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FOREWORD

Climate change is the justice challenge of our century, demanding unprecedented global and local legal, public policy and governance responses. The climate crisis undermines all possibility to advance our world's Sustainable Development Goals, impacting efforts to tackle poverty and hunger, to secure reliable access to health, education, clean water and energy, to protect life below water and on land. The most vulnerable face the heaviest and earliest burdens, but all of humanity is at stake. As we navigate an era marked by rising temperatures, intensifying floods, storms, droughts and wildfires, and escalating social and economic disruptions, the need for law and public policy insights to drive fast, effective climate action has never been more critical.

This issue of the *Cambridge Journal of Climate Research* reflects the urgency and importance of the challenge, particularly in its focus on climate law and policy. Convening diverse perspectives on the potential for legal and governance tools to catalyse transformative change in the face of mounting climate risks, the editors and authors of this collection offer a crucial and courageous contribution.

Among the central themes explored here are the evolving legal frameworks under the Paris Agreement, which frames international climate cooperation. Key in the discourse is the recognition that governance frameworks must extend far beyond ambition. They must reflect sustainability, equity and accountability, ensuring that all countries and communities, particularly the most vulnerable, are part of decision-making on all levels. Climate law and policy must prioritise the voices of those most affected by the crisis, while addressing historical responsibilities and future risks. Climate solutions must be inclusive, leveraging finance and investment, technology and science and community engagement, while advancing human rights, environmental and economic dimensions. The collection also underscores the dynamic and interdisciplinary nature of climate law and policy. It challenges scholars, practitioners, and policymakers alike to think critically and act boldly to shape legal and policy frameworks that are not only effective in curbing emissions but also in safeguarding human rights and ensuring sustainable development alternatives for generations to come. As we confront an increasingly volatile future, such dialogue and engagement is essential for forging new pathways toward global sustainability and justice.

The contributions in this issue of the *Cambridge Journal of Climate Research* offer a rich and nuanced exploration in climate studies, focusing on the growing centrality of legal and policy innovation in addressing the climate crisis. The *Journal's* division into shorter, summative "Insights" and longer, original "Articles" serves as a practical framework, engaging the reader's interest. The breadth of research presented here spans both theoretical and applied dimensions, showcasing the dynamic interplay between emerging legal principles and treaties, policy innovation, and practical solutions.

On the theoretical side, James Rice's compelling exploration of the 'just emissions' theory offers a critical contribution to governance and institutional philosophy, prompting fresh perspectives on equity in climate action. In contrast, more applied studies, such as Jilian Neufeldt's investigation into media framing of London's Ultra-Low Emissions Zone expansion and Tarlan Ahmadov's research on

Baltic bike-sharing schemes, provide practical insights grounded in qualitative content analysis. These works illuminate how localised strategies and narratives influence broader policy objectives. The diversity of methods and approaches offers new perspectives on common concerns. For instance, Khang Minh Pham's insightful application of orchestration theory to the International Maritime Organization's Polar Code complements Railla Veronica Puno's detailed analysis of synergies and conflicts in international law on oceans. Madelon van den Hoek Ostende considers the rights of nature approach in European law and jurisprudence touching especially on habitat protection in the Wadden Sea. Together, these pieces highlight the importance of strengthening regimes in global climate governance.

Indeed, legal scholarship is well represented, with further works addressing pressing justice and regulatory challenges. Tanvi Ajmera examines the criminalisation of environmental protestors and defenders. Anuttama Ghose and S M Aamir Ali offer a combined policy and legal analysis of climate refugees and displacement in the Sundarbans. Livia Ventura provides a comparative analysis of directors' duties in corporate law in relation to sustainability, whilst Eoin Jackson explores interactions of corporate law and the human right to a clean, healthy and sustainable environment, adding a critical rights-based perspective.

Technology, energy transitions and politics also emerge as central themes. Shrawani Shagun's study on space infrastructure links climate security to disaster reduction and food systems, while James Radford's examination of nuclear energy in Europe's net-zero ambitions and Murray Fallk's analysis of fracking's role in US elections highlight the nexus of technology and policy. Further, a notable feature of this issue is its embrace of underutilised methodologies. Paulina Gotz's work on the social acceptance of renewable energy in Germany and the collaborative study by Thant Thura Zan, Ida Dokk Smith and Indra Øverland on stakeholder dynamics in Indonesia's Just Energy Transition Partnership (JETP) underline the importance of qualitative research to uncover human dimensions often overlooked in climate governance. Rosie Alexandra Ward's careful statistical analysis of the UK's Contracts for Difference offshore wind scheme further underscores the methodological diversity and depth of this collection.

In addition, the inclusion of Oona Lagercrantz's fascinating literary and historical investigation into geoengineering in speculative fiction and practice offers a unique lens on how climate challenges have been envisioned across time. This interdisciplinary perspective reminds us of the importance of historical and cultural narratives in shaping present and future climate discourses.

The research presented in this issue of the Cambridge Journal of Climate Research underscores a fundamental truth: addressing the climate crisis requires a deeply interdisciplinary, innovative, and inclusive approach. As the contributions demonstrate, the challenges posed by climate change are as diverse as they are complex, calling attention to the evolving role of law and public policy as both a driver and a safeguard in the transition to a sustainable future. New research and teaching is urgently required to find and activate stronger, smarter public policy and legal instruments to address emerging challenges, whether by advancing innovative rights-based approaches, or by enhancing the regulatory frameworks governing financial structures, industries and technologies critical to achieving net-zero goals.

Yet, the climate crisis is not only a matter of policy, law, and technology—it is also a crisis of vision and knowledge. The future we seek shapes decisions taken today. The narratives we craft—as professors and researchers, policy leaders, professionals and practitioners—must inspire courage, creativity and commitment, while acknowledging the severity of the challenges ahead. As we stand at the crossroads of an uncertain future, the research presented in this *Journal* offers valuable insights and practical tools toward a more just and sustainable world.

The editorial team of this issue of the *Cambridge Journal of Climate Research* deserves particular recognition for their thoughtful curation and stewardship. Under the leadership of Editor-in-Chief Kaden Pradhan of Gonville and Caius College, the team has assembled an issue that not only reflects the diversity and complexity of climate research but also elevates its relevance for scholars, policymakers, and practitioners alike. The Senior Editors, Tamara Zambiasi of Newnham and Manav Divecha of Queens', alongside Associate Editors Lakshmi Rasipuram-Balakrishnan of St Edmund's, Siang Ern Lek of Hughes Hall, Apoorva Aladalli of Queens', Isabella Dressel of Churchill, and Sara Uddin Nasrat of Fitzwilliam, have demonstrated exceptional dedication in bringing this volume to fruition. Their collaborative effort is evident in the careful selection and refinement of contributions, ensuring both intellectual rigor and thematic coherence across the issue.

In guiding this project, the editors have balanced established voices and emerging perspectives, highlighting the interdisciplinary nature of climate research. Their emphasis on diverse methodologies and novel approaches underscores the importance of fostering innovative inquiry in this rapidly evolving field. Importantly, this editorial team also represents the next generation of climate leaders—early career scholars with the vision and commitment to advance knowledge and action on one of the most pressing issues of our time. Their work on this issue reflects a deep understanding of the interconnectedness of climate challenges and a willingness to engage with complexity and uncertainty. These qualities are essential for shaping the future of climate policy and law, as well as for building bridges across disciplines and sectors.

The editors' collective achievement in producing this special issue is more than an academic contribution; it is a call to action. By curating research that pushes boundaries, challenges assumptions, and highlights pathways for transformative change, they have made a meaningful contribution to the global discourse on climate governance.

It is an honour to commend their work to readers, and I look forward to encouraging these and further crucial efforts to advance climate scholarship, dialogue and action worldwide.

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PRESIDENTS' LETTER

Collaboration forms the backbone of the Cambridge Climate Society. We are a student-led society run by a committee of forty-three students; each of our teams mixes undergraduates with postgraduates, science with humanities, and vocational with technical.

The *Cambridge Journal of Climate Research* arose from a need to celebrate the diversity of climate expertise we have in and around Cambridge. We have specialists in climate law, policy and finance, as well as climate scientists and ecologists. Yet these academics are rarely in contact with one another, and their work is rarely shared across disciplines. We firmly believe that an interdisciplinary approach is the only approach that will work when it comes to creating and implementing holistic solutions for tackling the climate crisis and its socioeconomic consequences.

The *Cambridge Journal of Climate Research* has quickly proven itself a core pillar of the Cambridge Climate Society. Since the publication of its first issue just six months ago in May 2023, our Research Team has collated seventeen new insights and articles from academics all over the world.

This issue presents discussions of geoengineering alongside the legal rights of nature, and international oceans governance alongside a study of transnational corporate governance. Our ethos centres around the importance of bringing together a range of expertise and stakeholders in order to foster collaboration and collective action, whilst simultaneously celebrating the expertise each of our contributors has gained within their specific fields.

In a broader context, the issue recognises the contribution of a range of sectors towards causing the climate crisis, as well as the extreme vulnerability of many earth systems, industries and ways of life in the face of climate breakdown. However, the research collated here also crucially highlights the many avenues for transforming our existing systems. Every sector, and every individual, has the power to offer meaningful solutions—and it all starts with research.

We believe research is central to shaping the radical change that is needed. Research is how we create an evidence base, and evidence is how we gain the trust of industry and global leaders. Potential solutions require research in order to predict their outcomes and refine an idea until it is truly actionable. Even implementation stages require research; the re-evaluation of existing strategies is essential to ensure they are effective, and to allow these strategies to be adjusted and implemented elsewhere. Our hope is that the research presented across current and future issues of this *Journal* can contribute to this fundamental process.

The expertise collated in this issue has given us hope: we are surrounded by young people intent on making a change, though it may not always seem so. It can often feel like there is very little understanding of the urgency of the climate crisis, and the swiftly narrowing window of opportunity we have to make the necessary changes. In the Global North we are privileged to face only limited

effects of the climate crisis whilst continuing to be a major contributor. However, finding a driven and likeminded community is the first step to turning that doomerism into hope.

We offer a heartfelt thank you to our fantastic Research Team, led by Kaden Pradhan, Editor-in-Chief. Our other Research Officers, Tamara, Manav, Isabella and Lakshmi, have taken on the role of Senior and Associate Editors. We extend our thanks to Siang Ern, Apoorva, and Sara for joining us as Associate Editors for this issue of the *Cambridge Journal of Climate Research*.

The popularity of the *Journal* is evident through the sheer number of contributors, and the interest we have garnered throughout the University community, with so many students and scholars joining us as Editors. It has been a pleasure to work with you all, and we look forward to continuing to do so.

Shreya Patel, President, Cambridge Climate Society

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Politics and Fracking: A Case Study of Pennsylvania Elections

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KEYWORDS

energy, fracking, United States, politics, elections, campaigns

ABSTRACT

Over the past four years, hydraulic fracturing—or ‘fracking’, the combining of fracturing rock and horizontal drilling to extract oil and natural gas from shale deposits—has evolved into one of the most high-profile political issues in Pennsylvania, the second-highest producer of natural gas in the country. Although fracking began booming in the state around 2008, increased awareness of climate change and the need for urgent climate policy initiatives have facilitated fracking’s rise in politicians’ campaign agendas in recent years. Meanwhile, narratives highlighting fracking’s economic benefits to struggling rural portions of Pennsylvania—and the need for domestic drilling amid geopolitical tensions in Ukraine and the Middle East—have gripped recent political discourse. Consequently, fracking has evolved into a wedge issue between voters who view fracking as a boon for Pennsylvania’s economic development and national security and those who view the practice as environmentally destructive and feeding the country’s dependence on fossil fuels. With Pennsylvania’s growing importance in shaping the national political landscape, the goal of this summative piece is to explore fracking’s political and electoral role in Pennsylvania during the 2020 presidential election, 2022 senatorial election, and 2024 presidential election, when fracking served as a key issue during some of the most controversial and consequential elections in recent history.



I. The 2020 Presidential Election

As the 2020 presidential campaign approached its November end date, and as Pennsylvania appeared as a ‘must-win’ for then-President Donald Trump and former Vice President Joe Biden, fracking was elevated into a crucial political issue among candidates. With the natural gas industry contributing to

rural economies across the state¹—through royalty checks, employment, and philanthropic investments into rural communities—Trump and Biden’s embrace of fracking was predicated on the belief that Pennsylvanians support the practice and would respond to pro-fracking rhetoric. According to a Keiser Family Foundation /

¹ FTI Consulting. “Economic and Fiscal Impact of Pennsylvania Shale Gas Development Approach to Methodology and Results.” *Marcellus Shale Coalition*,

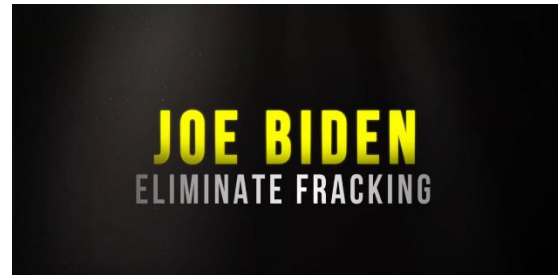
Aug. 2023; Augustine, John. “Impact Fees and Royalties Help Susquehanna County Community and Residents.” *Well Said Coterra*, 3 Jul. 2013.

Cook Political Report poll, in 2019, “57% of swing voters [in Pennsylvania said] a fracking ban is a bad idea.”² A 2020 Muhlenberg College / Morning Call poll found that over 40% of Pennsylvania voters “disagree with placing a moratorium on fracking in the state.”³

These campaign strategies were evident during the final presidential debate, when Donald Trump attacked Joe Biden for his previous stances on fracking, warning Pennsylvania voters that Biden would ban the practice if elected: “... he was against fracking. He said it. I will show that to you tomorrow. ‘I am against fracking’, until he got the nomination, went to Pennsylvania [then] he said ... you know what, Pennsylvania? He’ll be against it very soon because his party is totally against it.”⁴

To further portray Joe Biden as a threat to fracking and the Pennsylvania economy, Trump released a campaign ad days before the election. Eerie background music complemented the threatening messages which billowed on the screen, including, “Joe Biden will end fracking” and “Western Pennsylvania will lose hundreds of thousands of jobs.” The ad ended with the warning: “[A Biden fracking ban is] the end of a lot of livelihoods.”⁵

Other pro-Trump ads echoed a similar message, warning Joe Biden’s position on fracking would eliminate Pennsylvania jobs and decimate the state’s economy.



Source: America First Action Super PAC. “Impact.” YouTube, June 19, 2020.



Source: America First Action Super PAC. “Sick.” YouTube, October 23, 2020.

For his part, Biden refuted Trump’s claims, positioning himself as a pro-fracking moderate attempting to appeal to blue collar workers in rural districts as well as more environmentally conscious voters in the state’s urban districts, such as Philadelphia and Pittsburgh.⁶ While Biden did reiterate his prior statement that fracking should be prohibited on federal land, he argued: “I have never said I oppose fracking ... I do rule out banning fracking because the answer we need ... we need other industries to transition to get to, ultimately, a complete zero emissions by 2025. What I will do with fracking over time is make sure that we can capture the emissions from the fracking...”⁷

² “A Year from 2020 Election, Polling in Four Former ‘Blue Wall’ States – Michigan, Minnesota, Pennsylvania, and Wisconsin – Finds President Trump Is Voters’ Biggest Motivator.” *KFF*, 7 Nov. 2019.

³ Cole, John. “Pro-Trump Pac Hits Biden on Fracking and Coal.” *PoliticsPA*, June 9, 2020; “Muhlenberg College/Morning Call Pennsylvania Presidential Election Survey: February 2020.” *Muhlenberg College*, 2020.

⁴ Trump, Donald. “Debate Transcript: Trump, Biden Final Presidential Debate Moderated by Kristen Welker.” *USA Today*, 23 Oct. 2020.

⁵ Trump, Donald. “Joe Biden Will Ban Fracking and Destroy the Energy Industry.” *YouTube*, 23 Oct. 2020.

⁶ Friedman, Lisa. “Trump’s ‘Frack’ Attack on Biden Seems to Be Falling Short.” *New York Times*, 18 Oct. 2020.

⁷ Biden, Joe. “Debate Transcript: Trump, Biden Final Presidential Debate Moderated by Kristen Welker.” *USA Today*, 23 Oct. 2020.

Despite Trump's warnings of looming economic doom in Pennsylvania if Biden was elected, Trump narrowly lost the state by less than two percentage points.⁸ Trump's appeal to rural portions of the state likely to be more receptive to fracking was insufficient in counteracting the Democratic election returns of urban, more densely populated regions of Pennsylvania, where climate change and renewable energy are typically viewed as more salient issues.

Fracking may not have been the sole issue in Pennsylvania's 2020 presidential election, but it proved crucial enough to dominate the news cycle⁹ while forcing Biden to consistently play defence on an issue so tightly wound into Pennsylvania's political fabric.

II. The 2022 Senate Race

Donald Trump may have lost Pennsylvania, despite his onslaught of attacks on Joe Biden and Democrats on fracking. However, that does not mean the issue took a back seat during the 2022 consequential senate race. With the retirement of Republican Senator Patrick Toomey, Democrats sought to gain his seat in the Senate chamber. GOP nominee Mehmet Oz, more commonly known as his TV name, "Dr. Oz," and then-Lieutenant Governor John Fetterman, a Democrat, faced off in the high-stakes general election. Just as in 2020, fracking emerged as a consequential topic. Both candidates used their claimed support of fracking as a wedge issue in an effort to differentiate themselves from one another, appeal to rural portions of the state which economically benefit from drilling, and distance themselves from their previously critical comments of the practice.

On his official campaign website, Oz framed natural gas as both an economic and domestic energy issue, arguing:

"Pennsylvania is a leader in the production of natural gas and coal. The Biden Administration has launched an attack on the energy industry stifling domestic energy production and weakening the U.S. position in energy production. These attacks have resulted in skyrocketing gas and energy prices and made our current energy options less reliable. Dr. Oz will work to overturn these heavy-handed regulations that are hurting Pennsylvania jobs and our local communities."¹⁰

During a debate just days before the general election, Oz reiterated his support for fracking, attempting to contrast his position with Fetterman's:

"I've been very consistent. Fracking has been demonstrated, it's a very old technology, to be safe. It is a lifeline for this commonwealth to be able to build wealth similar to what they've been able to achieve in other states. For that reason, I strongly support fracking, drilling, the piping of that natural gas ... John Fetterman calls fracking a stain on Pennsylvania. He says that he will sign a moratorium to ban its continued use. He's against pipelines ... He supports Biden's desire to ban fracking on public lands, which are our lands, all of our lands together ... If we unleashed our energy here in Pennsylvania, it would help everybody. Why John Fetterman is so rigidly stuck on fighting against energy companies is stunning to me because it's the jobs I want, tens of thousands of high paying jobs to help Pennsylvanians."¹¹

Fetterman also discussed his views on fracking in the debate:

"I've always supported fracking and I always believe that independence with our energy is critical. We can't be held ransom to somebody like Russia ... I've never taken any money from their industry, but I support how critical it is

⁸ "Election Results." *Politico*, 6 Jan. 2021.

⁹ Levy, Marc. "Trump Intensifies Fracking Assault on Biden in Pennsylvania." *AP News*, 25 Oct. 2020; Sokolove, Michael. "Will Trump Win Pennsylvania Again?" *New York Times*, 10 Sep. 2020.

¹⁰ Oz, Mehmet. "Energy Independence." *Dr. Oz U.S. Senate Webpage*.

¹¹ Oz, Mehmet. "U.S. Senate Debate between Mehmet Oz and John Fetterman." *Rev*, 26 Oct. 2022.

that we produce our own energy and create energy independence.”¹²

However, both candidates’ professed support for fracking contrasted with their prior public remarks. In 2018, Fetterman revealed that he does not “support fracking at all and I never have.”¹³ Moreover, Fetterman signed a 2016 pledge ratifying his support for a fracking moratorium in Pennsylvania.¹⁴ Oz and his co-author previously wrote in 2014 that “[w]e wonder how eager the leaders of the natural gas industry would be to drink well water from a farm next to one of their drilling sites” and “... everyone would be best served by the policy adopted in New York state: No fracking until results of a state department of health study become available.”¹⁵ He is also listed as a co-author of a 2015 article with the sarcastic title: “Surprise! Fracking May Cause Birth Defects.”¹⁶



Attack ad against John Fetterman for his flip flopping over the issue of fracking. Source: “F&PPAC ‘Fracking’ 30s - PA.” YouTube, 2022.

Oz and Fetterman’s purported turnaround signalled the potential political importance of supporting the natural gas industry in Pennsylvania and the liability of maintaining negative fracking viewpoints. A 2022 poll revealed that nearly half of Pennsylvania residents supported natural gas extraction.¹⁷

Consequently, the candidates’ emphasis on fracking, particularly as election day loomed, is emblematic of the belief that securing victory in Pennsylvania required commitment to the natural gas industry. In both 2020 and 2022, it was the Democratic candidates playing defence, fighting relentless attacks from their Republican challengers on the issue. However, just as in 2020, the Democrats prevailed. Fetterman defeated Oz by nearly five percentage points.

III. The 2024 Presidential Election

As of this writing, the 2024 presidential election between former president Donald Trump and Vice President Kamala Harris is in its final weeks. For Trump and Harris, Pennsylvania is a must-win state. “It’s hard to see a path to the White House for either candidate that doesn’t run through Pennsylvania. Pennsylvania is crucial when it comes to the electoral map,”¹⁸ CBS News’ chief election and campaign correspondent recently remarked.

Although this paper does not benefit from hindsight in its exploration of fracking and the 2024 election, natural gas extraction has emerged as a prominent issue for both political campaigns in Pennsylvania. Similarly to the 2020 presidential election and the 2022 senate race, both candidates view opposition to fracking as a potential losing position. During their first, and possibly only, presidential debate, Trump portrayed Harris as anti-fracking and as a candidate whose presidency would harm Pennsylvania’s natural gas industry. Harris, running for president in 2019, did endorse a ban on fracking,¹⁹ but has shifted to a pro-fracking candidate. Ms. Harris defended her pro-

¹² Fetterman, John. “U.S. Senate Debate between Mehmet Oz and John Fetterman.” Rev, 26 Oct. 2022.

¹³ Fetterman, John. “Joy Marie Mann - Savage Joy with Mayor John Fetterman Who Is Running for PA Lt Gov.” YouTube, May 15, 2018.

¹⁴ Kaczynski, Andrew, and Olivia Alafritz. “John Fetterman Said He’s ‘Always Supported’ Fracking – He Previously Said ‘I Don’t’ and ‘Never Have’.” CNN, 18 Oct. 2022.

¹⁵ Oz, Mehmet, and Mike Roizen. “Why Fracking Needs to Wait for Results of Health Studies.” HT Health, 31 Oct. 2014.

¹⁶ Oz, Mehmet, and Mike Roizen. “Surprise! Fracking May Cause Birth Defects.” Newsmax, 9 Jan. 2015.

¹⁷ “Muhlenberg College Institute of Public Opinion & Sustainability Studies Program | 2022 Pennsylvania Climate and Energy Survey.” Muhlenberg College, 2022.

¹⁸ Costa, Robert, and Jon Delano. “Pennsylvania is the Key to the White House, Chief CBS News Elections Correspondent Says.” CBS News, 27 Sep. 2024.

¹⁹ Harris, Kamala. “Kamala Harris Discusses Fracking at CNN Town Hall.” YouTube, 9 Oct. 2019.

fracking stance during an August CNN interview shortly after her Democratic Party nomination,²⁰ as well as in the debate where she argued:

“... let’s talk about fracking because we’re here in Pennsylvania. I made that very clear in 2020. I will not ban fracking. I have not banned fracking as Vice President of the United States. And, in fact, I was the tie-breaking vote on the Inflation Reduction Act, which opened new leases for fracking...”²¹

Similarly to the 2020 presidential election against Biden, Trump has unleashed an onslaught of attacks against Harris for her previous positions on fracking, releasing an ad warning of impending job cuts and rises in energy prices if Harris is elected and bans the practice.



Trump advertisement warning voters about Harris’s purported stance on fracking. Source: X (formerly Twitter), Sep. 11, 2024.

It is unclear the effectiveness of these attacks or defences presented by the Trump and Harris campaigns in persuading voters. It is also unclear whether fracking will be a focal point for voters in the 2024 election, as other pertinent issues, such as abortion, inflation, and threats to democracy, loom over the electorate. Retrospective analyses dissecting the eventual electoral outcome will be an important post-election effort.

Moreover, a critical event of note is the recent pullback of drilling in Pennsylvania amid persistently low natural gas prices.²² For example, one of the most prolific fracking companies in Susquehanna County, Pennsylvania, Coterra Energy, recently announced a pause on new drilling.²³ Post-election analyses should examine any electoral consequences due to the reduction in fracking and subsequent economic fallout from such a pause—for instance, does the electorate blame the incumbent administration for low natural gas prices, decreases in fracking activity, and potential reductions in employment?

IV. Conclusion

No matter its salience, and no matter the actual benefits of fracking to the state, candidates’ calculations reveal pro-fracking positions have greater political value than anti-fracking stances across 2020, 2022 and 2024 federal elections. Evidence in my own research suggests that to many constituents—including in fracking-intensive rural regions—fracking is not a critical political issue. However, to some residents whose livelihoods have been either positively impacted by drilling (by, for example, industry employment or receiving royalty checks) or negatively affected (by, for instance, polluted water, air quality concerns, or adverse health effects), fracking may indeed shape their voting behaviour. Although fracking was not a significant political issue in Pennsylvania’s 2022 gubernatorial election—possibly due to the unfavorability of the Republican nominee and concerns over his reportedly radical policy ideas—some voters for Democrat Josh Shapiro, who, as Attorney General, criminally charged a fracking company with polluting

²⁰ Liptak, Kevin. “Harris Explains in Exclusive CNN Interview Why She’s Shifted Her Position on Key Issues Since Her First Run for President.” CNN, 29 Aug. 2024.

²¹ Harris, Kamala, and Riley Hoffman. “READ: Harris-Trump Presidential Debate Transcript.” ABC News, 11 Sep. 2024.

²² Phillips, Susan. “Fracking in Pennsylvania Hasn’t Gone as Well as Some May Think.” WHYY, 1 Oct. 2024; *Natural*

Gas Quarterly Update: Q2 April to June 2024.

Pennsylvania Independent Fiscal Office, 2024.

²³ SA Transcripts. “Coterra Energy Inc. (CTRA) Barclays 38th Annual CEO Energy-Power Conference (Transcript).” Seeking Alpha, 4 Sep. 2024; “Coterra Stops Drilling New Wells in Marcellus, Fracking Ends Soon.” *Marcellus Drilling News*, 10 Sep. 2024.

residents' water,²⁴ viewed Shapiro's reversal on fracking as a stab in the back.

Ultimately, fracking is not going away anytime soon, at least as a federal election issue. Interestingly, fracking has not gained traction among local campaigns in Pennsylvania. While it is challenging to speculate why, one reason may be the emergence of other pressing issues facing local communities and the state, such as COVID recovery and abortion rights. Additional academic research and polling is required to understand why fracking emerges in some elections and not others. In the meantime, the 2020, 2022, and 2024 election cycles prove that as long as there is fracking, there is controversy.

²⁴ "AG Shapiro and 43rd Statewide Grand Jury File Criminal Charges against NEPA Fracking Company." *Pennsylvania Attorney General*, 15 June 2020.

An Orchestrated Governance Approach: Tracing the International Maritime Organization's Development and Adoption of the Polar Code

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KEYWORDS

IMO, Polar Code, Arctic shipping, orchestration, maritime governance

ABSTRACT

The increase in Arctic maritime traffic induced by climate change has prompted the International Maritime Organization (IMO) to develop and adopt the International Code for Ships Operating in Polar Waters (Polar Code). While previous research on the governance of the IMO in the Arctic has addressed topics such as plastic waste management, the normative influence of international bureaucracies, and the implementation of the Polar Code from state and industrial perspectives, no study has specifically applied the concept of orchestration to Arctic maritime shipping and the development and adoption of the Polar Code. This paper seeks to fill this gap by using orchestration as an analytical framework to examine how the IMO orchestrated the development and adoption of the Polar Code, especially in response to climate-induced challenges. The analysis draws on documents from the IMO and Arctic Council (AC), along with previous research on Arctic shipping. Qualitative discourse analysis and process tracing are used to explore the data. Findings suggest that the IMO's orchestration was facilitated by its recognized leadership in maritime governance, but was constrained by capability deficits in Arctic-specific issues. The organization navigated divergent stakeholder interests and sovereignty concerns by engaging the AC and Arctic states as key intermediaries. Orchestration enabled the creation of a comprehensive regulatory framework balancing safety, environmental protection, and commercial interests. However, the article also reveals limitations in addressing critical issues such as the use of heavy fuel oil. These findings contribute to the array of empirical evidence on transnational environmental governance and the evolving regulatory landscape in polar regions.



I. Introduction

As Arctic waters become more navigable due to rapid climate-induced warming and sea ice decline, maritime traffic has increased, thus creating a need for new regulations. Established by the 1948 United Nations Maritime Conference as the United Nations (UN) specialised agency for regulating international shipping, the International Maritime Organization (IMO) has played a pivotal role in addressing this challenge through the development and adoption of the International Code for Ships Operating in Polar Waters (the 'Polar Code'). Research on the governance of the IMO in the Arctic has explored various themes, including the governance of plastic waste¹ and the normative influence of international bureaucracies.² Numerous studies have examined how the Polar Code is implemented in Arctic maritime shipping from both state and industrial perspectives.³ While previous research has examined the IMO's orchestration efforts in the environmental governance of maritime shipping in a broader context,⁴ no study has applied orchestration within the context of Arctic maritime shipping as well as the development and adoption process of the Polar Code. This paper addresses this gap by exploring the research

question: "how has the IMO orchestrated the development and adoption of the Polar Code in response to climate change?"

To address this question, this paper employs orchestration as an analytical framework which explains how intergovernmental organizations (IGOs) leverage intermediaries to govern target actors toward their desired outcomes when they lack direct authority. It argues that the IMO's success in developing and adopting the Polar Code stems from its recognized leadership in maritime governance, though constrained by Arctic-specific capability deficits. By engaging the Arctic Council (AC) and Arctic states as key intermediaries, the IMO effectively balanced safety, environmental protection, and commercial interests.⁵ However, critical gaps remain, particularly regarding heavy fuel oil (HFO) use. This paper primarily relies on document analysis to examine conventions, codes, amendments, and resolutions from the IMO and the AC. Additionally, it considers previous academic research, including scholarly articles and research papers on maritime safety, environmental protection, and Arctic shipping. The data are examined using qualitative discourse analysis, with findings interpreted through the lens of

¹ Cowan, Emily, et al. "Orchestration within Plastics Governance – From Global to Arctic." *Marine Pollution Bulletin*, vol. 197, Dec. 2023, p. 115635.

² Odgaard, Liselotte, and Kathryn C Lavelle. "The Arctic Council, the International Maritime Organization, and the Polar Code." *Environment and Security*, vol. 1, no. 3–4, May 2023, pp. 103–20.

³ Hartmann, Jacques. "Regulating Shipping in the Arctic Ocean: An Analysis of State Practice." *Ocean Development & International Law*, vol. 49, no. 3, June 2018, pp. 276–99; Bogner-Lahr, Dorottya. "In the Same Boat? A Comparative Analysis of the Approaches of Russia and Canada in the Negotiation of the IMO's Mandatory Polar Code." *Ocean Development and International Law*, vol. 51, no. 2, Nov. 2019, pp. 143–61; Chircop, Aldo, and Miriam Czarski. "Polar Code Implementation in the Arctic Five: Has Harmonisation of National Legislation Recommended by AMSA Been Achieved?" *Polar Journal*, vol. 10, no. 2, Jul. 2020, pp. 303–21; Fedi, Laurent, et al. "Mapping and Analysis of Maritime Accidents in the Russian Arctic through the Lens of the Polar Code and POLARIS System." *Marine Policy*, vol. 118, Aug. 2020, p. 103984; Hebbar, Anish Arvind, et al. "The IMO Regulatory Framework for Arctic Shipping: Risk Perspectives and Goal-Based Pathways." *Springer Polar*

Sciences, 2020, pp. 229–47; Karahalil, Meriç, et al. "Polar Code Application Areas in the Arctic." *WMU Journal of Maritime Affairs*, vol. 19, no. 2, May 2020, pp. 219–34; Engtrø, Espen. "A Discussion on the Implementation of the Polar Code and the STCW Convention's Training Requirements for Ice Navigation in Polar Waters." *Journal of Transportation Security*, vol. 15, no. 1–2, Apr. 2022, pp. 41–67; Browne, Thomas, et al. "A Method for Evaluating Operational Implications of Regulatory Constraints on Arctic Shipping." *Marine Policy*, vol. 135, Jan. 2022, p. 104839.

⁴ Lister, Jane, et al. "Orchestrating Transnational Environmental Governance in Maritime Shipping." *Global Environmental Change*, vol. 34, Sept. 2015, pp. 185–95.

⁵ The Arctic Council (AC) is a high-level intergovernmental forum established in 1996 to promote cooperation among Arctic states and indigenous communities on sustainable development and environmental protection in the Arctic region through consensus-based decision-making. The Arctic states are the eight countries with territorial claims or significant interests in the Arctic region: Canada, Denmark (including Greenland), Finland, Iceland, Norway, Russia, Sweden, and the United States (via Alaska).

orchestration. Process tracing is used to identify the IMO's orchestration approach in developing and adopting the Polar Code in coordination with suitable intermediaries.

While acknowledging the involvement of various stakeholders, such as Indigenous communities, the primary focus of this paper is on the IMO's orchestration efforts in the development and adoption process of the Polar Code to provide a comprehensive analysis of the IMO's strategies, capabilities, and challenges in navigating complex stakeholder dynamics. As a result, the paper does not explore the roles of other actors in depth. Moreover, while both the Arctic and Antarctic regions are governed by the Polar Code for shipping, this paper concentrates on the Arctic. Unlike Antarctica, which is an uninhabited continent surrounded by ocean and used solely for scientific research stations, the Arctic is an ocean covered by ice caps, surrounded by sovereign states, and inhabited by indigenous populations who have lived there for over 10,000 years with diverse cultures, languages, and traditions.⁶ These fundamental differences shape distinct maritime operational contexts and governance needs, as the Arctic operates under a more decentralised and fragmented governance framework. The Arctic is overseen by the AC, which is a soft law regime that can only make advisory recommendations with multiple overlapping treaties and agreements.⁷ In contrast, Antarctica is managed under the Antarctic Treaty System, a legally binding framework widely accepted internationally since the mid-twentieth century.⁸ These complexities in the Arctic,

particularly its reliance on soft-law mechanisms, make it a particularly compelling test case for orchestration.

The article proceeds in four additional Sections. Section II expands on the climate change implications for Arctic maritime governance to provide context for understanding the necessity of the Polar Code in addressing these climate-induced challenges. Section III reviews orchestration and applies it to Arctic maritime governance. Section IV discusses the hypotheses that have guided the development and adoption of the Polar Code. Section V concludes with some reflections.

II. Climate Change and its Implications for Arctic Maritime Governance

A. Climate Change and Rapid Environmental Shifts in the Arctic: Opportunities and Challenges

The Arctic is warming at a rate that is approximately four to seven times faster than the global average.⁹ This rapid warming has resulted in a significant decline in the extent and thickness of sea ice in the Arctic.¹⁰ Specifically, satellite observations since 1979 show that the September sea ice minimum has declined by approximately 13 percent per decade.¹¹ As a result, new shipping routes, such as the Northern Sea Route (NSR) along Russia's Arctic coast and the Northwest Passage (NWP) through the Canadian archipelago, are becoming more accessible. This trend is evidenced by a rise in ship traffic across the Arctic. Over the past decade, ship numbers in the region have surged by 37 percent, and the total distance sailed by all

⁶ Lennon, Erika. "A Tale of Two Poles: A Comparative Look at the Legal Regimes in the Arctic and the Antarctic." *Sustainable Development Law and Policy*, vol. 8, no. 3, 14, 2008, pp. 32–36; Stephen, Kathrin. "The Arctic vs. Antarctic—The Two Poles (Not) Compared." *The Arctic Institute—Center for Circumpolar Security Studies*, 22 Jan. 2024. As of 2020, the Arctic is home to approximately 4 million people, about 10 percent of whom are indigenous. Antarctica has no permanent population, hosting only 1,000–4,000 scientists in temporary settlements at 85 research stations. Moreover, each region has a distinct climate conditions with temperatures ranging from -15 to -20°C in the Arctic and -50 to -57°C in Antarctica.

⁷ Such as the United Nations Convention on the Law of the Sea (UNCLOS), the 1973/78 International Convention for the Prevention of Pollution from Ships (MARPOL), and the Polar Bear Treaty; see Lennon (n 6) *supra*.

⁸ *ibid*.

⁹ Somerville, Paul, and Maxime Marin. "The Arctic is Warming Four Times Faster than the Global Average." *Risk Frontiers*, 12 Apr. 2023.

¹⁰ Sumata, Hiroshi, et al. "Regime Shift in Arctic Ocean Sea Ice Thickness." *Nature*, vol. 615, no. 7952, Mar. 2023, pp. 443–49.

¹¹ NASA Global Climate Change. "Arctic Sea Ice Minimum Extent." *Climate Change: Vital Signs of the Planet*.

vessels has increased by an impressive 111 percent.¹² Specifically, the number of ships in the Arctic has risen from 1,298 in 2013 to 1,782 in 2023, which signals a steady upward trend.¹³ Notably, fishing vessels made up 41 percent of all ships in the region in 2023, while other vessel types¹⁴ are also becoming increasingly common.¹⁵

These developments present significant economic opportunities, particularly in shipping and resource extraction. The NSR, for example, could reduce the travel distance between Europe and Asia by approximately 8,000 kilometres.¹⁶ This offers an alternative to traditional shipping lanes such as the Red Sea and the Suez Canal, especially when these have become increasingly costly and associated with security risks.¹⁷ Additionally, the Arctic is estimated to hold about 13 percent of the world's untapped oil and 30 percent of its natural gas.¹⁸ The melting sea ice is also exposing an estimated USD 1 trillion worth of metals and minerals.¹⁹ As these resources become more accessible, the region has attracted increased investment in oil and gas exploration. Currently, the Arctic supplies 10 percent of the world's commercial oil and 25 percent of its natural gas.²⁰ With key basins such as the Kronprins Christian and Baffin Bay becoming future targets for extraction, the region's economic potential continues to grow.

However, these developments come with significant environmental challenges. One major concern is the risk of oil spills, which could be catastrophic in the Arctic's fragile ecosystem, given the difficulty of responding to accidents in such remote and harsh conditions. Additionally, many vessels rely on HFO, which produces high levels of black carbon and other pollutants. Operational discharges of chemicals, untreated 'grey water',²¹ and garbage further threaten Arctic waters, while the introduction of invasive species through ballast water or hull fouling poses risks to native ecosystems.

In particular, black carbon emissions from ships can accelerate local warming by reducing ice albedo.²² Estimates suggest that black carbon has a warming impact that is seven to ten times greater when deposited on snow or ice compared to its effect on the atmosphere.²³ Although shipping only accounts for about 2 percent of black carbon emissions in the Arctic, its impact is disproportionately high because the particles are emitted at low altitudes and are more likely to settle on ice and snow.²⁴ The increased use of HFO, which emits high levels of black carbon, also worsens this issue, with emissions from Arctic shipping rising by 85 percent between 2015 and 2019.²⁵ As sea ice continues to melt, opening up new shipping routes, this vicious cycle of warming and ice loss may continue unless stricter regulations on fuel types and emissions are implemented.

¹² *The Increase in Arctic Shipping 2013-2023: Arctic Shipping Status Report (ASSR) #1*. The Arctic Council Working Group on the Protection of the Arctic Marine Environment (PAME), Jan. 2022.

¹³ *ibid.*

¹⁴ Including cruise ships, bulk carriers, and private yachts.

¹⁵ PAME (n 12) *supra*; Raspotnik, Andreas. "Revisiting the Polar Code: Where Do We Stand?" *The Arctic Institute—Center for Circumpolar Security Studies*, 17 Jan. 2024.

¹⁶ *Shifting Ice: Russia's Increasing Reliance on the Private Sector and the PRC in the Arctic*. Strider Global Intelligence, 7 Feb. 2024.

¹⁷ Detsch, Jack, and Robbie Gramer. "Arctic Geopolitics: Russia and China Eye New Trade Routes in the High North." *Foreign Policy*, 30 May 2024.

¹⁸ This includes 90 billion barrels of oil, 1,669 trillion cubic feet of natural gas, and 44 billion barrels of natural gas liquids; see *Circum-Arctic Resource Appraisal*:

Estimates of Undiscovered Oil and Gas North of the Arctic Circle. USGS, 2008.

¹⁹ Cho, Renee. "What Lies Beneath Melting Glaciers and Thawing Permafrost?" *Columbia Climate School*, 13 Sept. 2022.

²⁰ "Oil and Gas." *Arctic Review*.

²¹ Wastewater from sinks, showers, and laundry.

²² When black carbon is emitted, it absorbs heat in the lower atmosphere, directly contributing to regional warming. As these particles settle on the Arctic's snow and ice surfaces, they reduce the albedo, or reflectivity, of these surfaces by making them to absorb more sunlight rather than reflect it.

²³ Prior, Sian. "How the Shipping Industry Can Halve Climate-Warming Black Carbon in the Arctic." *Climate Home News*, 18 Mar. 2021.

²⁴ *ibid.*

²⁵ *ibid.*

B. The Polar Code: Adaptation to Climate Change and Ongoing Challenges

The Polar Code was developed as a response to the increasing maritime risks posed by rapid Arctic climate change and the subsequent rise in polar shipping activity. As a comprehensive regulatory framework, it operates through amendments to three existing IMO conventions: the 1948 Safety of Life at Sea Convention (SOLAS), the 1973/78 International Convention for the Prevention of Pollution from Ships (MARPOL), and the 1978 International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers.²⁶ Through these amendments, the Polar Code aims to (i) ensure the maritime safety of ships, their crews, and passengers in harsh polar environments and (ii) protect the fragile polar regions from environmental hazards posed by increased shipping.

The Polar Code's structure reflects its dual focus on safety and environmental protection through a combination of mandatory and non-mandatory provisions. Part I focuses on maritime safety as a supplement to SOLAS²⁷ with two parts: mandatory safety measures (Part I-A) and additional guidance provisions²⁸ (Part I-B). Part II focuses on pollution prevention as a supplement to MARPOL to mitigate the environmental impact of increased Arctic and Antarctic shipping. Part II also includes mandatory pollution prevention measures²⁹ (Part II-A) as well as

non-binding guidance provisions (Part II-B) on various environmental practices.³⁰

The Polar Code implements these provisions through specific operational requirements tailored to the unique challenges of polar navigation. As sea ice conditions change, ships must be designed to handle varying ice conditions and extreme weather events. To mitigate the environmental impact of increased shipping in sensitive polar ecosystems, the Polar Code enforces stricter regulations on discharges and emissions. It also mandates enhanced safety and specialised training requirements to prevent accidents in remote areas and ensure that crews are well-prepared to face the challenges of polar navigation in a rapidly changing environment.

While the Polar Code represents a significant step forward in maritime safety and pollution prevention, it faces ongoing challenges. First, the current version does not fully account for climate-induced environmental impacts such as unusual storms and atmospheric rivers, which are becoming more frequent in polar regions.³¹ Second, the rapid pace of environmental change in the Arctic and Antarctic may necessitate more frequent updates to the Polar Code than initially anticipated.³² Third, the Polar Code represents a compromise between commercial and environmental concerns. For example, while it makes amendments to MARPOL to make

²⁶ International Convention for the Safety of Life at Sea (adopted 1 Nov. 1974, in force 25 May 1980) 1184 UNTS 2 (SOLAS); International Convention for the Prevention of Pollution from Ships (adopted 2 Nov. 1973) 1340 UNTS 184, as amended by the Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships (adopted on 17 Feb. 1978, in force on 2 Oct. 1983) 1340 UNTS 61 (MARPOL); International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (adopted 7 Jul. 1978, entered into force 28 Apr. 1984) 1361 UNTS 190.

²⁷ The Polar Code is further supported by a new SOLAS Chapter XIV concerning safety measures around design, equipment, operations, and manning for ships operating in polar waters.

²⁸ Guidance provisions in Part I-B are meant for ship owners and operators to provide details on how to comply with mandatory measures in Part I-A.

²⁹ These measures include legally binding provisions covering various aspects of managing maritime pollution, including oil (Annex I), noxious liquid substances carried in bulk (Annex II), sewage (Annex IV), and garbage (Annex V).

³⁰ Part II-B includes suggestions on how ship owners and operators can further reduce their environmental impact in polar areas by using safer materials such as eco-friendly oils or water-based coatings on underwater hulls; managing waste and harmful substances such as noxious liquid substances, animal carcasses, ballast water, and biofouling; and following voluntary restrictions such as the ban on heavy fuel oil used in polar waters.

³¹ Uryupova, Ekaterina. "Climate Change and Challenges of Navigation in the Arctic: How Safe are We?" *The Arctic Institute—Center for Circumpolar Security Studies*, 30 Apr. 2024.

³² Raspotnik (n 15) *supra*.

certain environmental provisions mandatory, it does not ban the use of HFO, which remains a significant environmental concern. This compromise highlights the ongoing tension between facilitating Arctic shipping development and ensuring robust environmental protection.

These challenges underscore the dynamic nature of Arctic maritime governance and the need for continued evolution of the Polar Code's regulatory framework. As both environmental conditions and shipping patterns continue to change, the ability to adapt and strengthen these regulations while maintaining effective implementation becomes increasingly critical for a sustainable Arctic maritime shipping future.

III. The Analytical Framework: Orchestration

Orchestration has emerged as a significant analytical framework for understanding forms of indirect governance as it offers insights into how IGOs can influence the policies and behaviours of target actors indirectly, without direct authority.³³ At its core is the Orchestrator-Intermediaries-Target (O-I-T) model. In this model, the Orchestrator (typically an IGO) works through Intermediaries³⁴ when facing capability deficits or complex stakeholder dynamics by providing them with ideational and / or material support to govern Target actors³⁵ in pursuit of IGOs' governance goals.³⁶ This soft governance approach allows the Orchestrator to coordinate voluntary action without relying on hierarchical authority or hard-law binding agreements, which has been found to enhance

the support for and shape of regulations and their compliance.³⁷

In the context of Arctic maritime governance, the IMO, as the Orchestrator, faced three challenges in developing and adopting the Polar Code: regulatory competence, operational capacity, and legitimacy. These constraints led the IMO to adopt an orchestration approach, working through Intermediaries such as the AC and Arctic states, to govern Target actors (ship owners and operators) in pursuit of a sustainable Arctic maritime shipping future.³⁸

Orchestrator	Intermediaries	Target
IMO	AC, Arctic States	Ship owners and operators

Table 1: Overview of O-I-T for developing and adopting the Polar Code for Arctic Maritime Governance adapted from Abbott et al.³⁹

The paper proposes six hypotheses to guide the analysis, which are divided into two groups. The first group, assessing the IMO's governance capabilities and authority in general terms, includes the following four hypotheses:

- H1—Orchestrator Focality: The IMO, as a recognized leader in maritime safety and environmental protection, can more easily orchestrate.
- H2—Orchestrator Capabilities: The IMO orchestrates because it has moderate capability deficits (limited governance capabilities) in regulating maritime safety and environmental protection in the polar regions.
- H3—State Oversight: The IMO has more autonomy in low politics of safe

³³ Abbott, Kenneth W, et al. "Two Logics of Indirect Governance: Delegation and Orchestration." *British Journal of Political Science*, vol. 46, no. 4, July 2015, pp. 719–29. Notable examples include the European Union (EU) leveraging on the Body of European Regulators for Electronic Communications (BEREC) for regulatory guidance, the United Nations Environment Programme (UNEP) and the United Nations Global Compact (UNGC) collaborating to develop and adopt the Principles for Responsible Investment (PRI), and the World Health Organization (WHO) engaging in public-private partnerships such as those with the Gates Foundation.

³⁴ Such as non-governmental organizations, business organizations, public-private partnerships, trans-governmental networks, and other IGOs.

³⁵ States or private entities.

³⁶ Abbott, Kenneth W, et al. "Orchestration: Global Governance through Intermediaries." *Social Science Research Network*, Jan. 2012.

³⁷ Cowan (n 1) *supra*.

³⁸ This goal encompasses: (i) ensuring maritime safety in harsh polar environments, (ii) protecting fragile polar ecosystems from increased shipping activity, and (iii) balancing economic opportunities with environmental conservation.

³⁹ Abbott et al. (n 36) *supra*.

ship operations and the protection of the polar environments compared to core areas of national sovereignty.

- H4—Orchestrator Entrepreneurship: The IMO encourages the development of new measures to meet the Polar Code's high standards.

The second group, focusing on the IMO's orchestration efforts in developing and adopting the Polar Code, includes the remaining two hypotheses:

- H5—Goal Divergence: The IMO orchestrates when there is a divergence of goals among different Arctic stakeholders.
- H6—Intermediary Availability: The IMO orchestrates when suitable intermediaries with a correlated goal of a sustainable Arctic maritime shipping future and complementary capabilities exist.

IV. Discussion

A. *The General Governance Capabilities and Authority of the IMO as an Orchestrator*

The IMO's recognized leadership in maritime safety and environmental protection significantly facilitated its orchestration of the Polar Code. First, as discussed in Section II.B, the IMO has adopted various conventions and regulations related to maritime safety and environmental protection. Second, the IMO oversees the Convention on Facilitation of International Maritime Traffic (FAL), which demonstrates its dedication to preventing unnecessary maritime traffic delays and promoting procedural uniformity. Third, rapid climate-induced warming and sea ice decline created an urgent need for new shipping regulations. The IMO leveraged this shared concern to bring together the AC, Arctic states, and ship owners and operators to develop and adopt the Polar Code. Given these factors, the IMO is the natural focal point for developing Arctic shipping regulations, which supports H1.

Despite its leadership position, the IMO faces challenges in directly regulating maritime safety and environmental protection due to its limited governance capabilities, particularly

in the context of the Arctic. The existing IMO instruments such as SOLAS and FAL are not sufficiently designed to address the risks and conditions associated with shipping operations in remote, ice-covered polar waters. For example, issues such as operating on ice, extremely cold temperatures, high latitude navigational challenges, and the lack of emergency response infrastructure are not sufficiently covered in these instruments. These technical limitations are compounded by governance challenges. Despite the increase in HFO consumption and greenhouse gas emissions from shipping, no binding agreements on these emissions were made between 1997 and 2011, and the use of HFO remains unprohibited.

Additionally, the IMO's governance capabilities were particularly constrained by its institutional relationship with the AC. Although the Polar Code came into force in 2017, it was not until 2019 that the AC recognised the IMO as an observer. The granting of observer status in 2019 formalised the relationship between the IMO and the AC, yet this delayed formal recognition affected (i) the legitimacy of the IMO and the Polar Code, and (ii) the ability of the IMO and the AC to work together on issues related to maritime safety and environmental protection in polar waters. Hence, the IMO had to rely on the voluntary collaboration of the AC and Arctic states in developing and adopting the Polar Code due to its moderate capability deficit, which supports H2.

Combining binding agreements under hard law with advisory provisions under soft law, the structure of the Polar Code reflects a balance between IMO authority and state sovereignty. The Polar Code includes mandatory measures covering safety (Part I-A) and pollution prevention (Part II-A), where the IMO has the authority to compel state compliance. However, many provisions are non-mandatory (Parts I-B and II-B), which means that their effectiveness relies on voluntary compliance by ship owners and operators. This indicates limits on IMO autonomy, especially when regulations border

on sovereignty issues. Decisions on implementation measures are taken at the national level, which points to sovereignty boundaries constraining IMO oversight into core state functions and thus supports H3.

The IMO's entrepreneurial approach is also demonstrated in this structure. This approach enables flexible updates to recommendations as new climate-induced challenges emerge while maintaining regulatory consistency for maritime operations in polar waters. Specifically, under Part I-A, ship owners and operators are required to perform an operational assessment around design and construction, equipment, operational, and manning measures to determine the limitations of operating in their specific polar regions. The IMO stipulates high standards, but the responsibility is on the owners and operators to develop measures to meet these standards.⁴⁰ This structure encourages ship owners and operators to innovate tailored solutions for their vessels to operate in polar regions and to meet the Polar Code's high standards. This approach to fostering innovation extends beyond immediate compliance; it facilitates adaptation to new technologies and evolving conditions, particularly in response to climate change. Progress is already underway to expand the Polar Code's mandate to fishing and small vessels, pushing more ship owners and operators to devise innovations that meet standards.⁴¹ All of these factors support H4.

The IMO's entrepreneurial orchestration does not completely fit with the one indicated by Abbott et al.'s suggestion that orchestrator actors will orchestrate more when organisational structure and culture encourage policy entrepreneurship and risk-taking.⁴² Yet, it is argued that, rather than by direct policy innovation, the IMO drives entrepreneurship by creating conditions that compel ship owners and operators to develop

innovative solutions to meet regulatory requirements. By setting high benchmarks while adopting a flexible and entrepreneurial approach, the IMO drives ship owners and operators to continually push for new technological and operational solutions. This modified understanding of entrepreneurship not only supports H4 but also acknowledges its unique manifestation in the IMO context. The IMO's success in fostering innovation through regulatory frameworks rather than direct policy intervention represents an important evolution in our understanding of institutional entrepreneurship in international maritime governance.

B. *The IMO's Orchestration Efforts in Developing and Adopting the Polar Code*

The development of the Polar Code was a comprehensive process. In 1993, Canada led an external working group that produced the first draft code in 1998.⁴³ Building on this initial work, the IMO adopted voluntary Arctic guidelines for ships in 2002, which were expanded to cover all polar waters by 2010. Despite these measures, the Arctic states acknowledged the need for mandatory rules and regulations.⁴⁴ Additionally, in 2009, the AC conducted the Arctic Marine Shipping Assessment (AMSA), which explicitly called for the IMO to develop a mandatory Polar Code. This unified position from Arctic states and the AC set the stage for formal negotiations toward binding regulations.⁴⁵

The path to mandatory regulations, however, revealed deeply divergent interests among stakeholders. While the IMO's primary goals were to develop and adopt consistent minimum standards for ensuring safe maritime operations and protecting the polar environments, other stakeholders had varying perspectives.⁴⁶ For example, Russia adopted a more isolated stance by prioritising the protection of its shipping interests to minimise costs. This was demonstrated by its

⁴⁰ Brigham, Lawson. "The IMO Polar Code: Safety and Environmental Protection for Polar Waters. Proceedings: January 2024 Vol. 150/1/1,451." *U.S. Naval Institute*, 31 Dec. 2023.

⁴¹ *ibid.*

⁴² Abbott et al. (n 36) *supra*.

⁴³ Brigham (n 40) *supra*.

⁴⁴ *ibid.*

⁴⁵ *Arctic Marine Shipping Assessment: 2009 Report*. Arctic Council, 2009.

⁴⁶ Odgaard and Lavelle (n 2) *supra*.

efforts to seek exemptions from discharge bans for some of its vessels or limit its construction costs related to reception facilities.⁴⁷ Environmental non-profit organizations advocated for prohibitions on HFO usage and sewage / grey water discharges given the Arctic's low tolerance for pollution.⁴⁸ Non-Arctic states focused on enabling access and transit rights while showing enthusiasm for environmental protection.⁴⁹

The formal negotiation process began in 2011 when the IMO's Marine Environment Protection Committee and Maritime Safety Committee initiated discussions for a mandatory Polar Code. Key negotiators included Canada, Norway, the United States, and Russia. The Arctic states actively pursued the Tromsø Ministerial Meeting and AMSA Report recommendations to cooperate in the development of the Polar Code from 2009 to 2015.⁵⁰ These states also made numerous submissions, with Canada, Norway, Russia, and the US making the most extensive documentary contributions.⁵¹ Moreover, the AC's Protection of the Arctic Marine Environment (PAME) working group provided input and recommendations during the IMO negotiations between 2010 and 2013.⁵² This enabled the IMO to align the Polar Code with existing AC environmental protection efforts and the interests of Arctic states. The AC and its working groups helped build consensus among Arctic states and stakeholders on the need for mandatory shipping regulations in polar waters years before the adoption of the Polar Code.

The success of the Polar Code's development heavily relies on the IMO's engagement of intermediaries, particularly the AC and Arctic states. These intermediaries play a crucial role in bridging the gaps between competing interests, as they not only share the common

goal of a sustainable Arctic maritime shipping future but also possess governance capabilities such as local information, technical expertise, enforcement capacity, legitimacy, and direct access to Arctic stakeholders—capabilities the IMO lacks. The AC's role was especially important as it represented both the collective voice of Arctic states and Indigenous communities, even though individual Arctic states occasionally expressed different views based on their national interests during negotiations. This divergence of interests increased the IMO's ability to orchestrate a compromise solution without explicit approval from any one bloc. The final Polar Code represented a compromise between commercial and environmental concerns. For example, the Polar Code does not ban HFO usage while making amendments to MARPOL to make the environmental provisions of the Polar Code mandatory as shown in Part II-A.

Following the Polar Code's adoption in 2014 and its 2017 enforcement, the AC continued its intermediary role by developing the Arctic Shipping Best Practice Information Forum in 2017 to continue promoting implementation and compliance with the IMO regulations. This continued to integrate Arctic states, and ship owners and operators, to support IMO regulatory efforts for a sustainable Arctic maritime shipping future. The development process and outcome underscored the IMO's ability to orchestrate when stakeholders have divergent goals (H5) and the crucial role of effective intermediaries in successful orchestration (H6).

V. Conclusion

This paper has examined how the IMO orchestrated the development and adoption of the Polar Code through the lens of orchestration. The analysis, guided by six hypotheses, provides a comprehensive

⁴⁷ *ibid*; Bogнар, Dorottya. "Russia and the Polar Marine Environment: The Negotiation of the Environmental Protection Measures of the Mandatory Polar Code." *Review of European, Comparative and International Environmental Law*, vol. 27, no. 1, Mar. 2018, pp. 35–44.

⁴⁸ Odgaard and Lavelle (n 2) *supra*.

⁴⁹ Bai, Jiayu. "The IMO Polar Code: The Emerging Rules of Arctic Shipping Governance." *International Journal of Marine and Coastal Law*, vol. 30, no. 4, Nov. 2015, pp. 674–99.

⁵⁰ Chircop and Czarski (n 3) *supra*.

⁵¹ *ibid*.

⁵² Arctic Council (n 45) *supra*.

explanation of the IMO's orchestration in the development and adoption of the Polar Code.

The IMO's orchestration of the Polar Code was fundamentally shaped by its position as a focal point in maritime safety and environmental protection (H1). This established authority allowed the IMO to convene diverse stakeholders and lead the process of developing such regulations. However, the IMO's moderate capability deficits in specific issues (H2) necessitated a collaborative approach, driving the organization to engage with the AC and Arctic states as key intermediaries. The varying levels of state oversight (H3) influenced the structure of the Polar Code, resulting in a mix of mandatory and recommendatory provisions. This reflects the IMO's strategic navigation of state sovereignty concerns while pushing for comprehensive polar shipping regulations. The IMO's entrepreneurial approach (H4) in setting high standards while allowing flexibility in implementation encouraged innovation among ship owners and operators, demonstrating how orchestration can drive industry advancements.

This orchestration was made possible by the availability of suitable intermediaries (H6), namely the AC and Arctic states, who provided essential regional expertise and legitimacy to the process. The divergence of goals among Arctic stakeholders (H5) made the IMO's orchestration role crucial. By mediating between safety, commercial, and environmental interests, the IMO crafted a balanced solution in the Polar Code among various priorities.

A realist perspective suggests that Arctic states pursued the Polar Code largely out of their national interests concerning security, economic growth, and sovereignty. For instance, Russia's push for certain regulations may have reflected its commercial shipping priorities more than a collective aim. Nevertheless, despite these differences in national interests, there was a shared commitment among Arctic states to foster a sustainable future, as evidenced by their

general support for a binding Polar Code. This interplay between divergent national interests and shared goals aligns well with the concept of orchestration, which emphasises cooperation and collective action among diverse actors.

These hypotheses explain how the IMO was largely successful in orchestrating the development and adoption of the Polar Code. The IMO leveraged its authority and focality to lead the process while acknowledging its capability gaps and the need for collaboration. It navigated complex state oversight issues, encouraged industry innovation, mediated divergent stakeholder interests, and effectively leveraged intermediaries. This orchestration approach enabled the IMO to create a comprehensive and widely accepted set of regulations for Arctic shipping that would not have been achieved through direct regulation alone.

However, the need for consensus in this orchestration process led to compromises that may limit the Polar Code's effectiveness in addressing some critical issues. A prime example is the lack of a ban on HFO use in the Arctic, despite its significant environmental risks. While the Polar Code encourages ship owners and operators to apply the HFO ban, this remains a non-binding recommendation. This illustrates how orchestration, while effective in achieving agreement, may sometimes result in regulations that fall short of addressing the most pressing environmental concerns. As climate change accelerates in the Arctic, there may be a need for more rapid and stringent regulatory responses. Future orchestration efforts may need to find ways to balance consensus-building with the need for decisive action on critical issues. Furthermore, the effectiveness of the orchestration approach in ensuring compliance and enforcement remains to be seen. The IMO still lacks direct enforcement capabilities. The reliance on flag states and port states for implementation and enforcement could lead to inconsistencies in how the Polar Code is applied across Arctic regions.

The Silencing of the Peaceful Protestor: Is It Legitimate to Criminalise Environmental Defenders?

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KEYWORDS

environmental defenders, environmental protest, policing of protests

ABSTRACT

Environmental defenders remain highly vulnerable and under attack across the globe. This paper seeks to answer the question of whether it is legitimate to criminalise environmental defenders, and focuses predominantly on case studies arising from the Philippines and the United Kingdom. This paper is divided into five parts, and addresses (i) the act of protesting, (ii) debates surrounding the policing of protests, (iii) a consideration of the criminalisation of environmental defenders in the Philippines and (iv) the UK respectively, and (v) an inspection of what environmental protests, and the realities of its participants, might look like in the future. The paper ultimately concludes that criminalising environmental defenders is illegitimate and unacceptable, especially if their actions are deemed to be peaceful.



I. Introduction

Climate change is a realised global threat, evidenced by the obvious rise of “hotter temperatures, [the] warming [and] rising of oceans, [and] loss of species” globally.¹ Not only is it visibly detrimental to the environment, but the impacts of climate change have also transcended borders, and are being intensely felt by humans as well. This “human face of climate change” shows itself by “eroding human capital” which has a “disproportionate impact on poverty ... especially for the most vulnerable members of

society.”² This makes what once used to seem a faraway issue more personal. Despite these tragic realities, the validity of climate change is still argued and deliberated upon by many. Various individuals and organisations have, over the years, taken a stand to prove its validity and demonstrate its severity, arguing that humans must act with an urgency to solve the climate crisis.³ These individuals and organisations are defined as “environmental defenders,” as they “strive to protect and promote human rights relating to the environment.”⁴ They have channelled their

¹ “Causes and Effects of Climate Change.” *United Nations Webpage*.

² Pangestu, Mari. “The Human Face of Climate Change.” *World Bank Blogs*, 7 Nov. 2022.

³ Olzak, Susan, and Sarah Soule. “Cross-Cutting Influences of Environmental Protest and Legislation.” *Social Forces*, vol. 88, no. 1, 2009, pp. 201-225, at p. 203.

⁴ “Who Are Environmental Defenders?” *United Nations Environment Programme Blog*.

sense of anger through the medium of protest against governments, corporations, and companies that question and deny climate change, or ones that continue to create harms for the environment by their action or inaction. Environmental protests have been viewed as one of “the most effective” and “indispensable tools for raising public awareness in the hope of affecting change.”⁵ However, these defenders have been met with an “increasing [level of] stigmatization.”⁶ This has unfortunately also resulted in increased levels of criminalisation towards them. These criminalisation mechanisms manifest themselves in the form of fines, imprisonment, or even physical brutality in various cases. These will be discussed further throughout the article. Environmental defenders, thus, “remain highly vulnerable and under attack across the globe.”⁷

This article will seek to answer the question of whether it is legitimate to criminalise environmental defenders. To narrow its broad scope, the article will predominantly be focused on the case studies arising from the Philippines and the United Kingdom. This paper will be divided into five parts, addressing the act of protest, the debates surrounding the policing of protests, a consideration of the criminalisation of environmental defenders in the Philippines and the UK respectively, and an examination of what environmental protests, and the realities of its participants, might look like in the future. By engaging with legal doctrines and case studies, this article will ultimately conclude that criminalising environmental

defenders is illegitimate and unacceptable, especially if their actions are deemed to be peaceful.

II. The Act of Protest

Protest is said to be the “cornerstone of democracy” as well as a “fundamental liberty within [it]”⁸ as it gives individuals an avenue “within which dissent and opposition may be expressed outside of the formal political structures.”⁹ The influence of public opinion plays a crucial role in shaping and driving fundamental changes in policy.¹⁰ Social movements arising from protest are imperative as they help to connect diverse groups of people, and larger gatherings provide space for individuals to exchange ideas, learn from one another, and take collective action on their common goals.¹¹ Protests are crucial, and sometimes the only way of “challenging established privileges and shaking the existing institutions.”¹²

Protests are also integral to the legitimacy of civil society, defined by philosopher Antonio Gramsci as “organizations which generate opinions and goals with which they seek not only to influence public opinions and policies within existing structures and rules, but sometimes also to alter the structures and rules themselves.”¹³ The act of protest within this context has shaped public thought, and paved the way for revolutions historically. Contemporary activism utilises the act of protest to drive and foster change, which is evidenced through the momentum gained in the Feminist and the Black Lives Matter

⁵ Mijatović, Dunja. “Crackdowns on Peaceful Environmental Protests Should Stop and Give Way to More Social Dialogue.” *Council of Europe Commissioner for Human Rights: Human Rights Comments*, 2 June 2023.

⁶ *ibid.*

⁷ United Nations Environment Programme (n 4) *supra*.

⁸ Gilmore, Joanna. “‘This is Not A Riot!’: Regulation of Public Protest and the Impact of the Human Rights Act 1998.” PhD Thesis, University of Manchester, 2019, at p. 35.

⁹ Gilmore, Joanna, et al. *Keep Moving! Report on the Policing of the Barton Moss Community Protection Camp*. Centre for the Study of Crime, Criminalisation and Social Exclusion, Liverpool John Moores University, and Centre

for Urban Research (CURB), University of York, 2016, at p. 11.

¹⁰ Olzak and Soule (n 3) *supra*.

¹¹ Gerlach, Lisa. “The Structure of Social Movements: Environmental Activism and Its Opponents.” *Networks and Networks: The Future of Terror, Crime and Militancy*, edited by John Arquilla and David Ronfeldt, RAND Corporation, 2001, at p. 293.

¹² Mishra, Manisha. “Legitimate Protest in European Human Rights Law: A Critical Reconstruction.” *Cambridge Law Review*, vol. 7, no. 2, 2022, at p. 54.

¹³ Ward, Thomas, and Philip Green. “Civil Society and State Crime.” *Social Justice / Global Options*, vol. 27, no. 4, 2000, at p. 79.

movements.¹⁴ Therefore, protest and collective activism are paramount for ensuring that a society is democratic in its essence, and for the functioning of civil society. It is evident that “climate change has become a vector of political unrest” as it has significant influence and direct impact on individuals.¹⁵ This ensures that climate change and environmental protests are a “point of intense social interest” which now catalyses and influences individual and collective action for accountability even further around the world.¹⁶

Environment-specific protests, particularly, have involved individuals joining “local protests against nuclear power plants, state-level protests against offshore oil-drilling and protests claiming support for national-level policies favouring protection of the environment in general,” to name a few.¹⁷ An increased level of protest has also invariably led to an increased amount of resistance to it. The policing of protests has gained momentum over the years, particularly towards climate change protests, arguably because the environment is usually viewed as something arbitrary by states, who are often “unwilling to protect alternative (non-human) rights and rights claims.”¹⁸ The idea of policing protests will be considered in the next Section.

III. The Policing of Protests

The police and the state play a strategic role in influencing the future of protests and the consideration of democratic values. The police are at the forefront of criminal justice systems. Their statutory duties enable them to

arrest individuals that have broken the law, and ones that commit crimes and offenses, to effectively protect “public order and safety.”¹⁹ The “modern, professional, bureaucratized police” came into existence as “the best means of supplying the higher level of order demanded.”²⁰ They must work efficiently to protect both the state and its citizens. Public authorities like the police are consequently “under the legal obligation to protect” protestors, as well, especially in the jurisdictions discussed within the scope of this article.²¹ However, the order which they seek to establish in society has often come at the cost of these citizens’ right to free speech, assembly, and expression.²²

The intensification of the policing of protests is justified and legitimised by a state’s sovereignty: the “legal justification” being that the police exist to “prevent serious disorder, damage to property, disruption to the life of the community and intimidation”²³ and are “empowered to place restrictions on static and moving protests where serious disorder, disruption, damage or intimidation is feared.”²⁴ These elements are often hard to define, however. There is no clear recognition of what is considered to be a ‘serious disorder’ or ‘disruption’ and ‘intimidation’. The lack of specificity around these elements might be said to be quite problematic, as it could influence officers to use these discrepancies to their advantage when making wrongful arrests, which could lead to a higher number of false imprisonments.

¹⁴ Cohen, Cathy, and Stephen Jackson. “Ask A Feminist: A Conversation with Cathy Cohen on Black Lives Matter, Feminism and Contemporary Activism.” *Signs Journal*, 2015.

¹⁵ Brannen, Sherri, et al. “Root Causes of Unrest and Continued Increase in Global Uprisings: The Age of Mass Protests.” *Center for Strategic and International Studies (CSIS)*, 2020, p. 18.

¹⁶ *ibid* at p. 20.

¹⁷ Olzak and Soule (n 3) *supra*.

¹⁸ Parker, Gavin. “Rights, the Environment and Part V of the Criminal Justice and Public Order Act 1994.” *Area*, vol. 31, no. 1, 1994, at p. 79.

¹⁹ “The Role of a Police Officer.” *Bedfordshire Police Webpage*.

²⁰ Reiner, Robert. “Policing Protest: The Control of Mass Demonstrations in Western Democracies.” *Social Movements, Protest, and Contention*, edited by Donatella Della Porta and Hanspeter Reiter, University of Minnesota Press, 1998, at p. 38.

²¹ Dunja (n 5) *supra*.

²² *ibid*.

²³ Waddington, Patrick. “Coercion and Accommodation: Policing Public Order after the Public Order Act.” *British Journal of Sociology*, vol. 45, no. 3, 1994, at p. 372.

²⁴ “Take Back the Streets”: *Repression and Criminalization of Protest Around the World*. International Network of Civil Liberties Organizations, 2013, at p. 50.

There is now a ferocity with which protest and dissent is being silenced in both the Global North and South. International law instruments, like Principle 13 of the 1990 United Nations Basic Principles on the Use of Force and Firearms by Law Enforcement Officials, state that “law enforcement officials shall avoid the use of force, or where that is not practicable, shall restrict such force to the minimum extent necessary.”²⁵ However, in contemporary policing practices, as will be demonstrated through the case studies of the Philippines and the UK, these principles are rarely followed. The police are oftentimes unaware that “they operate within a liberal democracy in which their actions must be conspicuously ‘reasonable’ and not only strictly lawful.”²⁶ This heightens the intensity with which they operate, despite the fact that their role is to maintain order within society. This undermines the notion of democracy, as “any measures interfering with freedom of assembly and expression other than in cases of incitement to violence or rejection of democratic principles—however shocking and unacceptable certain views or words used may appear to the authorities—do [it] a disservice ... and often even endanger it.”²⁷

IV. The Criminalisation of Environmental Defenders in the Philippines

The criminalisation of environmental defenders through the intensification of the policing of protests is highly relevant in the Philippines. Comprising 7,641 islands, the Philippines is renowned for its natural environment, and its population is highly dependent on its surroundings.²⁸ Its geography makes it prone to various natural

disasters, and is said to be “the most vulnerable country in the world to climate impacts” as it is prone to severe natural events like “super cyclones.”²⁹ The nation’s air, plastic, and marine pollution and rising sea levels are caused largely by extractive fossil fuel and mining processes within its borders.³⁰ This significantly impacts Filipinos living below the poverty line, with the rise of “public health emergencies” as well as “water scarcity.”³¹ Environmental defenders within the country are, thus, unwavering in their stance to protect their environment and lives. Although influential in garnering attention, protests conducted in the Philippines constantly receive severe backlash. The country is known as the “most dangerous country in Asia, and the third worst in the world, for land or environmental rights defenders.”³² Acts like “harassment and digital attacks” are used to silence these defenders to “[prevent them] from speaking out.”³³ It was reported in September of 2023 that fifteen activists and community leaders went missing, two individuals “were abducted,” and eleven were killed in the year of 2022—all for their environmental advocacy.³⁴ These activists are almost always silenced in inhumane ways: killing them has been used as a strong tactic to “silence [them] and scare others away.”³⁵ This shows that “there is no possibility of civilized conversation” in a country whose language for environmental defenders is “brutality, repression, resistance,”³⁶ and oftentimes, death.

Filipino environmental defenders believe that extractive companies and businesses’ actions are “neo-colonial” and merely “based on the commodification and financialization of the

²⁵ “E4J University Module Series: Crime Prevention and Criminal Justice.” *United Nations Office on Drugs and Crime*.

²⁶ Waddington (n 23) *supra*.

²⁷ Dunja (n 5) *supra*.

²⁸ “Know Before You Go: The Philippines.” *National Geographic Webpage*.

²⁹ Fonbuena, Camille. “Philippines’ Youth Call for Systemic Change at Climate Protest.” *The Guardian*, 21 Sep. 2021.

³⁰ Raji, K. “4 Biggest Environmental Issues in the Philippines.” *Earth.Org Blog*, 21 Aug. 2023.

³¹ “Climate Change Impacts.” *National Integrated Climate Change Database and Information Exchange System*.

³² Fonbuena (n 29) *supra*.

³³ “Standing Firm: The Land and Environmental Defenders on the Frontlines of the Climate Crisis.” *Global Witness*, 2023.

³⁴ Aspinwall, Nick. “Disappearances ‘Speak to Dangers’ of Environmental Activism in Philippines.” *Al Jazeera*, 13 Sep. 2023.

³⁵ Hallam, Kevin. “Environmental Defenders: Murdered, Missing and At Risk.” *Socialist Lawyer*, no. 75, 2017, at p. 42.

³⁶ Ward and Green (n 13) *supra*.

environment.”³⁷ The current president, ‘Bongbong’ Marcos, “has backed large mining and renewable energy projects as a way to unlock the country’s economic potential” upon his rise to power, with various “land activists and Indigenous leaders” facing dangers behind the scenes.³⁸ This creates a convergence of interests between companies and businesses and the government, who now equally benefit from the financialization and the commodification of the environment in the Philippines. State and private neocolonialism are, therefore, similar and linked. Environmental defenders in the Philippines also faced severe penalties under previous president Rodrigo Duterte; approximately 105 peaceful protestors were killed during his term.³⁹ These protestors have retaliated, mainly claiming that they “are not criminals for wanting to protect places like Sibuyan,”⁴⁰ an island which is used for nickel mining. However, their advocacy falters in the face of powerful Filipino politicians who are hungry to witness economic development and progress in the country.

Historically, Greenpeace were labelled as an ‘eco-terrorist’ organization as they arguably posed a serious threat to state sovereignty given their intense protesting methods.⁴¹ Their work in the Philippines as environmental defenders is also heavily prominent. Their “direct actions” usually require that protest participants “gain entry to private property,” which in various instances are “government buildings, headquarters, factories, [and] logging sites,” where certain acts are committed.⁴² Although their members cause no physical harm, the aforementioned acts are criminal under Philippine law: “no matter how [peaceful] an activity is, nonviolent direct action always entails the violation of the Public Assembly Act (Batas

Pambansa Blg. 880) and the law against trespass to dwelling (Article 280 of the Revised Penal Code).”⁴³ The latter states that “any private person who shall enter the dwelling of another against the latter’s will shall be punished by *arresto mayor* and a fine not exceeding 1,000 pesos” which can be extended further if “violence or intimidation” is used, per the Revised Penal Code of the Philippines of 1930. The penalty of *arresto mayor* is also one of significance, as it is imposed in various instances “upon any person who in any meeting, association, or public place, shall make an outcry tending to incite rebellion or sedition or in such place shall display placards or emblems which provoke a disturbance of the public order.”⁴⁴ This demonstrates that the Penal Code and criminal system, coupled with public assembly and protest laws, are essentially built against the protection of protesters, and are designed instead to criminalise them further.

It is noteworthy that the Philippines is a part of the Association of South-East Asian Nations (ASEAN), whose Human Rights Declaration provides that “every person has a right to freedom of peaceful assembly.”⁴⁵ The Philippines is also a member of the United Nations, and is a signatory to the UN Declaration of Human Rights Defenders 1999, which “recognises the legitimacy of environmental defenders and underlines the obligation on states to protect them from abuse.”⁴⁶ Despite acknowledging these frameworks, grassroots realities demonstrate that the rights and freedoms of environmental defenders are close to non-existent within the country. International law is ineffective here, as “these non-binding international commitments do little to protect communities on the frontline.”⁴⁷ This suggests that, perhaps, in order to adequately protect

³⁷ Hallam (n 35) *supra*.

³⁸ Aspinwall (n 34) *supra*.

³⁹ Global Witness (n 33) *supra*.

⁴⁰ Aspinwall (n 34) *supra*.

⁴¹ Dodd, Vikram, and Jamie Grierson. “Greenpeace Included with Neo-Nazis on UK Counter-Terror List.” *The Guardian*, 17 Jan. 2020.

⁴² Alvarez, Marlon. “On Deviance and Loving Nature: A Case Study of the Ecological Activism of Greenpeace

Philippines.” *Philippine Sociological Review*, vol. 58, 2010, at p. 106.

⁴³ *ibid*.

⁴⁴ Republic Act No. 10951, August 29, 2017.

⁴⁵ “Philippines.” *Laws on the Right of Peaceful Assembly Worldwide Webpage*.

⁴⁶ Hallam (n 35) *supra*.

⁴⁷ *ibid*.

environmental defenders from being criminalised further, domestic protesting laws should be softened. In a country like the Philippines, however, where corruption is rampant and policies are highly political and contested, the potential of altering these laws seems minimal. Thus, considering the Philippines as a case study can demonstrate the significant ways in which environmental defenders are criminalised—always at the expense of their fundamental rights and freedoms.

V. The Criminalisation of Environmental Defenders in the UK

The criminalisation of environmental defenders in the UK is less severe as compared to the Philippines, although new legislation has the potential to change its future. A country which was once commended for its democratic values and practices has now been labelled as “draconian”⁴⁸ given its newfound approach to criminalising dissent. This is demonstrated particularly in the realm of climate protests, considering the peaceful protests conducted by organisations like Extinction Rebellion (XR). These organisations’ methods of raising awareness about the urgency of the climate crisis has been seen as a threat, for which they can be reprimanded under the new Public Order Act 2023. This chapter will consider the protests of the aforementioned organisations, and ways in which they have been criminalised.

XR is an organisation of environmental defenders and advocates, who advocate for climate justice in a manner that is threefold. They demand that “1) governments tell the truth about the severity of the climate crisis and declare climate emergencies, 2) ... governments act now on this emergency and achieve net-zero carbon emissions by 2025, and 3) advocate for going beyond politics

through setting up citizen assemblies,” the latter of which is meant to empower citizens by themselves to “make decisions on climate and ecological issues.”⁴⁹ The mechanisms which XR employ for doing this are deemed to be peaceful. Their work is categorised as embodying acts that are “nonviolent civil disobedience” in their nature, although they have in the past dramatised “certain actions” about issues to “garner the maximum amount of publicity and attention, enabling them to raise awareness and force politicians into taking action.”⁵⁰ Their most notable incidents include two XR members gluing their hands to one of Picasso’s paintings in Australia,⁵¹ and an XR member gluing his feet to a tennis stadium floor at the US open, which led to the delay of a match for 49 minutes.⁵² XR and its members have been branded as “environmental fanatics” by many.⁵³ XR is successful in garnering momentum and raising awareness about the intensity of the climate crisis. Their strategy effectively engages the 3.5% Rule, which indicates that “nonviolent protests engaging around 3.5% of the population have historically been able to effect change.”⁵⁴ Given the publicity raised by their actions, it can be argued that they have been successful in achieving their aims, as they have inspired a movement which is transboundary and crosses jurisdictions.

The impacts and consequences of the protests led by XR have influenced the UK government to repurpose the country’s old Criminal Justice and Public Order Act 1994.⁵⁵ Scholars, when considering the 1994 Act, argued in the past that given its provisions, “‘innocent’ actions could be misconstrued by the police.”⁵⁶ This has influenced the new Public Order Act 2023, which mirrors the 1994 Act in this way, and has already been used to make arrests towards other environmental protesters and

⁴⁸ Adams, Martin. “Climate Protesters Criminalised, Not Deterred.” *The Ecologist*, 6 Jan. 2023.

⁴⁹ Arnold, Emma. “Extinction Rebellion and the Future City.” *Haste: The Slow Politics of Climate Urgency*, edited by Hanne Haarstad et al., UCL Press, 2023, at p. 39.

⁵⁰ Anderson, K. “What Is Extinction Rebellion (XR) and What Do They Do?” *Greenly*, 28 Apr. 2023.

⁵¹ *ibid*.

⁵² Pashankar, S. “Extinction Rebellion Quit ‘Disruption.’ Its Most Disruptive Tactics Live On.” *Bloomberg*, 14 Dec. 2023.

⁵³ “What Impact Have Extinction Rebellion Had?” *Climate Wise Webpage*.

⁵⁴ Pashankar (n 52) *supra*.

⁵⁵ Parker (n 18) *supra*.

⁵⁶ *ibid* at p. 78.

defenders.⁵⁷ The POA “includes orders that can ban named individuals from joining protests, and an expansion of police powers to stop and search people on the grounds they might be planning to commit a protest-related offense—including many newly created by the bill—as well as powers for ‘suspicionless’ searches.”⁵⁸ It has been argued to contain “draconian measures against climate activism, largely outside the public’s view.”⁵⁹ Even during its considerations during its passing at the House of Lords, the Bill was “criticized by peers for being ... ‘worrying’ and ‘open to serious objection and in some ways misconceived’.”⁶⁰ Many also argue that since the provisions contained under the POA are too broad and vague, there is an evident “clear lowering of the threshold for criminality,” which could lead to “an increase in arbitrary state use of new powers and offenses, to restrict and criminalize what would previously be ... the peaceful right to protest, or nonviolent direct action.”⁶¹ The POA also operates alongside the Police, Crime, Sentencing and Courts Act 2022. The PCSCA has “significantly increased the power of the state to regulate protest and activism,” as well as giving the police “extensive new powers to ban non-violent protests” that they think are “too noisy or disruptive.”⁶²

The legitimacy of both of these Acts is justifiable when considering the argument that a state must protect its sovereignty and citizens. In a world that is increasingly faced with opposition, a state establishing control over its borders and people is imperative. The anti-establishment nature of protesting, especially against government action, threatens that control, and raises internal and external threats to their governance. Arguably, then, “new laws and harsher

penalties are necessary to protect” against individuals that harm infrastructures, or through protests that are “increasingly disruptive.”⁶³ Despite this, however, a stronger argument lies in the consideration of individual human rights. The European Court of Human Rights recognises that although states do have an interest of protecting the “public safety” and prevent “disorder and crime” to ultimately support their sovereign values, they also must effectively strike a balance “in favour of those seeking to assert their right to protest, unless there is *strong evidence* for interfering with these rights.”⁶⁴ Creating limitations on an individual’s freedom of expression, thus, gives rise to issues under various Articles of the European Convention of Human Rights, mainly freedom of expression (Article 10) and freedom of assembly and association (Article 11). The need to protect the sovereignty of the state against the silencing of individuals who employ their rights to fight against the threat of climate change is trivial.

The introduction and implementation of both of the POA and the PCSCA in the UK has raised alarm bells at the international level, with the UN High Commissioner for Human Rights, Volker Türk, urging the “UK government to reverse this legislation as soon as feasible.”⁶⁵ Türk added that “as the world faces the triple planetary crises of climate change, loss of biodiversity and pollution, governments should be protecting and facilitating peaceful protests on such existential topics, not hindering and blocking them.”⁶⁶

VI. What is the Future of Environmental Protest (and its Participants)?

Considering the case studies of environmental defenders within the Philippines and the UK

⁵⁷ Gayle, Damien. “Met Uses New Anti-Protest Powers to Arrest Climate Protesters for First Time.” *The Guardian*, 30 Oct. 2023.

⁵⁸ Lakhani, Nina, et al. “How Criminalisation Is Being Used to Silence Climate Activists Across the World.” *The Guardian*, 12 Oct. 2023.

⁵⁹ Adams (n 48) *supra*.

⁶⁰ “UK: Deeply Draconian Public Order Bill Must Be Rejected by Lords - New Briefing.” *Amnesty International*, 2023.

⁶¹ Evans, Charlie. “The Public Order Act 2023: Has Our Right to Protest Been Restricted?” *Saunders*, 18 July 2023.

⁶² Lakhani et al. (n 58) *supra*.

⁶³ *ibid*.

⁶⁴ Gilmore et al. (n 9) *supra*.

⁶⁵ “UN Human Rights Chief Urges UK to Reverse ‘Deeply Troubling’ Public Order Bill.” *United Nations Human Rights Office of the High Commissioner*, 27 Apr. 2023.

⁶⁶ *ibid*.

suggests that the laws of both jurisdictions, as it stands, serves to criminalise them severely for actions that are almost always peaceful. This coincides with the views of John Cooper KC, who stated that “it is not so much a right to protest, rather than a fight to protest, because ... the law is weighted against the protestor.”⁶⁷ Therefore, domestic protest laws need amendment in order to ensure that the rights of the protestors, and the interests of the state, are equally protected. The ways in which this can be done is by altering policing practices to not be unduly or harsh, and equally by protestors finding ways to be less disruptive yet equally as effective in their practices.

It was argued that policing of protests is entering a new era in the UK starting 2011, embodying the characteristics of “consent, mutual collaboration, and an overarching respect for protesters’ human rights.”⁶⁸ This seems to be contradicted by the POA, however. Some academics have contended that “a growing awareness of human rights obligations among police officers does not necessarily translate into more democratic policing practices.”⁶⁹ In the UK, this was evident in anti-fracking protests, where individuals noticed that the arresting and criminalising decisions were “pre-planned and pre-emptive, rather than a genuine response to law breaking at the site.”⁷⁰ Policing practices must, therefore, be streamlined and softened even further. Officers must understand that protestors are “not criminals but citizens motivated by moral principles, exercising their democratic rights,” and they must allow them to protest peacefully.⁷¹ Various academics have also advocated for “the development of reliable intelligence,” which can help the police identify and distinguish “between peaceful

and violent protesters,” and then act without “the indiscriminate use of force.”⁷² Is imperative that everywhere around the world, there are “policy reforms aimed at making public order policing strategies more ‘human rights compliant.’”⁷³

Not only does the criminalisation of environmental defenders bring forth questions of reforms for policing, it also raises significant questions for protestors and their actions. It has been argued that “the ‘ideal’ protestor can theoretically engage in a somewhat ‘offensive’ protest and still be protected but should be careful to not be ‘too offensive.’”⁷⁴ It has been contended that “in the case of all disturbances arising from some protest or other there is the underlying constitutional problem of determining how far the right of protest ought to be tolerated.”⁷⁵ There is a major difference between protesting in a peaceful manner, and “throwing clods of earth and firecrackers at policemen and their horses” and that demonstrators that use tactics like the latter “must not be expected to get off scot free.”⁷⁶ As individuals question society and its actors through the means of protest, it is “disrupt[ing] the world as we know it,”⁷⁷ and although this disruption is inevitable, it must not be too great.⁷⁸ Criminalisation practices targeting peaceful environmental activists and activism lack legitimacy when they suppress fundamental rights under the guise of maintaining order. The legitimacy of criminalising environmental defenders must be assessed not just through the lens of legal authority but also in terms of moral accountability and social justice. There needs to be a balance in ensuring that neither the protestor nor the police are too harmful or disruptive in their approaches.

⁶⁷ Cooper, John. “The Right to Protest?” 25 *Bedford Row Blog*.

⁶⁸ Gilmore, Joanna, et al. “‘That Is Not Facilitating Peaceful Protest. That Is Dismantling the Protest’: Anti-Fracking Protesters’ Experiences of Dialogue Policing and Mass Arrest.” *Policing and Society*, vol. 29, no. 1, 2019, at p. 37.

⁶⁹ *ibid* at p. 38.

⁷⁰ *ibid* at p. 45.

⁷¹ Gilmore et al. (n 9) *supra*.

⁷² Gilmore (n 8) *supra*.

⁷³ Gilmore et al. (n 68) *supra*.

⁷⁴ Mishra (n 12) *supra*.

⁷⁵ Williams, David. “Protest and Public Order.” *Cambridge Law Journal*, vol. 28, no. 1, 1970, at p. 98.

⁷⁶ *ibid*.

⁷⁷ Mishra (n 12) *supra*.

⁷⁸ *ibid* at p. 46.

VII. Conclusion

“Democracy is imperiled” when political expression is stifled.⁷⁹ It is imperative that, given the environmental realities the world is faced with today, individual expression, through protests, is not diminished even further. “There is a connection between environmental activism and how we imagine the future.”⁸⁰ If this connection is lost, then there is no string that could link us to a world which is better for humanity and mankind. This article considered the connections between climate change protests and the criminalisation of environmental defenders in the Philippines and the UK. Upon reflection, the article has demonstrated that in a world that increasingly needs to hear about, and act urgently to combat, the climate crisis, it is illegitimate to silence and criminalise environmental defenders. This is particularly relevant when their methods of protesting are peaceful. Legitimate governance should protect, not punish, those who seek to advocate for environmental and human survival. By criminalising peaceful protests, states erode public trust. Thus, the policing of protests must be curtailed, controlled and softened, and domestic protest laws softened. Going forward, it can only be hoped that protection of the environment and the urgency of addressing the threat of climate change are handled with paramount consideration.

⁷⁹ Mishra (n 12) *supra*.

⁸⁰ Arnold (n 49) *supra*.

Decarbonisation Dilemma: The Role of Nuclear Energy in Europe's Net Zero Ambitions

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KEYWORDS

nuclear energy, net zero, European climate policy, decarbonisation

ABSTRACT

On June 24th, 2021, the European Parliament passed the EU Climate Law, legally binding itself to achieving net zero emissions by 2050. Central to this challenge is deciding the future role of nuclear energy. While nuclear power is a critical component of the net zero strategies in countries like China and India—valued for its ability to provide reliable, low-carbon baseload power—its use in the EU had declined by 35.2% between 2004 and 2022. This article investigates how the slowdown in nuclear power, driven by safety concerns, waste disposal challenges, and rising costs, may hinder the EU's path to net zero. It will explore whether advancements in renewable energy generation and energy efficiency can fully compensate for the reduction in nuclear power. Additionally, it will compare the financial costs and feasibility of nuclear power versus renewable energy in the context of meeting the EU's decarbonisation targets. Finally, the article will assess the challenges of replacing nuclear power's stable baseload energy production with intermittent renewable sources.



I. The History of Nuclear Energy in Europe

In December 1938, German physicists Otto Hahn and Fritz Strassmann made a groundbreaking discovery when they unexpectedly detected barium amongst the decay products of uranium they had bombarded with neutrons. The following year, Lise Meitner and Otto Frisch suggested this was caused by the uranium nucleus being split by nuclear fission, releasing significant amounts of energy.¹ This discovery marked the dawn of the nuclear age. By December 2nd,

1942, the first nuclear plant, Chicago Pile-1, reached criticality.² This achievement demonstrated that a self-sustaining nuclear chain reaction was possible and that nuclear energy was a viable energy source.

Following WWII, many European nations saw nuclear power as a solution to long-term energy security. They sought to reduce their dependence on imports from unstable global coal and oil markets, with nuclear energy as an obvious alternative. It was not until 1956 that the world's first commercial nuclear power station was built at Calder Hall in the

¹ Chodos, Alan. "December 1938: Discovery of Nuclear Fission." *American Physical Society*, 2007.

² Bersano, Andrea, and Stefano Segantin. "History of Nuclear Power Plants Development." *Nuclear Power*

Reactor Designs: From History to Advances, edited by Jun Wang et al., Academic Press, 2023, pp. 3-40.

UK.³ The following year, the original six ECSC states created the European Atomic Energy Community (Euratom) to promote the peaceful use of nuclear power across Europe.⁴ As the number of nuclear power plants increased throughout the continent, so did concerns about the potential dangers of nuclear technology. By the 1970s, anti-nuclear movements began to emerge, driven by fears around the proliferation of nuclear weapons and the long-lasting impact of the bombs dropped on Hiroshima and Nagasaki in 1945.⁵ In the late 1970s, these protests resulted in numerous referenda across Europe. Austria voted against using nuclear power, shutting down its plant before it could supply any power to its grid. In Sweden, a referendum resulted in a ban on the construction of constructing new nuclear facilities in the 1980s. These protests grew following the Chernobyl nuclear disaster in 1986, leading Italy to vote to shut down its existing nuclear plants in 1987, while Switzerland decided to halt the construction of new plants in 1990.⁶ These protests were motivated by three main concerns: the safety risks of a nuclear accident, the lack of proper management of radioactive spent fuel, and the potential for nuclear material to be used in nuclear weapons.

Despite this, nuclear power grew steadily as an energy source until it peaked in 2004, when it was responsible for 14.6% of European Gross Available Energy.⁷ Following this peak, nuclear power began to decline across the continent. This trend was amplified by the Fukushima nuclear disaster in 2011. The disaster significantly shifted public perception of nuclear energy, with safety concerns

overshadowing the benefits of nuclear power in Europe.⁸

The most significant reaction to the Fukushima disaster occurred in Germany, with extensive media coverage. Germany had a long-standing anti-nuclear power movement, with plans to phase out nuclear energy introduced in 2002.⁹ Although the Merkel administration had initially revoked this decision, the Fukushima incident prompted a policy reversal under significant public pressure.¹⁰ They voted to shut down eight nuclear plants and phased out their other nine plants by 2023.

Another significant issue is the ageing infrastructure of nuclear plants, leading to increase operational issues as they reach the end of their lifecycles. Most plants were built between the 1970s and 1990s with 30–40-year lifecycles. These lifecycles continue to be extended as they are more economically viable than constructing new plants. However, this approach raises safety concerns over the degradation of critical components, increasing the risk of accidents. Ageing plants become more expensive to run, requiring more monitoring and preventative maintenance to operate safely. Eventually, it becomes more cost-effective to decommission and shut down plants than to keep them running—a decision many European countries are now facing. In 2020, France shut down its oldest plant, Fessenheim. State-run energy company Électricité de France (EDF) had previously acknowledged that the reactors had manufacturing problems and had experienced an emergency shutdown in 2014 due to cracks in the reactor cover and internal flooding.¹¹

³ Ayres, G. "The Approach Associated with the Continued Operation of the Calder Hall and Chapelcross Nuclear Power Stations to 50 Years." *CNA Proceedings*, 1996, p. 450.

⁴ Cenevska, Ilina. *The European Atomic Energy Community in the European Union Context: The 'Outsider' Within*. Brill Nijhoff, 2016.

⁵ Tompkins, Andrew. "Generating Post-Modernity: Nuclear Energy Opponents and the Future in the 1970s." *European Review of History*, vol. 28, no. 4, pp. 507–530.

⁶ *ibid.*

⁷ "Complete Energy Balances (Data Set)." *European Commission / Eurostat*, 2024.

⁸ Welsch, Heinz, and Philipp Biermann. "Fukushima and the Preference for Nuclear Power in Europe: Evidence from Subjective Well-Being Data." *Ecological Economics*, vol. 108, 2014, pp. 171–179.

⁹ Appunn, Kerstine. "The History Behind Germany's Nuclear Phase-Out." *Clean Energy Wire*, 2021.

¹⁰ Wittneben, Bettina. "The Impact of the Fukushima Nuclear Accident on European Energy Policy." *Environmental Science & Policy*, vol. 15, no. 1, 2012, pp. 1–3.

¹¹ "France's Fessenheim Nuclear Power Plant Shuts Down." *BBC News*, 30 June 2020.

Not all European countries are phasing out nuclear energy. In 2022, France remained heavily reliant on nuclear power, generating 71.2% of its electricity.¹² France is also at the forefront of efforts within the EU to classify nuclear energy as a 'green' investment to help unlock billions in funding from pension funds, banks, and other investors. Belgium, Bulgaria, Croatia, Czechia, Hungary, Finland, Italy, the Netherlands, Poland, and Sweden support them. However, this move faces significant opposition from other EU countries, with Portugal, Denmark and Austria filing a legal challenge against the EU in 2022. They claimed the categorisation of nuclear energy as green was an act of greenwashing.¹³

Nuclear energy remains a divisive topic in Europe, with its role and acceptance varying widely across the continent. Figure 1, below, highlights the divide by illustrating each country's stance on nuclear energy.¹⁴

II. The Future of Nuclear Energy

Two major areas of development are emerging to address the challenges faced by traditional nuclear fission reactors: Small Modular Reactors (SMRs) and nuclear fusion technology. Both can potentially help to address many of the issues with current nuclear fission plants.

A. Small Modular Reactors (SMRs)

SMRs are nuclear reactors that produce up to 300MW¹⁵ of electric power, compared to the 1GW of traditional reactors. Unlike traditional large-scale nuclear plants, SMRs are designed to be factory-built and then transported to sites for assembly, making them adaptable for flexible power generation. This provides many advantages over traditional nuclear plants,

particularly in terms of costs, construction time, safety, and accessibility.

The simpler and smaller design of SMRs reduces initial investment, making nuclear power an accessible option for a broader range of countries and industries. Additionally, SMRs incorporate passive safety features that utilise fundamental physics principles like gravity and natural circulation to enable decay heat removal and emergency core cooling. Using these principles reduces reliance on complex, active computer control interventions in emergencies, minimising the risk of catastrophic failures.¹⁶ SMRs also eliminate the external coolant piping, mitigating the risk of coolant leaks. In addition, in the case of an accident, SMRs require much less fuel than traditional reactors, limiting the size of an accident.¹⁷

From a non-proliferation perspective, SMRs use low-enriched uranium (LEU) or high-assay low-enriched uranium (HALEU), which are challenging to reprocess into weapons-grade material. These can reduce concerns about diverting nuclear material from civil to military use.¹⁸

The EU has actively taken steps to deploy SMRs within its grid. In 2024, the European Industrial Alliance was established to fast-track development and deployment by the 2030s. This has resulted in significant funding of €132 million for SMRs.¹⁹

Despite their benefits, SMRs still face challenges regarding nuclear waste management and current economic viability. Like large-scale nuclear reactors, they generate radioactive waste, and their deployment over more sites complicates the

¹² European Commission Directorate-General for Energy. *EU Energy in Figures (Statistical Pocketbook)*. Publications Office of the European Union, 2024.

¹³ Frost, Rosie. "Europe Is Divided on Nuclear Power: Which Countries Are For and Against It?" *Euronews*, 1 Apr. 2024.

¹⁴ "Number of Operational, Shutdown, and Planned Nuclear Reactors in European Countries as of September 2024." *Statista*, 2024.

¹⁵ Hidayatullah, H, et al. "Design and Technology Development for Small Modular Reactors: Safety

Expectations, Prospects, and Impediments of Their Deployment." *Progress in Nuclear Energy*, vol. 79, 2015, pp. 127-135.

¹⁶ *ibid.*

¹⁷ *ibid.*

¹⁸ *ibid.*

¹⁹ European Commission. "Commission Declaration on 'EU Small Modular Reactors (SMRs) 2030: Research & Innovation, Education & Training'." 2023.

handling of this waste. Additionally, despite the lower upfront costs, they are not yet able to compete with the economies of scale of large nuclear reactors. Despite these challenges, as SMRs continue to develop, they provide an opportunity for safer, more flexible, clean energy generation.

B. Nuclear Fusion Technology

The other significant development in nuclear power is the evolution of nuclear fusion. Often considered the ‘holy grail’ of energy production, nuclear fusion has the extraordinary potential for generating vast amounts of clean energy. While nuclear fission splits up larger elements, nuclear fusion works by fusing two hydrogen isotopes, deuterium and tritium, under high pressure and temperature to release large amounts of energy.²⁰ The challenge with fusion is producing a positive energy return on energy invested (EROI); producing more energy than is consumed by initiating and sustaining the reaction. This milestone was first achieved in December 2022 and replicated a year later,²¹ leading to a renewed effort toward nuclear fusion. However, practical deployment is still a long way off.

One of the main advantages of fusion is its fuel source. Deuterium and tritium produce far less harmful radiation than uranium and plutonium, used in fission reactions. Although tritium does emit beta radiation, an aluminium plate can shield it, and its half-life is a relatively short 12.32 years. In contrast, waste from fission reactions can remain radioactive for tens of thousands of years. Fusion waste loses radioactivity within a century, making it a much safer option than fission.²²

Fusion reactors are also much less vulnerable to accidents. Unlike fission plants, fusion plants will not go supercritical, as the reaction

relies on super high plasma temperatures. In an accident, the plasma will cool quickly, stopping the reaction and preventing any large disaster.²³

Despite recent breakthroughs, nuclear fusion is not expected to be commercially viable until the late 2040s or early 2050s. Therefore, although fusion is a promising long-term option for clean energy production, it is unlikely to play a significant role for Europe reaching their 2050 net zero emission targets.

III. The European Green Deal

The European Climate Law, introduced in 2021, legally binds the EU to the targets set out in the European Green Deal. Under this deal, Europe aims to become the first net zero continent by 2050 and reduce net carbon emissions by 55% compared to 1990 levels by 2030. To facilitate this transition, the European Commission has estimated that a minimum of €1 trillion is needed in sustainable investments over the next decade.²⁴ These investments aim to improve environmental performance while also addressing social inequality to ensure the transition is inclusive.

The deal focuses on renewable energy sources, with a plan to expand wind and solar power and enhance energy storage solutions. The new target is for renewable sources to make up 42.5% of the EU’s energy mix by 2030, a significant increase from 23% in 2022.²⁵ Nuclear energy does not fall into this category and is instead classed as ‘low carbon’ energy. This deal directly impacts nuclear energy, which has traditionally been important in decarbonisation. Renewable investments will be prioritised, resulting in a diminished role for nuclear energy.

Investments in energy efficiency, particularly in buildings and transportation, are also vital

²⁰ Sadik-Zada, Elkhani Richard, et al. “Back to the Future: Revisiting the Perspectives on Nuclear Fusion and Juxtaposition to Existing Energy Sources.” *Energy*, vol. 290, 2024, p. 129150.

²¹ *ibid.*

²² *ibid.*

²³ *ibid.*

²⁴ European Commission. “Questions and Answers: The Green Deal Investment Plan and Just Transition Mechanism.” 2020.

²⁵ General Secretariat of the Council of the European Union. “Fit for 55: How the EU Plans to Boost Renewable Energy.” 2023.

in reducing demand for conventional and nuclear energy. Efficient infrastructure and transport systems are expected to reduce overall energy consumption, reducing the baseline need that nuclear and fossil fuels have traditionally filled.

In addition, the permitting process for renewable projects has been streamlined, recognising them as having “overriding public interest” and accelerating their deployment relative to nuclear projects.

At the same time, carbon pricing and the EU’s emission trading system (ETS) aim to encourage industries to transition to low carbon energy sources.

Studies suggest that current carbon prices are too low to cause a significant reduction in emissions.²⁶ Increasing these prices could enhance the economic appeal of both renewables and nuclear energy. However, raising carbon prices can lead to higher energy costs, a significant concern now due to the issue of energy poverty in Europe. In 2018, 34 million Europeans could not afford to heat their homes adequately.²⁷ To prevent exacerbating the issue, the EU must ensure that the transition to renewable energy does not significantly increase the cost of energy.

Bloomberg’s potential European 2050 NetZero scenario, shown in Figure 2, below, anticipates a significant increase in electricity demand, up 82% from 2021 to 2050.²⁸ The electrification of industries and the adoption of electric vehicles and heat pumps will drive this. While nuclear energy is projected to remain part of the EU’s energy mix, this transition and the increased focus on renewables suggest that nuclear energy may have a reduced role, providing a complementary but lesser share of the grid’s baseline needs as renewable capacity and storage continue to increase.

IV. Financial Comparisons Between Nuclear and Renewable Energies

The cost of energy generation is measured using Value-Adjusted Levelized Cost of Electricity (VALCOE). Levelized Cost of Electricity (LCOE) divides the total lifetime cost of a plant by the total lifetime electricity output. VALCOE expands on this by incorporating a discount rate and grid reliability factors. The discount rate is the interest rate used to calculate how much future money is worth today, considering that money available now is more valuable than the same amount in the future. For example, nuclear power plants have an extremely high upfront cost, but, once constructed, are relatively cheap to run. This means that over their 40-year lifecycle, the total cost needs to be averaged out. By extending the lifecycle of nuclear plants, countries can reduce costs further, as repairing plants is cheaper than building a new plant.

The International Energy Agency (IEA) reported in 2020 that nuclear is expected to be the cheapest low carbon energy source globally in 2025.²⁹ The report mainly focuses on how extending the lifecycle of nuclear plants significantly reduces nuclear energy’s VALCOE. Nuclear is becoming more price-competitive with fossil fuels and is expected to become more affordable than coal powered plants. However, the report also found that in Europe, both onshore and offshore wind and solar PV are already price-competitive with nuclear and gas options, as shown in Figure 3, below.³⁰

The EU prioritises renewable energy over nuclear power in its 2024 investment allocation, as shown in Figure 4, below. Renewables received \$106 billion in funding, significantly more than the \$15 billion

²⁶ Green, Jessica. “Does Carbon Pricing Reduce Emissions? A Review of Ex-Post Analyses.”

Environmental Research Letters, vol. 16, no. 4, 2021.

²⁷ Fetting, C. “The European Green Deal.” *ESDN Report*, 2020.

²⁸ BloombergNEF. “Europe’s Path to Clean Energy: A \$5.3 Trillion Investment Opportunity.” 2022.

²⁹ International Energy Agency. “Projected Costs of Generating Electricity.” 2020.

³⁰ *ibid.*

allocated to nuclear energy.³¹ This disparity in funding highlights the EU's commitment to renewable sources over nuclear energy.

Another important consideration is that manufacturing various renewable technologies, including solar panels, wind turbines and batteries, require significant amounts of rare earth minerals and metals. Currently, 52% of the reserves of rare earth elements are extracted in China and Russia,³² potentially posing challenges for Europe, particularly given its geopolitical tensions with these nations.

Furthermore, there is concern about the resource depletion of many metals and minerals. The data shown in Figure 5, below, indicates that most metals will not be depleted by 2050. However, the transition to renewable energy could accelerate the depletion of certain metals, particularly cadmium, cobalt, lithium, and nickel.³³ In order to build an energy grid entirely reliant on renewables, it may be necessary to either reduce energy demand or develop technologies that depend less on these metals. This could involve creating less efficient but less resource-intensive technologies.

V. Is It Possible to Switch to a Power Grid to Run Solely on Renewables?

A power grid is a complex network of generators, substations, and transmission lines designed to reliably distribute electricity to consumers. Its main function is to balance energy supply with fluctuating energy demand, which is crucial for preventing power shortages or blackouts from power surges.

One key difference between nuclear power and renewable energy is the reliability of energy production. Nuclear power plants, fuelled by high-energy-density fuels such as

uranium, provide a stable and continuous energy supply. These reactors can operate for years without interruption. In contrast, renewable energy sources such as wind and solar are more variable, as their generation depends heavily on weather conditions. This volatility makes switching from fossil fuels and nuclear energy to a renewable-only grid challenging.

Reliability issues were evident in 2016 when South Australia (SA), operating a grid with 50% renewable energy,³⁴ experienced severe blackouts due to a storm. On September 28th, 2016, a severe storm damaged several remote transmission towers, resulting in a 52% reduction in wind generation, creating an energy deficit.³⁵ SA responded by trying to import power from neighbouring Victoria to stabilise the grid. However, issues with the interconnectors between the two states led to a power surge, causing state-wide blackouts. This incident highlighted the struggles of switching to a renewable grid. It exposed the need for investment in more resilient energy infrastructure and energy storage solutions to draw upon when needed.

While energy storage systems like Pumped Hydroelectric Energy Storage (PHES) and Battery Energy Storage Systems (BESS) can help address the variability of renewables, they are not yet ready for large-scale implementation. PHES is the most established technology for large-scale energy storage. It works by pumping water from a lower reservoir to a higher one during low demand. Then, when demand peaks, the stored water is released back through turbines to generate electricity. This economic model relies on predictable energy pricing, allowing companies to purchase energy at lower prices and sell it when prices are higher. The variable nature of renewables makes energy prices less

³¹ International Energy Agency. "World Energy Investment 2024." 2024.

³² Månberger, André, and Bengt Johansson. "The Geopolitics of Metals and Metalloids Used for the Renewable Energy Transition." *Energy Strategy Reviews*, vol. 26, 2019, p. 100394.

³³ Moreau, Vincent, et al. "Enough Metals? Resource Constraints to Supply a Fully Renewable Energy System." *Resources*, vol. 8, no. 1, 2019, p. 29.

³⁴ Yan, R, et al. "The Anatomy of the 2016 South Australia Blackout: A Catastrophic Event in a High Renewable Network." *IEEE Transactions on Power Systems*, vol. 33, no. 5, 2018, pp. 5374-5388.

³⁵ *ibid.*

predictable, making it more difficult for operators to determine optimal times for pumping and releasing water.

The other energy storage method is BESS. Different battery technologies, such as lithium-ion batteries and flow batteries, can play an increasingly important role in stabilising grids. Currently, the main problems have been high costs, low efficiency, short life cycles,³⁶ and supply chain issues, with raw materials often sourced from Russia and China. As a result, alternative materials may have to be found if the EU wants to implement BESS in its power grid.

Despite these challenges, progress is promising. Between 2010 and 2021, battery storage costs fell from \$1220 to \$132 per kWh. Projections suggest that for a fully renewable-powered grid, energy storage costs could account for as little as 15% of total energy costs.³⁷ These improvements are encouraging but still insufficient to fully stabilise grids relying solely on renewables.

Complementary low carbon energy sources can support the transition to a renewable-based grid. Biomass can be stored and converted to energy on demand, providing flexibility to balance fluctuations.³⁸ However, it is critical that biomass is sourced sustainably so it doesn't compete with food crops for arable land or destroy biodiversity. However, among these challenges, nuclear energy—particularly SMRs—can play a vital role in supporting the transition to a renewable-based grid. Many EU countries, such as Czechia and France, have invested in SMRs³⁹ to enhance grid reliability by offsetting the variability in renewable generation. Research indicates that SMRs can

maximise renewable energy usage by providing consistent baseload power and quickly adjusting their output to stabilise the grid during fluctuations in renewable generation.⁴⁰

A successful transition to a renewable energy-based grid requires a diversified approach. While wind energy is currently one of the most economically viable options, it is also essential to continue investing in various renewable sources, such as solar, geothermal, tidal and sustainably sourced biomass. These diverse sources allow operators to mitigate the variability of each source, providing a more stable output.

Transitioning to a power grid without a stable baseload supply presents significant challenges, as current energy storage technologies are not advanced or economically viable for large-scale implementation. Therefore, nuclear energy can stabilise the grid until storage technologies develop. By bridging the gap, nuclear power can provide energy security for countries as they reduce their reliance on fossil fuels, helping pave the way for a future fully powered by renewable energy.

VI. Conclusion

Europe faces a complex and heavily divided debate regarding the future of nuclear power. While data suggests a decline in nuclear energy over the next 30 years, this transition must be managed carefully. Extending the lifecycle of plants, where safe, can significantly reduce the LCOE and contribute to energy security. While renewable energy has become increasingly cost-competitive at smaller scales, large-scale deployment requires advancements in energy storage

³⁶ Hesse, Holger, et al. "Lithium-Ion Battery Storage for the Grid—A Review of Stationary Battery Storage System Design Tailored for Applications in Modern Power Grids." *Energies*, vol. 10, no. 12, 2017, p. 2107.

³⁷ Haywood, Luke, et al. "Why Investing in New Nuclear Plants Is Bad for the Climate." *Joule*, vol. 7, no. 8, 2023, pp. 1675-1678.

³⁸ Bridgwater, Tony. "Biomass for Energy." *Journal of the Science of Food and Agriculture*, vol. 86, 2006, pp. 1755-1768.

³⁹ Van Hee, Nick, et al. "Economic Potential and Barriers of Small Modular Reactors in Europe." *Renewable and Sustainable Energy Reviews*, vol. 203, 2024.

⁴⁰ Boudot, Charly, et al. "Small Modular Reactor-Based Solutions to Enhance Grid Reliability: Impact of Modularization of Large Power Plants on Frequency Stability." *EPJ Nuclear Science & Technology*, vol. 8, 2022, p. 16.

systems due to their variable energy generation. Therefore, a rapid shift to rely solely on renewable energy could expose vulnerabilities in energy security.

While investment in nuclear energy remains far lower than in renewables in Europe, sustained investments in nuclear innovations such as SMRs and nuclear fusion remain essential. Both technologies can help address the current concerns associated with traditional nuclear power plants. It is far more important that countries prioritise phasing

out coal and oil before abandoning nuclear energy. As Bloomberg's NetZero scenario suggests, with careful planning and enough investment, Europe can achieve net zero emissions in Europe by 2050, even with a reduced reliance on nuclear power.

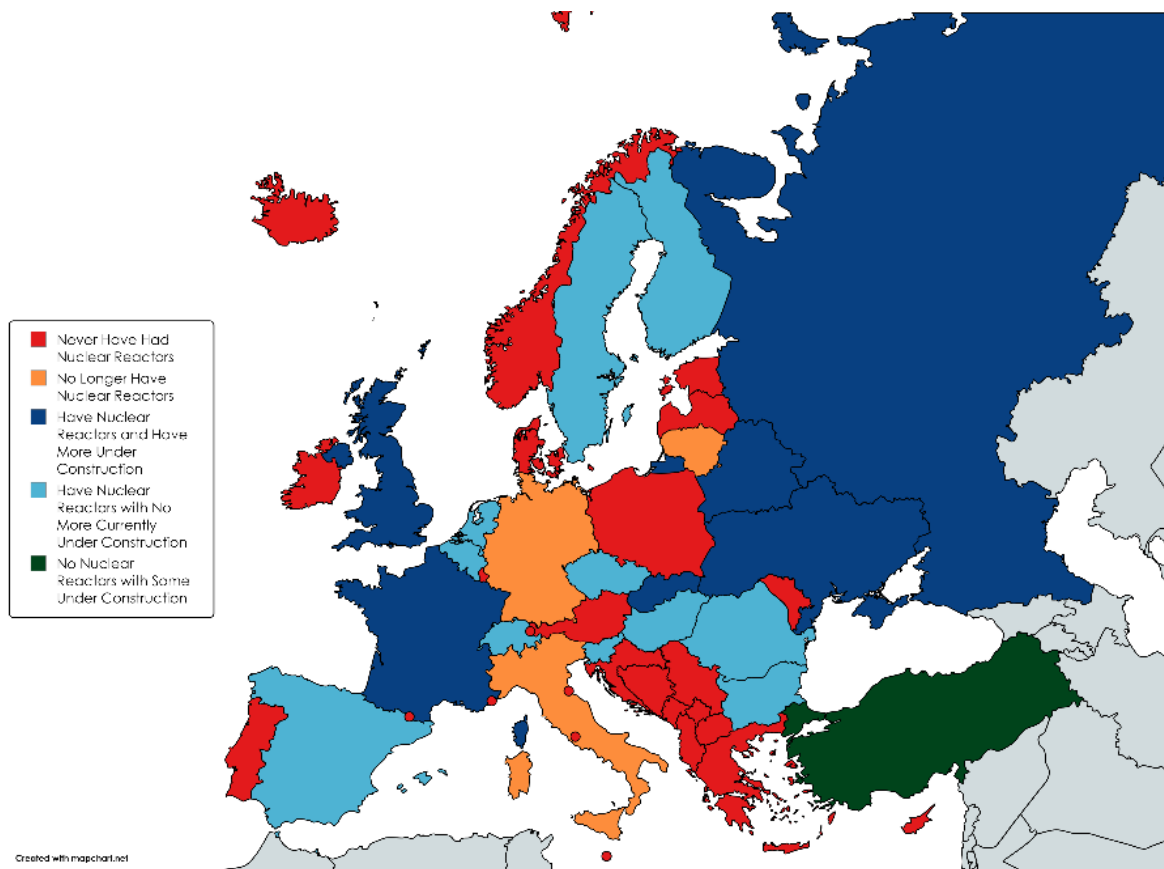


Figure 1: Current Status of Nuclear Energy in European Countries (Data Source: Statista)

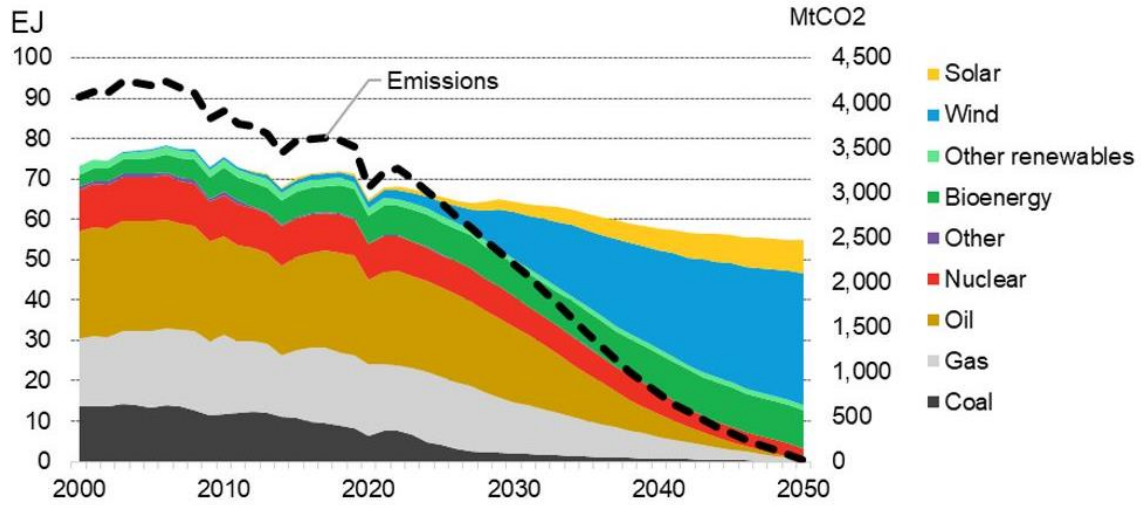


Figure 2: Potential 2050 Net Zero Roadmap for 2050 (Source: BloombergNEF, 2022)

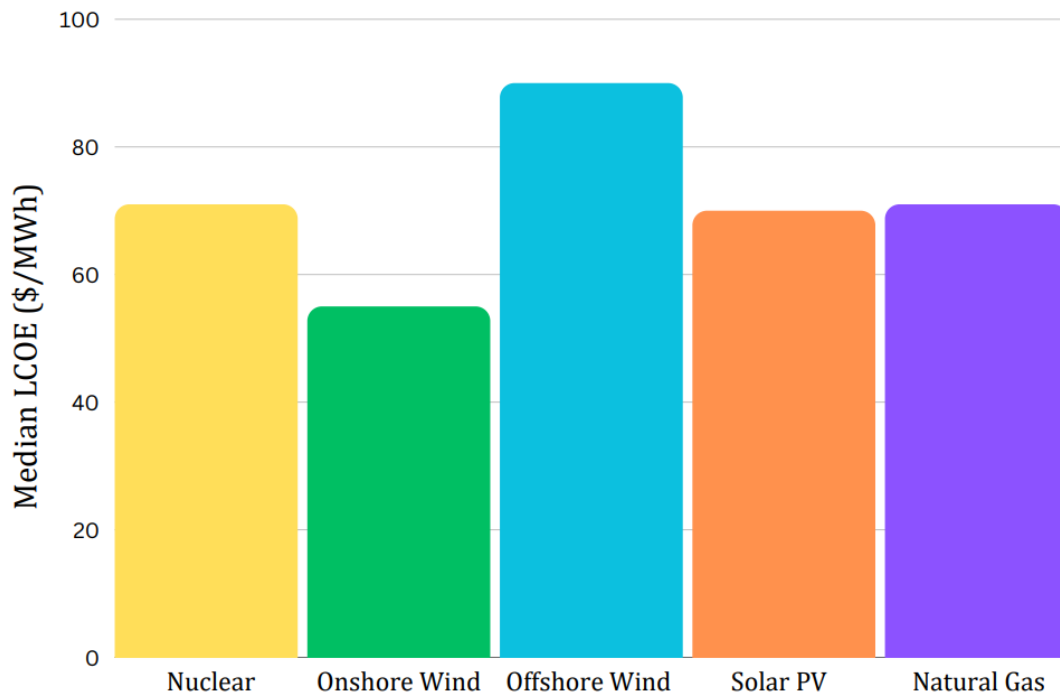


Figure 3: LCOE of Different Energy Sources in Europe (Data Source: IEA)

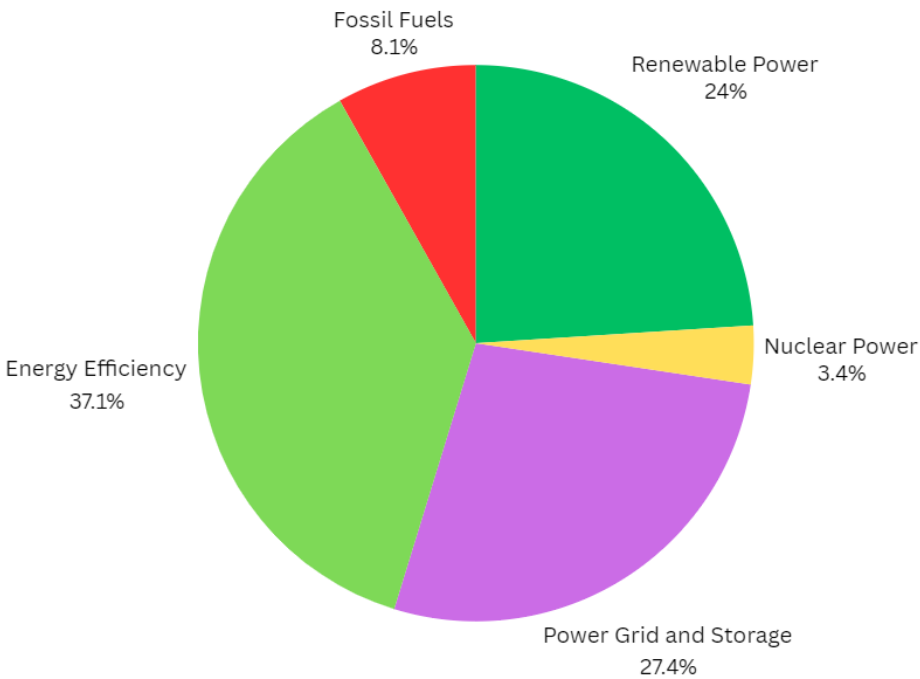


Figure 4: Breakdown of EU Investment in Clean Energy 2024 (Data Source: IEA)

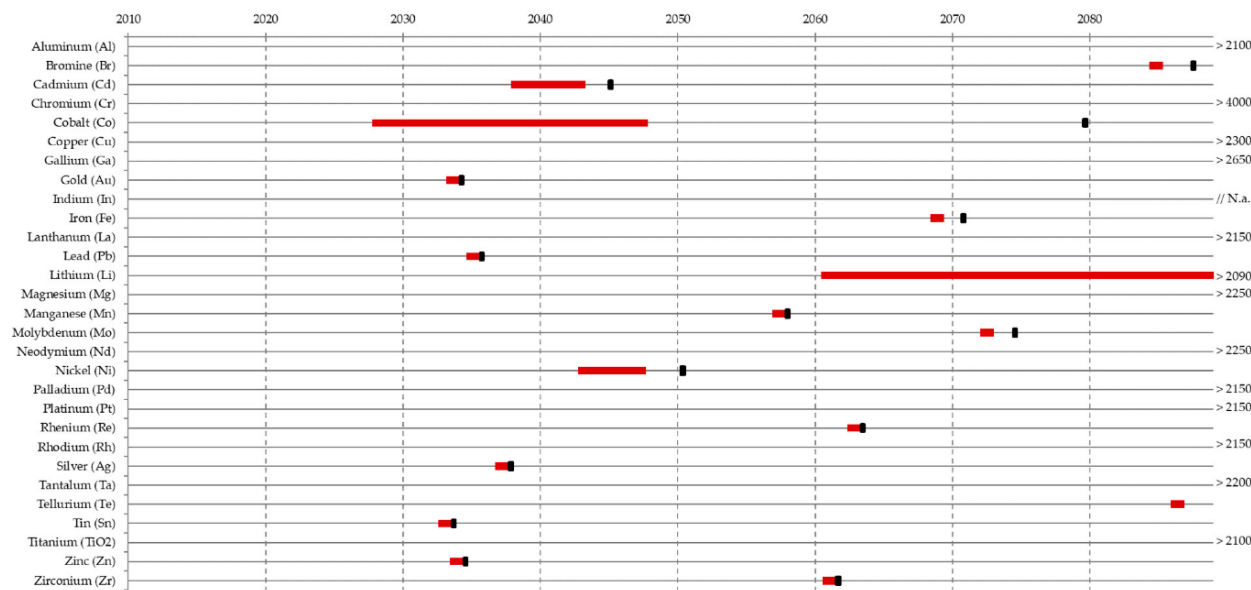


Figure 5: Depletion Timeline for Metals Based on Current Demand (Shown in Black) and Potential Net Zero Future Demand (Shown in Red) (Source: Resources)

The Political Economy of Climate Finance: Stakeholder Relationship Dynamics in the Indonesian Just Energy Transition Partnership

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KEYWORDS

climate finance, Just Energy Transition Partnership (JETP), political economy, stakeholder dynamics

ABSTRACT

As the global community tackles climate change, climate finance emerges as a critical mechanism to facilitate the transition to low-carbon economies in developing nations. This study explores the political economy of climate finance, focusing on Indonesia's Just Energy Transition Partnership (JETP). Through qualitative analysis of stakeholder interviews, the study unpacks the complex dynamics and power asymmetries influencing climate finance mobilisation, governance, and implementation. Key challenges identified include Indonesia's weak institutional framework, policy ambiguity, competing domestic interests, lack of political alignment among international partners, and unrealistic targets. These issues reflect deeper tensions between sovereign decision-making and external pressures, compounded by entrenched coal sector interests and fragmented donor strategies. The findings highlight the climate finance curse, where large-scale financial inflows can create inefficiencies, governance challenges, and perpetuate external influence, akin to neo-colonial practices. This study suggests the need for greater transparency, achievable targets, inclusive governance, and improved coordination among international partners to ensure effective climate finance delivery.



I. Introduction

As the world grapples with climate change, developing countries—the most vulnerable to its impacts—require significant investment to

facilitate their transition to a low-carbon economy.¹ Since these countries often struggle to mobilise the funds for this transition on their own, they depend on the allocation of

¹ Smith, Joel, et al. "Development and Climate Change Adaptation Funding: Coordination and Integration." *Climate Policy*, vol. 11, no. 3, June 2011, pp. 987–1000.

substantial financial resources from developed to developing countries.

However, climate finance transcends mere financial transactions: it is deeply intertwined with the broader political economy.² The mobilisation, allocation, and utilisation of climate finance are influenced by complex interdependencies among many different stakeholders, including governments, businesses, non-governmental organisations, and local communities. Understanding the dynamics among these actors is essential for unravelling the challenges that impede effective climate financing.

This article aims to shed light on the complex interdependencies and political undercurrents that shape climate finance activities. Specifically, it explores the political economy dimensions of energy transition finance, focusing on the interplay between partner and recipient countries.

A case study of the Just Energy Transition Partnership (JETP) in Indonesia serves as the focal point for the analysis. The JETP represents a commitment from Indonesia and international partners to facilitate a just transition in Indonesia from coal dependency to renewable energy sources. However, this partnership is not without its complexities. It involves navigating power asymmetries between Indonesia and its partner countries, where divergent interests and levels of influence can significantly impact the partnership processes.

II. Climate Finance

According to Article 9 of the Paris Agreement, climate finance is the mobilisation of both public and private finance from developed countries to developing countries to support their mitigation and adaptation efforts.

Climate finance became an important climate change topic during the 15th Conference of the Parties (COP15) in Copenhagen. The Copenhagen Accord, particularly in Paragraphs 8, 9, and 10, emphasises the need for climate finance to combat climate change. At COP15 in 2009, developed countries committed to mobilising USD 100 billion of climate finance annually by 2020 to support developing countries.³ This deadline was postponed to 2025 at COP21 in 2015.⁴ The overall amount of climate finance that had been contributed and mobilised by 2021 was USD 89.6 billion, a notable rise of 7.6% from the previous year (see Figure 1, below). In 2022, the USD 100 billion goal was finally reached.

A. Principles and Challenges in Climate Finance

The implementation of climate finance initiatives is informed by some generally recognized principles, such as the polluter pays principle (PPP). This principle asserts that those responsible for pollution should bear the costs associated with its environmental impact.⁵ According to this principle, developed nations that are cumulatively the largest contributors to greenhouse gas emissions should be accountable for their actions and provide financial and technological support to developing countries. The complementary concept of common but differentiated responsibilities (CBDR) acknowledges that, while all countries share the responsibility to combat climate change, their historical contributions—and their capacities to respond—differ significantly.⁶ This principle aims to foster an equitable climate finance framework that considers the historical injustices faced by developing nations.

Despite these ethical considerations, the current dynamics of climate finance raise

² Cash, Corrine, and Larry Swatuk. *The Political Economy of Climate Finance: Lessons from International Development*. Palgrave Macmillan, 2023.

³ *Climate Finance Provided and Mobilised by Developed Countries in 2013-2021: Aggregate Trends and Opportunities for Scaling Up Adaptation and Mobilised Private Finance*. OECD, 2023.

⁴ “Climate Finance in the Negotiations.” *United Nations Framework Convention on Climate Change Webpage*.

⁵ Munir, Muhammad. “History and Development of the Polluter Pays Principle.” *SSRN Electronic Journal*, 2013.

⁶ Stone, Christopher. “Common but Differentiated Responsibilities in International Law.” *American Journal of International Law*, vol. 98, no. 2, Apr. 2004, pp. 276–301.

concerns, such as the so-called ‘climate finance curse’,⁷ and neo-colonialism.⁸ According to Jakob et al., the climate finance curse refers to the potential negative macroeconomic impacts that large-scale climate finance inflows could have on developing countries, similar to the effects of natural resource exports. Key concerns include the volatility of financial flows, the risk of exceeding absorptive capacity, and governance challenges in effectively managing these funds to avoid economic distortions. Critics also argue that the prevailing development collaboration can perpetuate a form of neo-colonialism, whereby developed countries impose conditionalities on funding that exert undue influence over developing nations. This can undermine the sovereignty of recipient countries and lead to a situation where international partners prioritise their agendas rather than genuinely supporting local needs and priorities.

Scholars have also observed that the institutional environment surrounding climate finance is fragmented.⁹ Pickering et al. identified three types of fragmentation found in climate financing architecture, namely ‘institutional fragmentation’, which relates to established and emergent institutions with specific mandates in climate financing architecture; different ‘actor constellations’, which refers to the difference in membership style, such as universal, regional or with restricted criteria; and ‘norm fragmentation’, which means having different principles, such as historical responsibility.¹⁰

Owing to this fragmentation in providing and accounting for climate financing, developing countries have encountered challenges in accessing the funds. The fragmentation could also affect the fairness, accountability, and legitimacy of climate financing.¹¹

B. The Just Energy Transition Partnership (JETP) Initiative

The Just Energy Transition Partnership (JETP) initiative was launched at COP26 in 2021 as a way to unlock climate finance to help developing and emerging countries achieve their net zero climate emissions and renewable energy targets.¹² The international JETP partners are committed to collaborating and channelling the funds to the recipient countries in a way that facilitates programmatic investment tied to decarbonisation plans for the national power sector of the recipient countries.

The JETP is the first climate finance partnership of its kind in terms of structure and volume of capital. There have been over 100 climate finance initiatives to date.¹³ Some are national and regional bilateral initiatives, while others are multilateral, through climate funds and development finance institutions. Some are private finance or private-public partnership finance. One example is the USD 16 million Climate Finance Accelerator (CFA), which is funded by the UK and is being implemented in ten countries from 2020 to 2024. By contrast, a JETP employs a partnership model that combines several international partners gathered around a

⁷ Jakob, Michael, et al. “Climate Finance for Developing Country Mitigation: Blessing or Curse?” *Climate and Development*, vol. 7, no. 1, 2015, pp. 1–15.

⁸ Zylinski, Stefan. “Coloniality Dressed in Green: In Its Current Form, Climate Finance Risks Becoming a New Tool for Colonial Rule.” *Global Political Economy*, vol. 3, no. 2, Sep. 2024, pp. 315–22.

⁹ Biermann, Frank, et al. “The Fragmentation of Global Governance Architectures: A Framework for Analysis.” *Global Environmental Politics*, vol. 9, no. 4, Nov. 2009, pp. 14–40.

¹⁰ Pickering, Jonathan, et al. “Special Issue: Managing Fragmentation and Complexity in the Emerging System of International Climate Finance.” *International Environmental Agreements: Politics, Law and Economics*, vol. 17, no. 1, Feb. 2017, pp. 1–16.

¹¹ Liang, Chao, and Bai Liu. “Challenge or Opportunity of Climate Financial Fragmentation: Evidence from China-Initiated Cooperation with Emerging Multilateral Institutions.” *International Journal of Climate Change Strategies and Management*, vol. 12, no. 3, Feb. 2020, pp. 289–303; Michaelowa, Axel. “CDM Host Country Institution Building.” *Mitigation and Adaptation Strategies for Global Change*, vol. 8, no. 3, 2003, pp. 201–20.

¹² Martinus, Melinda. *Just Energy Transition Partnerships (JETPs) in Indonesia and Vietnam: Implications for Southeast Asia*. ISEAS – Yusof Ishak Institute, 2024.

¹³ Marke, Alastair, and Bianca Sylvester. “Decoding the Current Global Climate Finance Architecture.” *Transforming Climate Finance and Green Investment with Blockchains*, edited by Alastair Marke, Elsevier, 2018, pp. 35–59.

single recipient country.¹⁴ JETPs also represent the largest financing sums to date in the climate finance landscape.

The first JETP was agreed between South Africa and international partners during the COP26 summit; it is worth USD 8.5 billion, with a duration of three to five years starting from 2021. The second, third, and fourth JETPs were established for Indonesia (USD 20 billion), Vietnam (USD 15.5 billion), and Senegal (USD 2.47 billion), with each partnership spanning three to five years, starting from 2022 for Indonesia and Vietnam, and 2023 for Senegal.¹⁵

III. The Indonesian Context

Indonesia is a key player in global climate discussions, ranking as the largest carbon emitter among the four countries in the Just Energy Transition Partnership (JETP) and the 10th in the world, compared to South Africa (13th), Vietnam (24th), and Senegal (101st).¹⁶ This makes Indonesia's JETP particularly important. Despite its ambitious goal of reaching net zero emissions by 2060, Indonesia's economy remains heavily dependent on coal, which fuelled a 60% increase in the country's total energy supply between 2000 and 2021.¹⁷

To achieve its net zero target while maintaining economic growth, Indonesia has developed several key energy sector documents governed by the National Energy Council and the Ministry of Energy and Mineral Resources (MEMR), such as the National Energy Policy (KEN), the National Electricity Plan (RUKN), and the National Energy Plan (RUEN).¹⁸ The Indonesian JETP also requires the development of a Comprehensive Investment and Policy Plan

(CIPP) to guide energy transition investments and reforms. Launched in connection with the 2022 G20 Bali summit hosted by Indonesia, the JETP reflects the country's ambition to transition from coal while securing international financial support for cleaner energy development.

IV. Methodology

To understand how the dynamics of the political economy shape climate finance, this article takes a case study approach, using qualitative analysis of interviews on Indonesia's JETP. This analysis is based on ten interviews with a range of highly relevant stakeholders, including government and embassy representatives from the Government of Indonesia (GoI), the International Partner Group (IPG), and working group experts from both sides.

We ensured validity, in accordance with Pettigrew,¹⁹ by carefully selecting respondents who were both relevant and representative, to reduce the chance that irrelevant experiences or biases. Thus, the selection of the interviewees focused on (i) relevance: in this case ensuring that interviewees came from the two main sides of JETP Indonesia, i.e., GoI and the IPG; and (ii) salience: in this case, interviewees with high-level positions (at least manager level) involved in JETP governance. The interviewees are annexed and referred to in the text that follows using reference codes (I1, I2, I3, I4 for IPG respondents and G1, G2, G3, G4, G5, G6 for respondents from the GoI side).

V. Findings and Analysis

Based on the interviews we conducted, we have identified five significant themes affecting the Indonesian JETP. These are: (i) a

¹⁴ Earsom, Joseph. "Fit for Purpose? Just Energy Transition Partnerships and Accountability in International Climate Governance." *Global Policy*, vol. 15, no. 1, Feb. 2024, pp. 135–41.

¹⁵ Banerjee, Aparajita. "Transforming the Rhetoric of Just Energy Transition Partnerships into Reality: The Devil Lies in the Details." *PLOS Sustainability and Transformation*, vol. 3, no. 8, Aug. 2024, pp. 1–22.

¹⁶ see EDGAR, the Emissions Database for Global Atmospheric Research.

¹⁷ "CIF Accelerating Coal Transition (ACT): Indonesia Country Investment Plan (IP)." Fiscal Policy Agency, Ministry of Finance, Government of Indonesia, 2022.

¹⁸ "Indonesia Energy Sector Assessment, Strategy and Road Map Update." Asian Development Bank, Jan. 2021.

¹⁹ Pettigrew, Andrew. "Longitudinal Field Research on Change: Theory and Practice." *Organization Science*, vol. 1, no. 3, Aug. 1990, pp. 267–92.

weak institutional framework; (ii) policy ambiguity; (iii) competing domestic interests; (iv) a lack of political alignment among partners; and (v) unrealistic targets. These themes are expanded upon in this Section.

A. Weak Institutional Framework

Indonesia's JETP agreement, like other JETP agreements, is not legally binding. The lack of a legal framework for JETP accentuates the political and institutional weaknesses that impede effective governance. The political reluctance to formalise the JETP partnership reflects Indonesia's desire to maintain sovereignty and avoid external influence. However, without a clear legal structure, Indonesia's JETP secretariat operates in a fragmented governance environment, reflecting broader challenges in climate finance.

One government respondent pointed out: *"The JETP process is not institutionalised. I mean, it's a joint statement. It's not a multilateral agreement that is ratified."* (G5)

In the case of Indonesia, this absence of a formalised arrangement shows how the political will to establish robust institutions can be undermined by competing domestic interests. Interviewees suggested that Indonesia's political reluctance to formalise these partnerships may stem from a desire to maintain flexibility for domestic actors, avoiding accountability and regulatory oversight that could limit powerful stakeholders, such as the coal industry (G5, G6).

This dynamic reflects broader issues in global climate finance, where institutional voids create inefficiencies and increase uncertainty. The lack of strong institutional support hinders the host country's ability to negotiate on an equal footing with donor countries, deepening the power asymmetry between them.

B. Policy Ambiguity

Unclear and inconsistent regulatory frameworks reflect the tensions between the

goal of advancing renewable energy and the desire to maintain vested interests in fossil fuels. In the case of Indonesia, regulatory uncertainty is driven by the competing priorities associated with promoting renewables while still relying heavily on coal-fired power plants. These conflicting policies demonstrate how entrenched interests within the political and economic elites influence energy transition strategies.

The slow pace of regulatory reform can be seen as a strategy by those actors with entrenched interests to delay the transition to renewables, as they benefit from continued subsidies for fossil fuels. According to one respondent from the Indonesian side:

"I think one of the challenges we've seen in the last five years is just the number of regulations that have come down the pipe. ... If there's uncertainty about how a regulation is going to be enforced or implemented, companies may be inclined to take a more cautious approach ... Sometimes it's hard to get feedback from the regulators ... It can be challenging to get in touch with someone who can answer your questions." (G3)

This demonstrates how the political economy shapes policy environments, with regulatory ambiguity often serving the interests of powerful incumbents in the fossil fuel industry, while also creating barriers for international climate finance investments.

C. Competing Domestic Interests

JETP implementation is shaped by the competing interests of various domestic actors. In the case of Indonesia, powerful stakeholders from the coal sector influence policy decisions, often delaying or weakening efforts to transition to cleaner energy sources. As one IPG respondent stated, *"There is no level playing field for renewables. Coal and fossil fuels in general are still highly subsidised."* (I3)

Moreover, according to G3, several politically influential people involved in JETP negotiations are not interested in the energy transition, but rather are more concerned with ensuring the ongoing survival of the coal industry:

“You know, the coal industry is ... backed by some very powerful people in Indonesia ... politicians who were negotiating the JETP ... those coal projects have somebody powerful, you know politically or a rich family or something behind, so those aren’t the projects you take on and say, sorry we’re cancelling your project, right?” (G3)

This means that decisions within the sphere of a political actor carry considerable weight and therefore make it difficult for energy transition projects under the JETP to make progress. The influence of these stakeholders can create conflicts between partner countries and domestic actors resisting change. This can be seen as a reflection of the climate finance curse—where the influx of international funds aimed at mitigating climate change is often accompanied by a lack of strategic coordination, weak regulatory frameworks, and rent-seeking behaviour by powerful domestic stakeholders.

For Indonesia, the internal political economy also complicates the coordination of the JETP and the energy transition. The role of Indonesia’s national state-owned electricity provider, Perusahaan Listrik Negara (PLN), is crucial for the JETP process, but creating a unified Comprehensive Investment and Policy Plan (CIPP) under the JETP has been challenging, owing to resistance from PLN, whose agreement is necessary for CIPP endorsements. A government official interviewee highlighted that without PLN’s agreement, no progress can be achieved. A member of Indonesia’s Energy Council also underscored the challenges of coordinating

various government institutions, stating, “[w]ithin the government of Indonesia, we have to have one voice” (G4). The interviewee also argued that reaching an agreement on the specific energy mix percentages for each year is crucial for a successful energy transition in Indonesia. Given the dynamic nature of Indonesia’s energy transition, speaking with one voice across institutions remains a significant challenge.

D. Lack of Political Alignment Amongst Partners

International partners within the JETP may also have competing interests, which can lead to disjointed efforts and a lack of coherent strategy in supporting Indonesia’s energy transition. As indicated by respondent I1, “[i]t might be a case where there will be some competition between the different international partners.”

Each country brings its own policy objectives, energy priorities, and economic interests, which often results in fragmented decision-making and a lack of clear direction in how to allocate climate finance. This is reflected in the disorganization and lack of coordination that has been observed within the IPG. One GoI respondent observed:

“It’s because of the disorganisation within the IPG countries. So, because the recipient countries are asked to organise themselves, we have been asked to organise ourselves internally, right? In terms of our planning, we have been asked to produce the investment plan, which means we have to, you know, swap everything to get into one room and to talk about, you know, what we’re going to put in this investment plan, get your assumptions right.” (G5)

This argument is supported by the IPG countries themselves. As one IPG respondent observed: “Partners ... they had ten

international partners. So, this is really, we are not only part of the solution, but we are also part of the problem as well ... That's a problem. And from a donor perspective, I think it's also a chance to speak with one voice." (I3)

This misalignment could be thought of as reflecting a neo-colonial legacy of international development, where donor countries shape climate finance agendas in a way that serves their interests while limiting the recipient's agency and autonomy. This situation also highlights the complexity of managing multilateral climate finance, where power asymmetries between donor and recipient countries, as well as among donor countries themselves and within recipient countries, shape the negotiation and coordination processes.

E. Unrealistic Targets

Indonesia has been balancing its relationships with all its major partners, particularly when hosting the G20 summit in 2022. Despite concerns about potential implementation capacities and domestic support, Indonesia committed ambitious pledges, such as the targets shown in their JETP Political Declaration, in an effort to project a positive international image and avoid disappointing on their internationally endorsed commitments (G3, G5, I3).

The very ambitious nature of project timelines and emission reduction targets, as mentioned by the interviewees, leads to inefficiencies, delays, and increased costs in implementation. For instance, the inclusion of projects in the Rencana Usaha Penyediaan Tenaga Listrik (RUPTL) plan to meet a target of 23% renewable energy by 2025, despite prior delays, underscores the impracticality of setting ambitious goals within tight timelines. *"It was pretty unrealistic because it had all these projects coming in by 2025 in order to meet that 23% target, even though these projects had been delayed for many years."* (G3)

One of the IPG members thought that the Indonesian JETP had unrealistic targets within

the given timeline, such as the goal of achieving 44% renewables by 2030. The respondent felt that this pressure was coming from the IPG itself.

"Sometimes I think we are pressing Indonesia too much to do certain things ... Our experience is [the goal of] 44% renewables in 2030 is not realistic at all. Nobody wants to lose faith ... So sometimes I think we are pressing Indonesia too much to do certain things and then they do some sort of lip service." (I3)

G3 shared a similar view: *"It's no longer the JETP. It's kind of this international framework. Expecting to accelerate things or to put some external pressure on Indonesia to realise the commitments that they signed up for."* (G3)

This quotation demonstrates how Indonesia's relationships with other nations and their perceptions have a substantial impact on the local environmental and climate change agenda, which is largely driven by political concerns about international environmental policies. The climate finance curse is evident here, as external pressures to meet international commitments may encourage Indonesia to adopt overambitious targets without a clear strategy for implementation, leading to inefficiencies, delays, and increased costs.

Some interviewees placed greater emphasis on the public image and narrative that has evolved around JETP. The narrative around the JETP created an image where funding appeared to be innovative, original, and generous. However, it is not yet fulfilling its purpose since most of the funding was already dedicated years before the JETP was set up (G3, G4, G5).

"The narrative that goes out into the world makes it look like JETP is innovative, and you have fresh money, right? And

when in fact it isn't, it just adds to the distrust.” (G5)

For example, Japanese commitments were already in the pipeline, designated for specific purposes. These were previously committed, or they were part of development financing programs already in action. This has raised doubts among stakeholders regarding the authenticity of the international partners' JETP commitments.

VI. Conclusions and Recommendations

The mobilisation of climate finance is a complex political process influenced by a myriad of factors, including power dynamics, strategic interests, and political will. Understanding these factors is crucial to ensure that climate finance contributes to global energy transitions in an equitable, effective, and efficient manner. Four recommendations have emerged from our analysis, as summarised below.

First, providing transparency in funding sources, goals, timing, and allocation of the funding is essential for building credibility and accountability, not only within the JETP initiative but across all climate finance initiatives. Transparency in communicating both the challenges and progress of the JETP will further build credibility and manage expectations.

Second, over-promising and setting unrealistic timelines has caused inefficiencies in partnership outcomes. Setting achievable goals will prevent setbacks and loss of trust among stakeholders.

Third, reducing conflicts of interest is vital for effective climate finance governance. Addressing the competing interests of powerful stakeholders requires efforts to reduce the influence of entrenched coal interests by fostering greater stakeholder inclusivity and transparency in decision-making.

Fourth, fragmented decision-making among international partners complicates the JETP process. Improving coordination within the International Partner Group is crucial for more effective climate finance governance. By working to unify their objectives and speak with one voice, international partners can avoid delays and ensure that financial resources are allocated in line with Indonesia's transition needs.

This study has examined the intersections of power, governance, and resource allocation within the framework of global climate agreements, contributing to the understanding of climate finance dynamics. The result highlights how climate finance, intended to support energy transitions, can reveal power imbalances and institutional weaknesses in both recipient and donor countries, as exemplified by Indonesia's JETP. This underscores the need for a more balanced and transparent approach to climate finance, where both donor and recipient countries engage in more equitable, accountable, and collaborative decision-making processes.

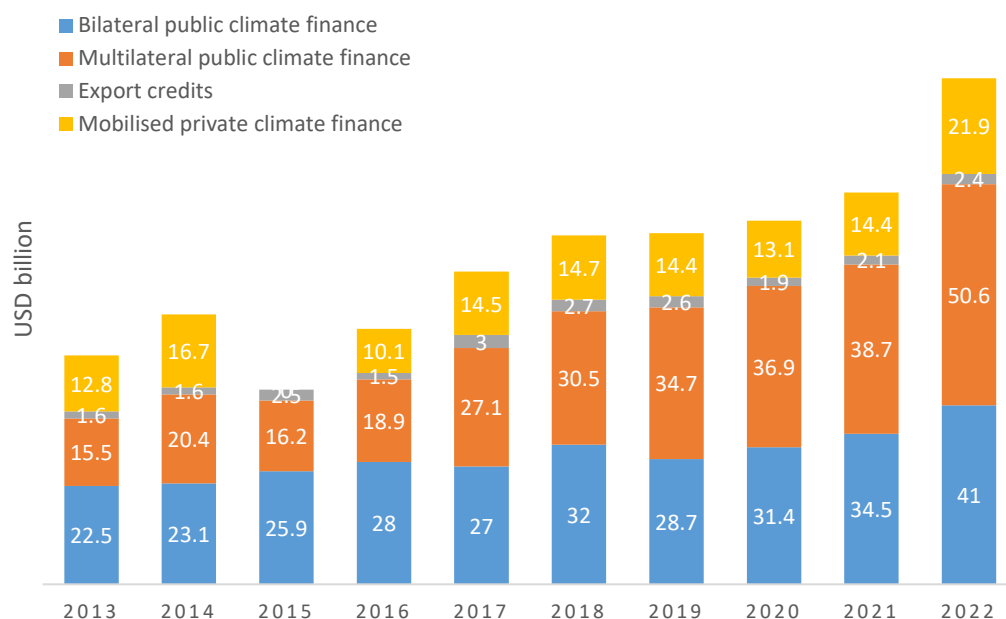


Figure 1: Climate Finance Allocation (Data Source: OECD)

	Side		Organization	Code
1	IPG	IPG	European Union to ASEAN	I1
2		IPG	Royal Norwegian Embassy in Jakarta	I2
3		IPG	Embassy of the Federal Republic of Germany	I3
4		GFANZ & Finance Working Group	GFANZ Working Group & Finance Working Group	I4
5	GOI	Technical Working Group	Institute for Essential Services Reform (IESR)	G1

6		Just Transition Working Group	Indonesian Center for Environmental Law (ICEL)	G2
7		Policy Working Group	Tetra Tech and USAID	G3
8		GOI	National Energy Council & National Energy Transition Task Force of the Republic of Indonesia	G4
9		GOI	JETP Secretariat	G5
10		GOI	Coordinating Minister Secretary for Maritime and Investment Affairs	G6

Table 1: List of Interviewees

How Media Framing Shapes Opinion of Environmental Policy: The Case of ULEZ

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KEYWORDS

media framing, ULEZ, public opinion of policy

ABSTRACT

This article examines how British media outlets frame the ULEZ expansion policy in London and how that framing impacts public perception. Using content analysis, I examined 50 online news articles on the expansion from 19 British media outlets and analysed 508 comments. My findings reveal a strong polarisation, with opposition being the loudest. Framing varied by publication, showing clear policy bias. Some articles were neutral, whilst others were overtly supportive or opposed. Comments also reflected the polarisation: 58% opposed the expansion, 33% supported it, and 9% were neutral. This contrasts with a YouGov poll from August 2023, where 47% of Londoners supported the expansion and 42% opposed it, suggesting online commentary is not reflective of overall public opinion. Negatively framed articles attracted opponents, neutrally framed articles had balanced opinions, and positively framed articles attracted more support but still triggered notable opposition. Patterns emerged based on the overall sentiment of the comments. The most frequently mentioned subject was Sadiq Khan, followed by conspiracy / cash grab, policy criticism and affordability. Subjects were associated with the opinion of the commenter, with references to Sadiq Khan, conspiracy / cash grab and affordability coming from detractors, and policy criticism coming from both supporters and detractors.



I. Introduction

Environmental issues, including climate change, pose serious threats to society, yet political agendas often prioritise other concerns. With rising costs of living, inflation, and other pressing matters, there are questions about whether the public and governments still prioritise environmental

challenges.¹ Since Brexit, UK politicians have increasingly undermined environmental standards, such as reversing toxic chemical bans, lowering greenhouse gas reduction targets, and worsening water pollution.² The challenge is how to make environmental issues more pressing to both citizens and policymakers to drive political, economic, and

¹ United Nations. "Press Conference by Secretary-General António Guterres at United Nations Headquarters." 15 June 2023.

² Horton, Helena. "The UK Environmental Protections Dropped Since Brexit." *The Guardian*, 19 Jan. 2024.

social change. There is a compelling dynamic in how media framing and bias shape public opinion and, in turn, influence policy. Whilst much research explores the media's agenda-setting role and its impact on public opinion, little has been done in the UK environmental policy context.

In political science literature, there is empirical evidence of a correlation between public opinion and public policy output.³ Mainstream media plays a critical agenda-setting role by determining newsworthiness, shaping values, and manipulating political discourse.⁴ According to Entman, "public opinion grows out of an interaction between media messages and what audiences make of them."⁵ However, media coverage frequently exhibits bias, which can stem from the ownership or financial sources of the media outlet, or the political or ideological stance of the outlet and its audience.⁶ Techniques like framing, which emphasise or downplay certain aspects, shape how the public perceives issues.⁷ Consequently, public opinion strongly influences policy.⁸ If people do not see environmental problems as urgent, policymakers may avoid ambitious actions due to political risks. This has major implications for environmental policy. If people do not believe environmental problems require the drastic action scientists say it does, then policymakers are not likely to pursue ambitious environmental policies as they may be politically unpopular.

This study brings together the literature on policy drivers, media framing, and public opinion to explore how media outlets frame environmental policy and its impact on public perception. Specifically, I will examine how online news media has shaped public views on the ultra-low emission zone (ULEZ) expansion in London, a key yet controversial policy aimed at improving urban air quality. I will use content analysis of news articles and online comments to address this question, focusing on several objectives: examining how ULEZ articles are framed, identifying any policy bias in their framing, and comparing how different types of online news media present the ULEZ expansion. Additionally, I aim to explore the themes and subjects in online comments, analyse the frequency distribution of comments across various views and framings, and compare these findings to public survey data. My work is unique in its focus on media framing of the ULEZ, an area previously unexplored.

II. Literature Review

A. The Media

Mainstream media, including radio, television, and print, historically served as dominant platforms for agenda-setting, framing, and political influence.⁹ Online media, such as BBC's news site, blends editorial content with participatory elements, mirroring traditional journalism but introducing interactive dynamics.¹⁰ Both media types serve crucial roles: surveillance, interpretation, socialisation, and

³ Monroe, Alan. "Consistency Between Public Preferences and National Policy Decisions." *American Politics Quarterly*, vol. 7, no. 1, 1979, pp. 3-19; Page, Benjamin, and Robert Shapiro. "Effects of Public Opinion on Policy." *American Political Science Review*, vol. 77, no. 1, 1983, pp. 175-190.

⁴ Lasswell, Harold. "The Structure and Function of Communication in Society." *The Communication of Ideas*, vol. 37, no. 1, 1960, pp. 136-139; Dunaway, Johanna, and Doris Graber. *Mass Media and American Politics*. CQ Press, 2022.

⁵ Entman, Robert. *Democracy Without Citizens: Media and the Decay of American Politics*. Oxford University Press, 1990.

⁶ Hamborg, Felix, et al. "Automated Identification of Media Bias in News Articles: An Interdisciplinary

Literature Review." *International Journal on Digital Libraries*, vol. 20, no. 4, 2019, pp. 391-415.

⁷ Druckman, James. "The Implications of Framing Effects for Citizen Competence." *Political Behavior*, vol. 23, 2001, pp. 225-256; Iyengar, Shanto. *Is Anyone Responsible?: How Television Frames Political Issues*. University of Chicago Press, 1991.

⁸ Entman, Robert. "Framing: Toward Clarification of a Fractured Paradigm." *Journal of Communication*, vol. 43, no. 4, 1993, pp. 51-58.

⁹ Spitulnik, Debra. "Anthropology and Mass Media." *Annual Review of Anthropology*, vol. 22, 1993, pp. 293-315.

¹⁰ Deuze, Mark. "The Web and Its Journalisms: Considering the Consequences of Different Types of Newsmedia Online." *New Media & Society*, vol. 5, no. 2, 2003, pp. 203-230.

manipulation.¹¹ However, scholars like Curran debate whether online platforms truly democratise media or reinforce power structures through corporate ownership.¹² In Britain, the distinction between broadsheets (analysis) and tabloids (sensationalism) complicates media's role in shaping public opinion and policy.¹³ The media strongly influences public opinion¹⁴ and policymaking by setting the agenda and attracting policymakers' attention, as it affects their constituents.¹⁵

B. Media Framing, Online Media and Social Media

The rise of social media, driven by algorithms, has fundamentally transformed media framing, creating a hybrid space where traditional media and social platforms interact.¹⁶ This hybrid environment complicates framing, as actors use social media to rapidly disseminate and reframe narratives. Both Ausat and Nee et al. argue that social media serves as a crucial platform for shaping public perceptions, especially in competitive spaces where multiple narratives compete for attention.¹⁷ The visual and interactive nature of platforms amplifies this effect, allowing users to modify and circulate content in ways that suit their interests and biases.¹⁸

Importantly, frames are no longer static, as interactions on social media enable constant reframing. Social media algorithms play a

decisive role by prioritising certain frames and marginalising others, thus shaping public discourse in real-time. These dynamics challenge traditional media theories like agenda-setting and framing, suggesting a more complex, decentralised process. Antony and Thomas point out that this new landscape calls for a reassessment of these theories, as social media has introduced new actors into the framing process.¹⁹ Meraz and Papacharissi emphasise the democratisation of framing in networked environments, where non-elite actors gain greater influence over narratives traditionally controlled by elite media.²⁰ However, the role of algorithms complicates this potential democratisation, as they often serve to amplify dominant voices and commercial interests. This has led to concerns over the power of social media companies in shaping public opinion by deciding what content is prioritised or suppressed.²¹

C. Media Bias

The internet has expanded access to information, but media bias remains a critical issue, influencing public opinion and political engagement. Access to unbiased information is crucial for forming a balanced understanding of current events, and for many, news articles are the primary source of such information.²² News articles play a role in shaping public opinion; however, media coverage frequently exhibits bias. Scholars like McChesney argue that ownership concentration and profit motives skew

¹¹ Dunaway and Graber (n 4) *supra*.

¹² Curran, James. *Media and Democracy*. Routledge, 2011.

¹³ Hallin, Daniel, and Paolo Mancini. "The North Atlantic or Liberal Model." *Comparing Media Systems: Three Models of Media and Politics*, Cambridge University Press, 2004, pp. 198–248.

¹⁴ Cairney, Paul. *Understanding Public Policy: Theories and Issues*. 2nd ed., Macmillan Education UK, 2019.

¹⁵ Kingdon, John. *Agendas, Alternatives, and Public Policies*. 2nd ed., Longman, 2002.

¹⁶ López-Rabadán, Pablo. "Framing Studies Evolution in the Social Media Era: Digital Advancement and Reorientation of the Research Agenda." *Social Sciences*, vol. 11, no. 1, 2021, p. 9.

¹⁷ Ausat, Abu Muna Almaududi. "The Role of Social Media in Shaping Public Opinion and Its Influence on Economic Decisions." *Technology and Society Perspectives (TACIT)*, vol. 1, no. 1, Aug. 2023, pp. 35–44; Nee, Rebecca Coates, et al. "Double Vision: Testing Audience Effects of

Competing Social Media and Institutional Media Political Framing." *Electronic News*, vol. 11, no. 4, 2017, pp. 211–228.

¹⁸ Pöyhtäri, Reeta, et al. "Refugee Debate and Networked Framing in the Hybrid Media Environment." *International Communication Gazette*, vol. 83, no. 1, 2021, pp. 81–102.

¹⁹ Antony, Mary Grace, and Ryan Thomas. "'This Is Citizen Journalism at Its Finest': YouTube and the Public Sphere in the Oscar Grant Shooting Incident." *New Media & Society*, vol. 12, no. 8, 2010, pp. 1280–1296.

²⁰ Meraz, Sharon, and Zizi Papacharissi. "Networked Gatekeeping and Networked Framing on #Egypt." *The International Journal of Press / Politics*, vol. 18, no. 2, 2013, pp. 138–166.

²¹ Van Dijck, José, and Thomas Poell. "Understanding Social Media Logic." *Media and Communication*, vol. 1, no. 1, 2013, pp. 2–14.

²² Hamborg et al. (n 6) *supra*.

reporting, prioritising sensationalism over objectivity.²³ Others, such as Herman and Chomsky, suggest that media serves elite interests through agenda-setting.²⁴ Whilst news articles are perceived as more trustworthy than social media, bias manifests through selective reporting and ideological framing, as seen in partisan media ecosystems.²⁵ This raises questions about media's role in shaping democratic discourse.

Bias manifests in many forms, including unbalanced reporting, ideological or partisan slants, and even fabricating information.²⁶ Media bias can undermine objective reporting, highlighting the interplay between media profits and agenda-setting, journalist incentives and consumer demand in shaping news coverage.²⁷

D. Media Framing

Framing involves presenting information in a way that emphasises certain aspects whilst downplaying others, shaping how audiences perceive issues.²⁸ Whilst deductive and inductive approaches guide framing analysis,²⁹ critics like Gitlin argue that dominant frames reflect power structures, perpetuating societal inequalities.³⁰ This study uses deductive framing analysis, drawing from five common news frames:³¹

- The responsibility frame “presents an issue or problem in such a way as to attribute responsibility for its cause or solution to either the government or to an individual or group.”³²
- The human interest frame provides a human face or an emotional angle when describing an event, issue, or problem and articulates how individuals and groups are likely to be affected by that issue. Research has demonstrated that the human interest frame can trigger emotional arousal in readers, evoking feelings of concern and compassion for others and increasing engagement with the news.³³
- The conflict frame highlights conflict between individuals, groups or institutions to attract attention and readership.³⁴ The conflict frame is frequently used in news coverage of politics and public affairs, in part done to uphold the journalistic best-practice of balanced coverage.³⁵
- The morality frame puts an issue within the context of values, moral prescriptions or normative messages. Because overt references to morality oppose the traditional journalistic norm of objectivity, the media will make references to such a moral frame

²³ McChesney, Robert. *The Problem of the Media: US Communication Politics in the Twenty-First Century*. NYU Press, 2004.

²⁴ Herman, Edward, and Noam Chomsky. *Manufacturing Consent: the Political Economy of the Mass Media*. Pantheon, 1988, pp. 198-206.

²⁵ Iyengar, Shanto, and Kyu Hahn. “Red Media, Blue Media: Evidence of Ideological Selectivity in Media Use.” *Journal of Communication*, vol. 59, no. 1, 2009, pp. 19-39.

²⁶ Entman (n 5) *supra*.

²⁷ Baron, David. “Persistent Media Bias.” *Journal of Public Economics*, vol. 90, no. 1-2, 2006, pp. 1-36.

²⁸ Druckman, James. “The Implications of Framing Effects for Citizen Competence.” *Political Behavior*, vol. 23, 2001, pp. 225-256.

²⁹ D’Angelo, Paul. “Framing: Media Frames.” *The International Encyclopedia of Media Effects*, 2017, pp. 1-10.

³⁰ Gitlin, Todd. *The Whole World is Watching: Mass Media in the Making and Unmaking of the New Left*. University of California Press, 2003.

³¹ Semetko, Holli, and Patti Valkenburg. “Framing European Politics: A Content Analysis of Press and Television News.” *Journal of Communication*, vol. 50, no. 2, 2000, pp. 93-109.

³² *ibid.*

³³ Valenzuela, Sebastián, et al. “Behavioral Effects of Framing on Social Media Users: How Conflict, Economic, Human Interest, and Morality Frames Drive News Sharing.” *Journal of Communication*, vol. 67, no. 5, 2017, pp. 803-826; Jebril, Nael, et al. “The Effects of Human Interest and Conflict News Frames on the Dynamics of Political Knowledge Gains: Evidence from a Cross-National Study.” *Scandinavian Political Studies*, vol. 36, no. 3, 2013, pp. 201-226.

³⁴ Neuman, W Russell, et al. *Common Knowledge: News and the Construction of Political Meaning*. University of Chicago Press, 1992.

³⁵ Bartholomé, Guus, et al. “Manufacturing Conflict? How Journalists Intervene in the Conflict Frame Building Process.” *The International Journal of Press / Politics*, vol. 20, no. 4, 2015, pp. 438-457.

indirectly through quotation or inference.³⁶

- The economic consequences frame reports an issue in terms of the economic consequences it will have. It is generally used by mainstream news outlets like elite newspapers to signal high newsworthiness and authority.³⁷

Scholars debate whether frames like “responsibility” deflect systemic critiques,³⁸ or whether the conflict frame fuels polarisation,³⁹ complicating journalism’s role in democratic deliberation.

E. Public Opinion

Media framing is particularly relevant to public opinion, as it can shape the public’s perception of the importance and priority of issues and how they should be understood.⁴⁰ Framing leads individuals to focus on the issues emphasised by the media when forming opinions.⁴¹ However, both Zaller and Bolsen et al. argue that media influence is mediated by individual partisan identities and confirmation biases, which filter information through pre-existing beliefs.⁴² This feedback loop complicates democratic responsiveness, as public opinion shapes policy mostly when issues are highly salient.⁴³ When policy levels diverge from public preferences, the public’s demand for policy adjustments ensures that

policymakers remain attuned to public desires.⁴⁴ The interaction between media, public opinion, and policy outcomes thus remains an area of contested scholarship, particularly in polarised environments.⁴⁵

F. Policy Drivers

Public policy is shaped by various actors, including the media, which plays both passive and active roles.⁴⁶ Traditional institutional theories emphasise political organisations’ structural power,⁴⁷ but recent scholarship critiques the media’s dual role. Some scholars argue that the media is a channel for the policy beliefs of political actors, reflecting these beliefs to the public.⁴⁸ However, others posit that the media is not just a passive channel, but rather an active participant in advocacy coalitions.⁴⁹ The media thus plays a dual role in shaping policy: it both reflects the beliefs of political actors and actively participates in shaping and promoting these beliefs.⁵⁰ This dual role complicates straightforward analyses of policy formation, making the media an influential yet contested actor in the policy process.

G. Low Emission Zone Schemes

European cities continue to experience unsafe air quality as per WHO guidelines, despite efforts over past decades to improve air quality.⁵¹ To improve air quality, many

³⁶ Semetko and Valkenburg (n 31) *supra*.

³⁷ *ibid*.

³⁸ Iyengar (n 7) *supra*.

³⁹ Cappella, Joseph, and Kathleen Hall Jamieson. *Spiral of Cynicism: The Press and the Public Good*. Oxford University Press, 1997.

⁴⁰ Delli Carpini, Michael. “News from Somewhere: Journalistic Frames and the Debate over ‘Public Journalism’.” *Framing American Politics*, edited by Karen Callaghan and Frauke Schnell, 2005, pp. 21-53.

⁴¹ Chong, Dennis. “How People Think, Reason, and Feel about Rights and Liberties.” *American Journal of Political Science*, vol. 37, no. 3, 1993, pp. 867-899.

⁴² Zaller, John. *The Nature and Origins of Mass Opinion*. Cambridge University Press, 1992; Bolsen, Toby, et al. “The Influence of Partisan Motivated Reasoning on Public Opinion.” *Political Behavior*, vol. 36, 2014, pp. 235-262.

⁴³ Burstein, Paul. “The Impact of Public Opinion on Public Policy: A Review and an Agenda.” *Political Research Quarterly*, vol. 56, no. 1, 2003, pp. 29-40.

⁴⁴ Soroka, Stuart, and Christopher Wlezien. “Opinion-Policy Dynamics: Public Preferences and Public

Expenditure in the United Kingdom.” *British Journal of Political Science*, vol. 35, no. 4, 2005, pp. 665-689.

⁴⁵ Nickerson, Raymond. “Confirmation Bias: A Ubiquitous Phenomenon in Many Guises.” *Review of General Psychology*, vol. 2, no. 2, 1998, pp. 175-220.

⁴⁶ Weible, Christopher, and Paul Sabatier. *Theories of the Policy Process*. 4th ed., University of Colorado Press, 2018.

⁴⁷ John, Peter. *Analyzing Public Policy*. Taylor & Francis Group, 2012.

⁴⁸ *see*, for instance, Baumgartner, Frank, and Bryan Jones. *Agendas and Instability in American Politics*. 2nd ed., University of Chicago Press, 2010; Kingdon, John. *Agendas, Alternatives, and Public Policies*. 2nd ed., Longman, 2002.

⁴⁹ Sabatier, Paul, and Hank Jenkins-Smith. *Policy Change and Learning: An Advocacy Coalition Approach*. Westview Press, 1993.

⁵⁰ Shanahan, Elizabeth, et al. “Narrative Policy Framework: The Influence of Media Policy Narratives on Public Opinion.” *Politics & Policy*, vol. 39, no. 3, 2011, pp. 373-400.

⁵¹ “Air Pollution.” *European Environment Agency*, 2024.

European cities have introduced low emission zones (LEZs) since the 1990s, with over 300 currently in place across Europe.⁵² LEZs restrict road access based on vehicle emissions, accelerating the shift to cleaner vehicles. However, over time, emissions plateau, requiring stricter standards to continue reducing pollution.⁵³

London's ultra-low emission zone (ULEZ), introduced in 2019 and expanded in 2023 to cover all 32 boroughs,⁵⁴ charges drivers of non-compliant vehicles £12.50 daily.⁵⁵ The expansion has been highly controversial, with media coverage reflecting political divides, making it a useful subject for research.

In summary, the interplay between media framing, public opinion and policy output highlights the influential role the media plays in shaping policy discourse and direction. The role of media framing on public opinion has been studied in a variety of different environmental context, including addressing climate change,⁵⁶ responses to natural disasters,⁵⁷ and support for different energy sources.⁵⁸ My study will fill a gap in the literature by looking at a policy aimed at improving air quality.

III. Method

To explore how media framing is used when reporting on ULEZ and how the public responds to that messaging, I take a two-pronged approach using content analysis.

A. Content Analysis of News Media Articles

Content analysis is used to study unstructured data, such as opinion change, media effects, and agenda setting.⁵⁹ I use content analysis to understand how different media outlets frame the same policy issue and to get a general view of the media landscape in Britain. I examined fifty online news media articles on the ULEZ expansion from the run up to the expansion to several months after the expansion was implemented, covering a period from June to November 2023. In addition to the broad research question articulated in the introduction, I explore a few specific questions through content analysis of articles:

- How are articles on the ULEZ expansion framed? Do they exhibit bias in their policy preference? (e.g. are they supportive, opposed or neutral about the expansion).
- Do different types of online news media (i.e. tabloids vs. broadsheets) and those with varying political agendas differ in how they use news frames?

News outlets in Britain are typically categorised as broadsheets (more in-depth) or tabloids (more sensational).⁶⁰ Because readership is high across both,⁶¹ I have included a variety of outlets (e.g., BBC, The Guardian, Daily Mail), including articles of varying stances from a variety of publications ('left-leaning' and 'right-leaning' publications). To select articles for analysis, I first identified the largest online UK news outlets by viewership (audience size) and reach. I selected articles from the BBC, Daily

⁵² "The Development Trends of Low- and Zero-Emission Zones in Europe." *Clean Cities Campaign*, 20 Jul. 2022.

⁵³ Holman, Claire, et al. "Review of the Efficacy of Low Emission Zones to Improve Urban Air Quality in European Cities." *Atmospheric Environment*, vol. 111, 2015, pp. 161-169.

⁵⁴ Ward, Bob. "The Truth About London's Ultra Low Emission Zone." *LSE Grantham Institute News*, Aug. 2023.

⁵⁵ "ULEZ Expansion 2023." *Transport for London*, 2023.

⁵⁶ see, for example, Bromley-Trujillo, Rebecca, et al. "Analyzing Variation in State Newspaper Coverage of Climate Change." *Climatic Change*, vol. 176, no. 12, 2023, p. 174.

⁵⁷ Crow, Deserai, et al. "Local Media Coverage of Wildfire Disasters: An Analysis of Problems and Solutions in Policy Narratives." *Environment and Planning C: Politics and Space*, vol. 35, no. 5, 2017, pp. 849-871.

⁵⁸ Zanocho, Chad, et al. "Fracking Bad Guys: The Role of Narrative Character Affect in Shaping Hydraulic Fracturing Policy Preferences." *Policy Studies Journal*, vol. 46, no. 4, 2018, pp. 978-99.

⁵⁹ Krippendorff, Klaus. "Uses and Inferences." *Content Analysis: An Introduction to Its Methodology*. 4th ed., SAGE, 2019.

⁶⁰ Hird, Ella. "UK Media, Explained." *A News Education*, 2020.

⁶¹ Watson, Amy. "News Brands Reach in the United Kingdom 2020-2022, by Category." *Statista*, 2023.

Express, Daily Mail, Mirror, Evening Standard, Financial Times, GB News, The Guardian, The Independent, ITV, Metro, Sky, The Sun, The Telegraph and The Times.⁶² I excluded non-Britain-based publications like the New York Times, as well as regional newspapers that are headquartered outside of London (for instance, Birmingham Live). I also excluded outlets that are not considered broadsheets or tabloids, including subject-specific publications like Money Saving Expert.

After identifying which outlets I would source articles from, I compiled a dataset of three articles on the ULEZ expansion from each outlet in June 2024. News outlets generally had more than three articles on the expansion, so I filtered articles by my defined time range and the degree of relevance to my study, selecting what I perceived to be three of the most topical articles. I assigned each article an ID for coding and classification purposes. As I only selected fifteen news outlets, I needed five more articles to reach my target sample size of fifty articles. Therefore, I selected five additional articles on the ULEZ expansion from the following outlets: one from Politico, one from Reuters, one from Channel 4 and two from LBC. To measure the extent to which certain frames appear in stories on the ULEZ expansion, I used media framing measures from Semetko and Valkenburg.⁶³ Binary coding was used to establish whether different elements were present (1) or not (0). Each question was meant to measure one of five news frames: human interest, conflict, morality, attribution of responsibility, and economic consequences. Following the analysis, I conducted simple frequencies to summarise the findings and commented qualitatively on the results.

One major limitation of this method is the likelihood of selection bias. When the sample

selected for a study is not representative of the population of interest, this introduces the risk of selection bias.⁶⁴ In my case, I have tried to examine news articles from a wide variety of British publishers; however, despite my best efforts, it is likely my selected sample reflects a media landscape that is incorrect or not generalisable beyond this study. Additionally, by manually selecting articles from each outlet, I have likely unintentionally introduced bias by pulling articles I perceive to be interesting, which may also not reflect a representative media landscape.

B. Content Analysis of Online Comments

To supplement the articles analysis, I examined public opinion in online comments. Internet-based opinions significantly influence public and political support for environmental policies, with politicians highly sensitive to this feedback.⁶⁵ I analysed online reader comments to the fifty news articles on ULEZ analysed in the previous section. Based on language and tone, comments were assigned to one of three general opinion categories: supportive, opposed, or neutral about the ULEZ expansion. My specific objectives were:

- to determine the frequency distribution of online reader comments over the different views (i.e. supportive, opposed or neutral), compared to results from surveys of the general public;
- to explore whether this frequency distribution was affected by the framing of the article to which the readers responded; and
- to uncover themes and subjects used by the public when discussing the ULEZ expansion, and examine whether the nature of those themes corresponds to the opinion of the reader.

⁶² Majid, Aisha. "Top 50 UK News Websites in April: Independent Drops Back Out of Top Five but Strong Growth for Metro." *Press Gazette*, 31 May 2024.

⁶³ Semetko and Valkenburg (n 31) *supra*.

⁶⁴ Ellenberg, Jonas. "Selection Bias in Observational and Experimental Studies." *Statistics in Medicine*, vol. 13, no. 5-7, 1994, pp. 557-567.

⁶⁵ De Kraker, Joop, et al. "Internet Public Opinion on Climate Change: A World Views Analysis of Online Reader Comments." *International Journal of Climate Change Strategies and Management*, vol. 6, no. 1, 2014, pp. 19-33.

Upon completing the articles analysis, I revisited each article to extract comments. My goal was to collect approximately ten comments per article; however, the number of comments varied widely, with some articles having fewer than ten and others having hundreds. Out of the fifty articles analysed, twenty-seven contained comments, whilst twenty-three did not. In cases where comments were disabled, I sourced comments from discussion of the article on the r/unitedkingdom and r/ukpolitics subreddits where available, as well as the news outlet's Twitter post. In total, I downloaded 520 comments. I sorted comments by the number of likes and dislikes where possible to ensure high quality and relevant data. After filtering out twelve irrelevant comments, 508 comments remained for analysis.

I uploaded the comments to NVivo, a qualitative software designed to assist researchers in collecting, organising, analysing, visualising, and reporting their data.⁶⁶ First, I coded the dataset to categorise sections of the data. Each comment was coded based on its source/publisher and whether the article had a pro-ULEZ, anti-ULEZ, or neutral stance. I also categorised each comment's opinion on the ULEZ expansion as supportive, opposed, or neutral. Additionally, I identified recurring themes in the comments and created corresponding codes for the most prevalent ones. Comments could contain multiple codes. After completing the coding, I tabulated the frequencies of the data for further analysis.

As with the articles' selection, my selection of comments is likely to be a source of selection bias. Because I have filtered comments to source high quality data and took a limited number of comments from each article, I have potentially created a dataset that is not representative of the population. Additionally, sourcing comments from the articles themselves and also from other social platforms like Reddit and Twitter likely further exacerbates this selection bias.

IV. Results

A. Articles Analysis

I looked first at the number of articles by general frame (Table 1, below). Half of articles studied (twenty-five) were neutral, seventeen were negative (opposed to the ULEZ expansion) and eight were positive (supportive of the expansion).

Looking at the presence of five news frames in each article, I found the conflict frame was the most widely used, followed by the economic, attribution of responsibility, human interest, and morality frames (Table 2, below).

1. Conflict Frame

The conflict frame was nearly universal, reflecting the polarised nature of the ULEZ expansion debate. Of the articles analysed, thirty-six highlighted disagreements between parties, thirty-five featured one party reproaching another, and twenty-eight referred to multiple sides of the issue.

Typically, the conflict is portrayed as a battle between Sadiq Khan and TfL (Transport for London) versus various opponents. Most articles would quote Khan or TfL advocating for ULEZ as necessary for improving air quality and bringing health and environmental benefits. Conversely, opponents criticised the scheme for reasons such as its unaffordability and conflicting scientific evidence on its efficacy. For example, a BBC article illustrated conflict: "[a] business owner in Kent has said that the expansion of [ULEZ] to the whole of outer London will have a 'massive impact' on her livelihood. But a clean air campaigner labelled ULEZ 'the most effective solution' to pollution and poor respiratory health. London Mayor Sadiq Khan said it would bring 'cleaner, healthier air.'"

Many articles used direct quotations to convey conflict. In the Standard, Hillingdon councillor Steve Tuckwell criticised the expansion and Khan directly, stating that "[o]ur local community, and countless others across London getting roped into this shambolic

⁶⁶ Dhakal, Kerry. "NVivo." *Journal of the Medical Library Association*, vol. 110, no. 2, 2022, pp. 270-272.

scheme, are dead against it. Not because we don't want clean air, as Sadiq keeps trying to spin. But we don't accept that taxing the lowest earners is the right way to go about it." Conflict was frequently depicted along political lines, with articles reflecting opposing views between the Conservatives and Labour and / or Sadiq Khan. For example, GB News reported, "London Mayor Sadiq Khan has been branded a 'modern day highwayman' in a scathing rant by the Deputy Leader of the Conservative Party, Lee Anderson."

Sixteen articles discussed winners and losers of the ULEZ expansion, often depicting small businesses, low-income families, and the elderly as losers, whilst City Hall, TfL, and Sadiq Khan were portrayed as winners. For example, an article in the Independent depicts Khan and City Hall as financially benefiting at the public's expense: "John Taylor, 81, said, 'I've had to sell my car and buy a new one, which cost me a lot of money unfortunately. We've never had a bad air pollution problem, and I think ULEZ is just a way of taking money away from us.'" Tabloids and broadsheets both used the conflict frame when reporting on the expansion.

2. Economic Frame

Media coverage often highlighted the economic implications of the ULEZ expansion on various segments of the population, including small business owners, tradesmen, the elderly, and low-income households. Of the thirty-seven articles employing an economic frame, all discussed the costs associated with the ULEZ expansion. Commonly cited figures included the £12.50 daily charge for non-compliant vehicles and the penalty for non-payment.

Several articles discussed immediate financial losses or gains (twenty) and references to wider economic consequences of pursuing the ULEZ expansion (sixteen). For instance, discussions often centred on the revenue generated by the scheme for the government and the cost to taxpayers. Metro emphasises the amount of money being generated by the scheme for TfL, writing that ULEZ "expansion

raked in £23,000,000 in first month with 57,000 facing daily charge. ... That means TfL is receiving approximately £715,000 a day in ULEZ charges on average." The Sun emphasised the taxpayer burden, reporting "the scheme is expected to cost £140 million of taxpayers' money." Some reports also touched on broader economic repercussions, such as increased service charges for deliveries and goods transport, which critics argue could harm the London economy. LBC featured a perspective deeming the mayor's policy as "anti-business," predicting dire economic outcomes. Articles also explored financial relief measures, such as tax deductions for self-employed drivers using non-compliant vehicles for business purposes. The Financial Times reports: "self-employed workers would be able to claim back the fee as part of their tax return if the journey was 'an exceptional trip solely for business'. The loophole will come as a relief to thousands of traders who fear they will have to replace their vehicles at great expense, despite there being support available from a scrappage scheme."

The framing varied between tabloids and broadsheets. Broadsheets, like Reuters, often used technical economic terminology and provided extensive context, framing the issue within the larger economy-versus-environment debate. Reuters notes that "opponents argue the £12.50 daily charge on older, more polluting vehicles is unfair and economically damaging." In contrast, tabloids tended to sensationalise the costs and focus on individual impacts. The Sun, for instance, employed emotive language to depict public outrage, stating that "[d]rivers have reacted with fury at paying an extra £12.50 a day to drive to collect their kids from school, go to the shops or see elderly relatives."

Overall, articles using the economic frame frequently adopted a negative tone, emphasising both direct expenses and broader economic consequences.

3. Attribution of Responsibility frame

The government is predominantly blamed in articles utilising the responsibility frame. Many articles (twenty-nine) suggested that some level of government can alleviate the problem, whilst twenty-eight articles indicated that the government is responsible for the problem. Often, the media attributed responsibility indirectly, quoting individuals who criticised the government over the scheme. Mayor Sadiq Khan was frequently singled out, though City Hall, Labour, and TfL were also held accountable. For example, Sky quoted then Prime Minister Rishi Sunak attributing responsibility to his political opponents: “I think people and families are struggling with the cost of living, that is obvious to everyone. And at that time, the Labour Party, the Labour Mayor Sadiq Khan and [Labour leader Sir] Keir Starmer are introducing the ULEZ charge which is going to hit working families.”

Some positively framed articles also implicated Boris Johnson, noting that he introduced the ULEZ scheme as mayor of London in 2014.

Other articles implied that the government could alleviate the problem, whether it be the UK Government or City Hall, and suggested various solutions (fifteen). Proposed solutions include reversing the expansion, providing more funding for the scrappage scheme, and allowing more time between the announcement and implementation of the expansion.

Every negatively framed article (seventeen) used the responsibility frame, most often to attribute responsibility for ULEZ to the government, particularly to the mayor. Neutral and positive articles were less likely to blame the government outright but suggested that the government has the ability to alleviate the problem. Tabloids and broadsheets alike used the attribution of responsibility frame.

4. Human Interest Frame

The media’s use of the human interest frame focused on highlighting those likely to be

affected by the ULEZ expansion, aiming to generate an emotive response from audiences. Whilst the articles did not explicitly frame stories in empathetic or compassionate terms, they employed adjectives, personal vignettes, and visuals designed to evoke feelings of outrage, empathy, sympathy, or compassion. Specifically, thirty-two articles used emotive language, twenty-nine emphasised the personal impact of the ULEZ expansion, and twenty-one included visual elements designed to elicit an emotional reaction.

For example, a BBC article detailed the impact on a family living south of London, where their child is receiving cancer treatment:

“Arin Ghosh has to drive his daughter from Kent to the Royal Marsden Hospital in Sutton every day for chemotherapy. He must pay the £12.50 daily [ULEZ] charge and ... claim the cost back afterwards. Mr. Ghosh told the BBC the [ULEZ] fee was ‘the last thing you should have to think about when attending critical appointments and caring for an unwell child.’ He also said the process to claim back the charge was ‘unclear, confusing and lengthy.’ He added he believed he and others in his position should be fully exempt from the charge, as it would save time and allow him ‘to spend as much time as possible with my daughter.’”

This story included an image of the father and daughter, likely intended to invoke compassion from audiences.

Reporters avoided direct expressions of compassion, instead putting a “human face” on stories by providing human examples (twenty-eight articles) and detailing the personal lives of those impacted by the expansion (twenty-one articles). Many negatively framed articles quoted individuals

for whom the ULEZ expansion represented a prohibitive expense, using these human interest tales to illustrate the severity of the situation. The media generally refrained from direct expressions of emotion or evaluative statements, with direct feelings of compassion appearing primarily in interviews or quotations.

All seventeen negatively framed articles used the human interest frame. Most articles utilising this frame combined multiple techniques from the coding list, suggesting that these methods are most effective when used together (e.g., photographs, emotive adjectives, and personal anecdotes). Tabloids and broadsheets alike used the attribution of human interest frame.

5. Morality Frame

This frame was the least utilised among those studied (nineteen articles). As with other frames, the media referenced moral perspectives indirectly through quotations or inferences rather than direct commentary. Reporters typically relied on others to “raise the issue,” as they are not positioned to speak on morality themselves.⁶⁷ Articles using the moral frame often conveyed a stance, positive or negative.

Positively framed articles often highlighted the perceived immorality of allowing people to suffer from air pollution. For instance, The Guardian quoted London Mayor Sadiq Khan to introduce a moral perspective: “[Khan] told BBC Breakfast, ‘We now have a really effective policy to reduce air pollution. It’s shown to be effective in central London and inner London, but I think clean air is a right, not a privilege. What about outer London? Why shouldn’t they breathe clean air? Why should they carry on dying prematurely in numbers that could be reversed?’”

Conversely, negatively framed articles focused on the perceived immorality of imposing financial burdens on those unable to afford them. Most neutral articles did not refer to morality. Tabloids and broadsheets both

raised moral perspectives indirectly through quotations, with no significant differences in their approach.

B. *Online Comments*

This section presents a qualitative content analysis of readers’ comments on the fifty news articles about the ULEZ expansion discussed in Section IV.A. A total of 508 readers’ comments were coded and categorised into frames, opinions, and themes. The coding process was inductive, examining the comments within their contextual use to align with the research objective. The contextual meaning of words was derived from the readers’ comments, which served as the units of analysis.

Table 3, below, presents a breakdown of the origin of each comment based on article framing: 188 comments are from negatively framed articles, 243 from neutral articles, and 77 from positively framed articles. This distribution roughly reflects the proportion of framed articles analysed in Section IV.A, with about half of the comments coming from neutral articles. Most comments originate from neutral or negatively framed articles. There are significantly fewer comments on pro-ULEZ articles for two main reasons: many of these news websites do not have comments enabled, limiting access to public discourse, and there are generally fewer pro-ULEZ articles available.

The overall sentiment of the comments is shown in Table 4, below. Nearly three out of five comments (58%) opposed the ULEZ expansion, while a third (33%) expressed support. Less than 10% were neutral about the expansion. The ULEZ expansion is clearly a polarising issue, with opposition voices being the most prominent.

Breaking down the opinions of comments by their origin reveals significant trends (Table 5, below). Most commenters on anti-ULEZ framed articles also expressed opposition to the ULEZ expansion. Specifically, 148 commenters on these articles were opposed

⁶⁷ Neuman et al. (n 34) *supra*.

(79%), 5 were neutral (14%), and 35 were supportive (19%). Neutrally framed articles exhibited a more balanced distribution of opinions: 116 opposed the expansion (48%), 95 supported it (39%), and 32 remained neutral (13%). In the case of positively framed articles, supportive comments outnumbered opposing ones, yet opposition voices were still notable: 36 commenters supported the expansion (47%), 30 opposed it (39%), and 11 were neutral (14%).

In exploring themes that emerged from comments, several trends became apparent. Common subjects or themes were identified and categorised. The most significant themes are shown in Table 6, below.

The most frequently mentioned subject was Sadiq Khan, referenced in 138 comments (27%). Comments falling under this category explicitly mentioned the mayor, often including praise or criticism as the face of ULEZ. The second most mentioned theme was conspiracy or cash grab, with 92 comments (18%). Many commenters expressed suspicion about the ULEZ expansion, perceiving it as a government scheme to generate revenue. Comments in this category often suggested that the expansion was a pretext for restricting freedoms, predicted its wider implementation, or asserted that the proceeds would benefit Sadiq Khan and the government. Policy criticism was the third most prevalent theme, appearing in 71 comments (14%). This category included critiques of the ULEZ policy and suggestions for improvement, and recommendations for other policy measures the government should prioritise. Additionally, 54 comments (11%) addressed the affordability of the ULEZ expansion and its impact on marginalised groups, such as low-income families. These comments often highlighted the financial burden of the scheme, its implications during the cost of living crisis, and its effects on small businesses and tradespeople.

Other themes appeared in smaller numbers: the health benefits of ULEZ (38 comments), the Conservative Party (30), criticisms of

reporting and the media (29), the environmental benefits of the ULEZ expansion (20), the Labour Party (20), wider economic impacts of the expansion (11), and anti-environment / climate denial rhetoric (9). Descriptions of each theme are as follows:

- Health benefits of ULEZ: emphasised the health advantages of cleaner air, particularly for individuals with asthma, children, and the elderly.
- Conservative Party: mentioned the Conservative Party, typically blaming them for perceived harmful rhetoric or political manoeuvring.
- Criticism of journalism / reporting / media: criticised the quality of reporting, pointing out perceived errors, misrepresentations, or political bias.
- Environmental benefits of ULEZ: highlighted the improvements in air quality due to ULEZ.
- Labour Party: mentioned the Labour Party, either positively or negatively, often attributing responsibility for the policy to them.
- Wider economic impacts: suggested that ULEZ would raise the costs of goods and services, negatively affecting the economy.
- Anti-environment / climate denial: argued against the necessity of measures like ULEZ, often denying the reality of climate change.

Patterns emerged based on the overall sentiment of the comments, highlighting themes / subjects that were associated with specific opinions (Figure 1, below).

With comments supporting ULEZ, a prevalent theme was the emphasis on its health benefits, cited in 38 instances. One commenter on the Telegraph wrote: “I can’t stand Khan, but as someone who lives in Central London, the current ULEZ zone has reduced pollution / noxious fumes / CO₂ substantially. Figures easily available online. Why should other’s choices affect my kids’ lungs?”

Supporters also underscored the environmental advantages of cleaner air, often mentioned alongside its health benefits.

One Financial Times reader explained:

“I cycled along a busy road in Bromley on Thursday evening and my airways still feel raw from the car exhaust pollution. I absolutely support the expansion of ULEZ because this will make the outer boroughs air cleaner, reduce motor traffic and therefore help to increase more environmentally friendly means of transport.”

References to the Conservative Party varied among supportive comments, with some attributing the scheme's introduction to Boris Johnson, while others criticised the then Tory government's stance against ULEZ.

Amongst neutral commenters, a recurring theme involved criticism of the article or publication itself rather than addressing the ULEZ expansion directly. For instance, similar sentiments were expressed in comments on the Financial Times, where criticism of the journalist's framing of a tax deduction for ULEZ charges incurred for business as a loophole was voiced.

In contrast, the opposition camp expressed a wide array of themes. The predominant subject among those opposing ULEZ centred on personal criticism of Sadiq Khan. Many comments blamed the mayor, questioning his competence and ethics, alleging personal gain from the scheme, and questioning his commitment to the welfare of Londoners. One reader of the Daily Mail writes “Sadiq is a thief and a conman, attacking the poor as usual, he is bringing London to a standstill! His lies about death is [sic] also wrong, one recorded death from air pollution since 2015!” Some remarks even resorted to derogatory labels like ‘Genghis Khan’, reflecting a tone of name-calling and personal insults.

Conspiracy theories and accusations of a ‘cash grab’ were significant among opponents of the ULEZ expansion. Many expressed strong suspicions regarding its true intentions. For instance, some commenters feared that the ULEZ expansion could be a precursor to a pay-per-mile scheme. Concerns about government surveillance were also expressed.

Others questioned the allocation of funds, suggesting it could be a bailout for TfL or a financial gain for Sadiq Khan. One Daily Express reader speculates: “how much of a person's £12.50 will go towards cleaning up the air and how much will go towards bailing out TFL?” Many critics asserted that the government's primary concern was profit rather than addressing air pollution, viewing drivers as easy targets for revenue generation.

Many critics of the expansion justified their opposition by highlighting its potential financial burden on various groups. A common concern raised was the affordability issue, particularly amidst the broader cost of living crisis. Commenters noted that those driving older vehicles often belong to low-income brackets, questioning the fairness of imposing additional fees on individuals who struggle to afford vehicle upgrades. One Mirror reader writes: “So who are the people who need the scrappage trade in-? Those with very old cars! In the main who are those with very old cars? People who could not afford a new one either second hand or off the production line!” Moreover, there was recognition of the impact on small businesses and tradesmen who rely on vehicles to transport essential equipment, making alternative transport options impractical. One reader on the Standard made a sarcastic reply about the impact of ULEZ on tradesmen: “that's why I will in future use my cycle to carry all my tools and equipment to jobs. Shouldn't be a problem to fit a few 3metre lengths of copper tube over my shoulder, balance a boiler and a few radiators on my handle bars”. Additionally, discussions extended to vulnerable groups such as the sick and elderly, underscoring concerns about how ULEZ could disproportionately affect their mobility and daily lives.

Although less frequently mentioned, criticism of the Labour Party was notable among opponents, with some blaming the party for prioritising other interests over those of working people. A subset of critics also expressed concerns about the broader economic impacts of ULEZ, fearing potential inflation and detrimental effects on London's economy. A Standard reader expressed fears for the economy: "zero proof a single life would be saved. However, many livelihoods will be destroyed slowly due to increased costs, possibly leading to unemployment, business closures, bankruptcies, and even suicides? Doesn't sound like a win to me." Additionally, a few individuals asserted that the ULEZ expansion was unnecessary, disputing claims of environmental necessity.

Interestingly, policy criticism emerged prominently across both opponents and supporters of the ULEZ expansion. Many voiced scepticism about its effectiveness, citing mixed scientific evidence and proposing alternative methods to tackle air pollution. Others argued that the government's scrappage scheme fails to provide adequate financial support for purchasing new vehicles. Moreover, critics and supporters alike highlighted areas where ULEZ policy could be strengthened and offered additional policy recommendations for consideration.

V. Discussion

In this study, I examined how the British media framed the ultra-low emission zone (ULEZ) expansion in London and how online public discourse reacted to these articles.

A. News Media Articles

My first objective was to examine the framing of ULEZ expansion across fifty articles from British news outlets, assessing five common frames and whether they were supportive, neutral, or opposed. Overall, my findings from the articles analysis reveals there is a strong

polarisation on the ULEZ expansion, with opposition being the loudest. Framing varies depending on the publication, with clear evidence of policy bias. Some articles were neutral and expressed no policy preference, while others were overtly supportive or opposed. The use of interviews and quotations was a key mechanism employed by those articles with a policy preference, using interviewees as a proxy to convey an overall stance. This finding confirms a well-established theory that suggests media outlets frame issues in different ways, reflecting a range of policy biases.⁶⁸

The analysis revealed a few articles which were supportive of the ULEZ expansion, mostly from centrist or left-of-centre publications like The Guardian. Neutral coverage was found in broadsheets like The Times, Financial Times, BBC, Sky News and ITV, confirming the literature which suggests broadsheets tend to offer more balanced reporting.⁶⁹ Negative framing was found in many tabloid publications like The Daily Mail, The Express and The Sun, as well as some right-leaning broadsheets like The Telegraph. Articles with a stance were twice as likely to be negative as positive. Political alignment shaped coverage; left-leaning outlets were neutral or supportive, while right-leaning ones were more often opposed, reflecting party loyalties.⁷⁰

The most common frames, in order of predominance, were conflict, economic consequences, attribution of responsibility, human interest and morality. The conflict frame, the most widely used, was typically presented as a battle between proponents of the expansion like Sadiq Khan and TfL against various detractors. The economic frame, often used negatively, highlighted the economic impacts of the expansion on different populations. Responsibility attribution largely blamed the government, usually Sadiq Khan

⁶⁸ Strömberg, David. "Mass Media Competition, Political Competition, and Public Policy." *Review of Economic Studies*, vol. 71, no. 1, 2004, pp. 265-284; Baron (n 27) *supra*.

⁶⁹ De Vreese, Claes, et al. "The News Coverage of the 2004 European Parliamentary Election Campaign in 25 Countries." *European Union Politics*, vol. 7, no. 4, 2006, pp. 477-504.

⁷⁰ Baron (n 27) *supra*.

himself, and was usually used in negative articles. The human interest frame focused on the personal impact of the ULEZ expansion, while the morality frame, the least used, appeared mostly in positively framed articles discussing environmental benefits and in negative articles highlighting financial burdens. The use of news frames depended on the overall stance of the article. Articles that were negatively framed (that is, opposed to the ULEZ expansion) tended to use the responsibility attribution, human interest and economic frames. Neutral frames tended to avoid overt blame and emotional manipulation, focusing instead on factual reporting. Positively framed articles rarely used responsibility or economic frames, but occasionally took a moral frame to argue against environmental degradation and threats to human health.

1. Tabloids vs Broadsheets

Comparing tabloids and broadsheets' coverage, I found that broadsheets, as expected, generally held a neutral stance, giving factual accounts of the expansion, often showing two or more sides of the story and allowing readers to come to their own conclusion. Notable exceptions included publications that tend to be more overtly political like The Telegraph and The Guardian. Half of articles took a definitive stance, with twice as many taking a negative stance than a positive stance, suggesting a general media bias against the ULEZ expansion. As is often the case, the negative voices seem to be the loudest.⁷¹

Tabloids and broadsheets used similar frames, though tabloids sensationalised costs in the economic frame, while broadsheets provided more context and technical language. This approach by tabloids, although potentially oversimplified, likely sought to make content more accessible to appeal to a broader

audience. Tabloids also frequently combined multiple frames to enhance the impact of their articles. Thus, my findings somewhat support the literature as tabloids tended to sensationalise while broadsheets were usually more technical when it came to economics,⁷² but in my study broadsheets also employed techniques that would traditionally be used by tabloids like human interest stories.

Neutral broadsheets used the conflict frame to show both sides of the story, whilst tabloids often sensationalised conflict through direct quotations. With the economic frame, the literature suggests this frame occurs more often in serious newspapers.⁷³ My results were not consistent with this finding. Rather, I found tabloids and broadsheets alike used this frame. However, as mentioned, the way in which they used it differed.

Semetko and Valkenberg found that serious publications used attribution of responsibility most frequently, while sensationalist news programmes used it less often.⁷⁴ My results do not support this finding, as I found that both tabloids and broadsheets used this frame. The only difference in the use of the responsibility frame was in the overall stance of the article itself, where negative articles were more likely to use it than neutral or positive articles, which also contradicts Semetko and Valkenburg's findings. However, Iyengar posited that by covering an issue or problem episodically (an isolated event or individual instance), the media leads readers to attribute social problems to individual actions:⁷⁵ a phenomenon my findings do support. In the ULEZ expansion case, the responsibility attribution frame was largely used to blame City Hall and Sadiq Khan. Furthermore, the literature suggests the human interest frame is used more by sensationalist newspapers.⁷⁶ This is consistent with my findings. I found neutral and more serious articles used this

⁷¹ Ha, Taehyun, and Sangwon Lee. "Why Majorities Are Silent but Minorities Are Loud: An Empirical Approach to Opinion Interactions in Online Communities." *International Journal of Human-Computer Interaction*, 2023, pp. 1-10; Baumeister, Roy, et al. "Bad Is Stronger than Good." *Review of General Psychology*, vol. 5, no. 4, 2001, pp. 323-370.

⁷² De Vreese et al. (n 69) *supra*.

⁷³ *ibid*.

⁷⁴ Semetko and Valkenburg (n 31) *supra*.

⁷⁵ Iyengar (n 7) *supra*.

⁷⁶ Valenzuela et al. (n 33) *supra*.

frame less than those with a stance (usually a negative stance). Finally, my findings are consistent with the literature on the morality frame which is seldom used.⁷⁷

Interestingly, most articles used direct quotations to indirectly present policy bias. Quotations were used to attribute responsibility, portray conflict, suggest moral perspectives, and evoke emotions. This strategy allows media outlets to appear policy neutral while subtly influencing public opinion through selected quotations. I speculate that the media's general opposition to the ULEZ expansion is due to several factors. Like many current issues, the ULEZ expansion has become highly politicised, with publications aligning their content with the stance of the political parties they support. There is a growing body of literature on the pervasiveness of negative media, which could explain the media's coverage of the expansion. Scholars point out that negativity in news is a way to compete for audiences' attention, as it is entertaining, interesting, eye-catching, and understandable. Media outlets therefore overemphasise negative news to get high ratings.⁷⁸ Additionally, because the topic is so emotional and controversial, this likely drives readership and ensures continued coverage. The emotional elements of the ULEZ debate, such as its impact on small businesses and individual livelihoods, likely adds to media interest and public engagement.

B. Online Comments

Additionally, I analysed 508 comments from the fifty news articles. Most comments came from neutral and negatively framed articles, with fewer from positively framed articles. I suspect there were fewer comments on pro-ULEZ articles because many of these articles had disabled comment sections and there were simply fewer pro-ULEZ articles overall.

Additionally, most readers who support the expansion of ULEZ (47% of Londoners)⁷⁹ likely feel less compelled to comment than those who oppose the expansion, as the literature suggests that people are more inclined to voice their dissatisfaction publicly than to comment when they are satisfied or unaffected.⁸⁰

There is a clear polarisation of opinions amongst the comments, with detractors being most vocal: 58% were opposed to the expansion, 33% supported it, and less than 10% were neutral. My results contradict a YouGov poll conducted just before the expansion in August 2023, where just under half of Londoners said they support the ULEZ expansion (47%) whilst 42% were opposed.⁸¹ It seems like online commentary is not reflective of overall public opinion in this matter. This supports a growing body of literature which finds differences in outcomes between studies of online reader comments and public opinion surveys, confirming that online comments are not always representative of the population at large.⁸² However, one potential explanation for this divergence is the political leanings of the publication from which the comments were sourced. Reader comments often reflected the ideological stance of the outlet, which potentially shaped how the audience engaged with the content. For instance, readers of right-leaning outlets like The Daily Mail and The Telegraph may be more inclined to express opposition to the ULEZ expansion, whilst commenters on left-leaning platforms such as The Guardian may be more supportive.

This dynamic points to an interesting interaction between media framing and public engagement, where the framing of an article not only shapes the narrative but also influences the nature and volume of

⁷⁷ Semetko and Valkenburg (n 31) *supra*.

⁷⁸ Van der Meer, Toni, et al. "Crafting Our Own Biased Media Diets: The Effects of Confirmation, Source, and Negativity Bias on Selective Attendance to Online News." *Mass Communication and Society*, vol. 23, no. 6, 2020, pp. 937-967.

⁷⁹ Smith, Matthew. "Londoners Split on ULEZ Expansion." *YouGov*, 30 Aug. 2023.

⁸⁰ Baumeister et al. (n 71) *supra*; Pfeffer, Jürgen, et al. "Understanding Online Firestorms: Negative Word-of-Mouth Dynamics in Social Media Networks." *Journal of Marketing Communications*, vol. 20, no. 1-2, 2013, pp. 117-128.

⁸¹ Smith (n 79) *supra*.

⁸² De Kraker et al. (n 65) *supra*.

comments. Negatively framed articles attracted more opposition, whilst neutral articles garnered more balanced views, highlighting confirmation bias, where readers engage more actively with content that aligns with their pre-existing beliefs.⁸³ This finding suggests that the political leanings of a publication may amplify certain voices within the comment sections, contributing to an echo chamber effect in which dissenting or minority opinions are less visible. Whilst the objective of this paper was not to establish causality, future research could work to establish causality between article framing and political bias on reader opinion on the ULEZ expansion.

Many themes emerged from the comments, and the nature of these themes appears to correspond with the political orientation of both the reader and the publication. Top themes include references to Sadiq Khan, conspiracy theories (e.g., cash grab), policy criticism, and affordability. Critics often mentioned Sadiq Khan negatively, particularly in publications known for their conservative stance, and viewed ULEZ as a revenue-generating scheme. Affordability was another key theme raised by detractors, who expressed concerns about the financial impacts of the expansion on low-income families and small businesses. This suggests that the readership of right-leaning tabloids, where affordability concerns were most prominent, may engage more with articles highlighting the economic costs of the ULEZ expansion. On the other hand, supporters of ULEZ, often commenting on left-leaning outlets, frequently mentioned the health and environmental benefits of the policy. This division in themes reflects the broader ideological divide between readers of different publications, reinforcing the idea that public

discourse in comment sections is shaped by both media framing and the political bias of the outlet. My findings seem to indicate more harsh rhetoric comes from detractors, which is not a surprise. Studies on online reader comments have found commenters to be “blindly opinionated,”⁸⁴ “often challenging institutions,”⁸⁵ and “using comments to vent and bloviate.”⁸⁶

Policy criticism was used by both supporters and detractors, where readers offered critiques and suggestions for the ULEZ policy and offered alternative measures. The policy criticism finding supports John’s ideas-based approach concept, where ideas about solutions to policy problems circulate and gain influence independently of the policy process.⁸⁷ Criticism of reporting also emerged, most often among readers of neutral articles, suggesting readers expect a high level of quality from neutrally framed publications, typically broadsheets. In summary, the dichotomy of themes tells us that the two sides are coming with very different points of view. The question then is how can we reconcile both sides? Is there a way to frame these issues so that the public is more receptive?

C. Policy Implications

Clearly, it is impossible to get everyone onboard with any policy. However, the media and commenters have pointed out some flawed elements of the expansion policy’s design, like its perception as a cash grab and affordability issues. The ULEZ expansion can thus provide a valuable lesson to policymakers in understanding how policy gets translated by the media. Even though the expansion is designed to improve air quality, the financial penalties have led many in the media and the public to view it as a tax, with some assuming the scheme is merely a revenue-raising

⁸³ Nickerson (n 45) *supra*; Knobloch-Westerwick, Silvia, et al. “Confirmation Bias, Ingroup Bias, and Negativity Bias in Selective Exposure to Political Information.” *Communication Research*, vol. 47, no. 1, 2020, pp. 104-124.

⁸⁴ Richardson, John, and James Stanyer. “Reader Opinion in the Digital Age: Tabloid and Broadsheet Newspaper Websites and the Exercise of Political Voice.” *Journalism*, vol. 12, no. 8, 2011, pp. 983-1003.

⁸⁵ McCluskey, Michael, and Jay Hmielowski. “Opinion Expression During Social Conflict: Comparing Online Reader Comments and Letters to the Editor.” *Journalism*, vol. 13, no. 3, 2012, pp. 303-319.

⁸⁶ Eisinger, Robert. “Incivility on the Internet: Dilemmas for Democratic Discourse.” APSA 2011 Annual Meeting Paper, 2011.

⁸⁷ John (n 47) *supra*.

strategy. This perception is worsened by the unpopularity of penalising those who cannot afford extra expenses, especially since poor air quality disproportionately affects low-income communities.⁸⁸ For policymakers looking to implement similar schemes in future, it is important to ensure that the design has been well thought out and includes supports for those who need it. In the case of ULEZ, supports were made available, but funding was limited and only those living within Greater London were eligible to apply. If these factors are overlooked, the policy will likely be heavily criticised by the media and the public, as with the ULEZ expansion. It is also evident that this is a highly polarised issue, with many people expressing valid concerns. For policymakers looking to implement similar policies, creating a forum for dialogue to allow people to voice their concerns could be helpful. In the case of ULEZ, the media and readers were quick to cite conflicting evidence and policy contradictions related to the expansion. Therefore, policymakers need to be prepared to listen to the public's concerns and provide strong, evidence-based justification for policy decisions if those decisions go against a subset of the population's interests.

Policymakers cannot control media framing or content. However, there are strategies for effectively (and ineffectively) framing policy, as demonstrated by the ULEZ expansion case. Policymakers should engage with a variety of media outlets to provide clear, factual and consistent messaging through well-prepared spokespersons. With the ULEZ expansion, spokespersons seemed to deliver a uniform message regardless of the outlet. Rather, communication messages should be tailored to specific media types. For example, tabloids often sensationalised the costs associated with the ULEZ expansion, so proponents could instead emphasise the cost estimates of air pollution-related illnesses on taxpayers through the NHS. 'Us vs. them' rhetoric is also used frequently in ULEZ policy debates, which further alienates some constituents and

contributes to polarisation. Policymakers can try to bridge the gap by framing issues to emphasise common ground, doing so using simple language and addressing the concerns of stakeholders.

In addition, the ULEZ expansion shows how complex implementing ambitious environmental policies can be, particularly those with direct economic impacts on the public. Climate policies often face significant political and media scrutiny, and as seen with ULEZ, perceptions of fairness and affordability are crucial to securing public buy-in. Policymakers should recognise that whilst environmental initiatives like ULEZ aim to address urgent issues like air pollution, public opposition can arise when policies are perceived as being a financial burden, especially for low-income populations. This has broader implications for climate policy. Future policies targeting emissions reduction—whether through congestion charges, clean air zones, or carbon taxes—must prioritise equity in their design. Providing adequate financial support to those disproportionately affected is essential to avoid the backlash observed with the ULEZ expansion. Furthermore, the polarisation in media coverage suggests that climate policies will continue to be contested in public discourse, which can affect their implementation and viability. To mitigate these risks, policymakers need to foster more transparent, inclusive dialogue around climate policy. Creating forums for public input and addressing concerns through evidence-based communication could help bridge divides. Ultimately, climate policies must strike a balance between environmental goals and economic realities, ensuring they are both effective and socially equitable to withstand political and public scrutiny.

D. Limitations and Future Research Directions

A significant limitation of my work was the small sample size of articles and comments. Additionally, selection effects with my article

⁸⁸ Rentschler, Jun, and Natalia Leonova. "Global Air Pollution Exposure and Poverty." *Nature Communications*, vol. 14, no. 1, 2023, p. 4432.

selection and comment sourcing are a significant drawback. Because my sampling was not randomised, it is likely to not be representative of the population which I seek to study, introducing selection bias. Comments themselves also present a self-selection bias, as some subsets of the population are more likely to publicly comment on news articles than others. Furthermore, these comments are not representative of the population because the media itself is not representative of the population. These factors and others likely introduced bias into my findings. Future research could address these limitations by looking at more articles over a greater time period from a larger range of publications. Analysing additional comments from various sources beyond the articles in question (for instance, Reddit, Twitter and other social media sites) could provide a wealth of data. Another important direction for future research would be to establish causality. Using experimental design, future researchers could establish whether media framing actually changes the opinion of its readers on the ULEZ expansion or other environmental policies. Moreover, a more longitudinal study could be done, looking at how opinion has changed over time on ULEZ since it was first introduced in

2014, to its first and second iteration, and see how the media and public opinion have correspondingly evolved over that period.

VI. Conclusion

This study explored the media framing of the ULEZ expansion in London and its impact on public discourse, revealing significant polarisation in both article coverage and online commentary. Media outlets with varying political orientations framed the expansion differently, with left-leaning outlets offering neutral or supportive stances, whilst right-leaning outlets largely opposed it. The analysis of reader comments demonstrated a similar polarisation, with opponents being more vocal. These findings highlight the influential role of media framing in shaping public opinion on environmental policies and the potential disconnect between online discourse and broader public sentiment. The implications for climate policy are clear: future initiatives must consider equity, affordability, and transparent communication to ensure public support.

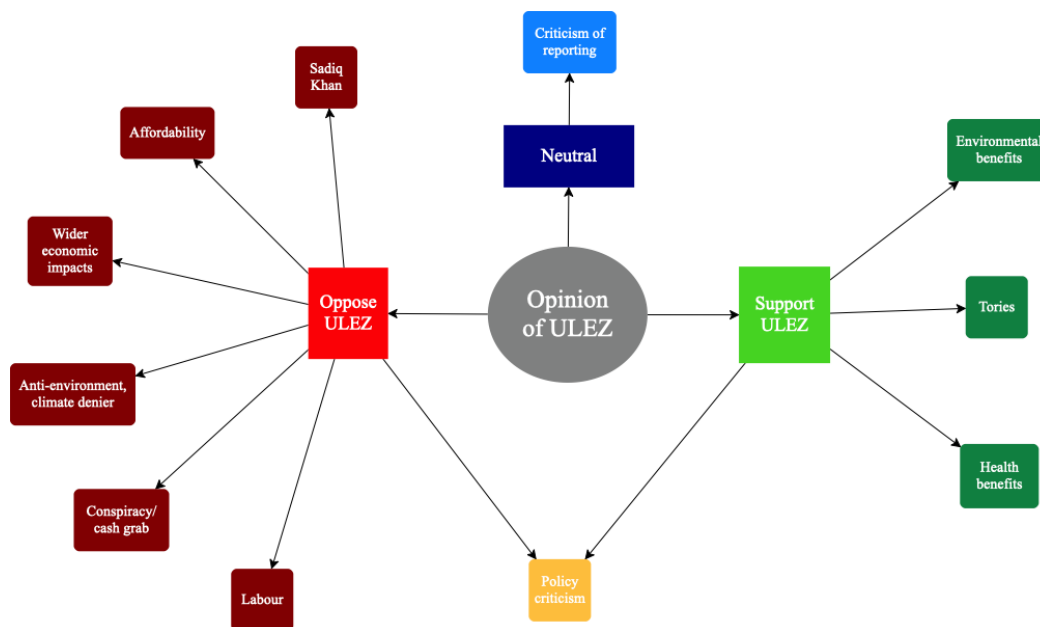


Figure 1: Map of Themes by Opinion of ULEZ Expansion

Article framing	# of articles examined
Anti-ULEZ frame	17
Neutral frame	25
Pro-ULEZ frame	8
TOTAL	50

Table 1: Number of Articles by Frame

Frame	Used	Did not use
Conflict frame	42	8
Economic frame	37	13
Attribution of responsibility frame	36	14
Human interest frame	36	14
Morality frame	19	31

Table 2: Article Breakdown by Frame

Article framing	# of comments examined	Percentage of total comments
Anti-ULEZ frame	188	37%
Neutral frame	243	48%
Pro-ULEZ frame	77	15%
TOTAL	508	

Table 3: Origin of Comments Based on Article Frame

Article framing	# of comments	Percentage of total comments
Oppose ULEZ	294	58%
Neutral about ULEZ	48	9%
Support ULEZ	166	33%

Table 4: Overall Opinion of Comments

Article framing	Oppose ULEZ	Neutral about ULEZ	Support ULEZ
Anti-ULEZ frame	148	5	35
Neutral frame	116	32	95
Pro-ULEZ frame	30	11	36

Table 5: Opinion of Expansion by Origin of Comment

Theme/Subjects	# of comments
Sadiq Khan	138
Conspiracy/ cash grab	92
Policy criticism	71
Affordability/ poor	54
Health benefits of ULEZ	38
Tories	30
Criticism of reporting/media	29
Environmental benefits of ULEZ	20
Labour	17
Wider economic impacts	11
Anti-environment, climate denier	9

Table 6: Theme Breakdown

Investigating the Importance of UK Government Support for Offshore Wind: The Impact of Higher CfD Strike Prices on Developers' Share Returns

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KEYWORDS

CfD AR6, offshore wind, strike price announcement

ABSTRACT

This paper uses stock market reactions to the Contracts for Difference Allocation Round 6 (CfD AR6) offshore wind strike price announcement to investigate the recent importance, or lack thereof, of the UK's CfD scheme for offshore wind. Specifically, it takes the form of an event study, estimating the impact of the government's AR6 offshore wind strike price announcement on offshore wind developers' share prices. This is important, as any increase in share prices attributable to the AR6 strike price announcement should indicate the CfD scheme's present-day relevance and ability to incentivise offshore wind development. If the CfD programme is instead redundant, then the AR6 strike price announcement should not have significantly affected developers' share prices. Ultimately, this paper uncovered evidence supporting the continued relevance of the CfD scheme. While it appears that most offshore wind developers' share prices did not significantly increase immediately after the government's formal AR6 strike price announcement, there is evidence that investors reacted to leaked information about the offshore wind AR6 strike price in the week prior to the government's announcement. Many of the sample firms experienced statistically significant positive abnormal returns following the first identifiable AR6 strike price information leak, and positive abnormal returns were particularly significant when aggregated across the sample and over the time period from the first instance of leakage to the government's formal announcement. These results suggest that the CfD scheme increases the value of offshore wind developments today and indicate the scheme's present-day relevance and ability to incentivise development.



I. Introduction

The United Kingdom aims to install 50 gigawatts (GW) of offshore wind by 2030.¹ This is an ambitious goal, and achieving it will

require a major acceleration of current offshore wind development rates. As of December 2023, 14.7 GW of offshore wind was

¹ Hassan, Munir, and Dalia Majumder-Russell. *Renewable Energy in United Kingdom*. CMS Legal, Feb. 2022.

installed in British waters, and 8 GW was under construction.²

Government subsidies have formed a part of the revenue stream of every British offshore wind farm developed to date.³ Since the passage of the Energy Act 2013, large-scale renewable projects in the UK have been supported through the Contracts for Difference (CfD) scheme. This renewable energy auction programme awards renewable energy developers long-term contracts to supply energy at a fixed price per MWh, and this price has historically been set above current and forecasted wholesale electricity prices.⁴ Six CfD auction rounds, referred to as “allocation rounds” (AR), have taken place since 2014,⁵ collectively supporting 26 GW of offshore wind.⁶

While the UK government has historically played a significant role in incentivising renewable energy development, this role may be unnecessary today. The cost of developing an offshore wind farm fell 60% from 2010 to 2022,⁷ and energy prices have more than doubled in the UK since 2020.⁸ Should price trends continue, developers’ projects may be profitable without subsidy. There has also been an increase in corporate power purchase agreements (CPPAs).⁹ Under CPPAs, which are structured similarly to CfD contracts, offshore wind developers enter into long-term agreements with large corporations to supply renewable energy at a pre-determined price. If corporations remain keen to purchase clean power at a fixed price, CPPAs may eventually replace the CfD scheme.

Nonetheless, recent events suggest that offshore wind subsidies are key in the UK today. Arguably, the event most indicative of the CfD scheme’s continued relevance occurred in September 2023. As background, in March 2023, the UK government announced the AR5 offshore wind ‘strike price’, which is the maximum price, in £/MWh, developers can bid to receive through a CfD contract.¹⁰ When the AR5 bidding window closed and auction results were released in September 2023, it surfaced that no offshore wind developers participated in AR5.¹¹ Instead, the British offshore wind industry criticised the UK government for setting the maximum strike price too low to cover development costs and called for a higher strike price in AR6.¹² On 16 November, the UK government responded to these pleas, announcing an increase in the strike price from £44/MWh in AR5 to £73/MWh in AR6.¹³ Politicians, energy organizations, trade associations, and offshore wind developers praised this move.¹⁴

This paper uses stock market reactions to the AR6 offshore wind strike price announcement to investigate the recent importance, or lack thereof, of the UK’s CfD scheme for offshore wind. Specifically, this paper conducts an event study to estimate the impact of the government’s AR6 offshore wind strike price announcement on offshore wind developers’ share prices. Event studies aim to isolate and identify changes in share prices caused by an

² Jaspert, Gus. *UK Offshore Wind Report 2023*.

³ The Crown Estate. *Project Listings*. Mar. 2024.

⁴ Watson, Nicole, and Paul Bolton. *Contracts for Difference*. House of Commons, 13 Sep. 2023.

⁵ DESNZ. “Contracts for Difference.” *GOV.UK*, 16 Nov. 2023.

⁶ The Crown Estate (n 3) *supra*.

⁷ Boedt, Geert, et al. *Offshore Wind Energy: Patent Insight Report*. Nov. 2023.

⁸ Office of National Statistics. *Quarterly Energy Prices*. 27 June 2024.

⁹ BloombergNEF. “Corporate Clean Power Buying Grew 12% to New Record in 2023, According to BloombergNEF.” 13 Feb. 2024.

¹⁰ Shapps, Grant. “Contracts for Difference (CfD): Budget Notice for the Fifth Allocation Round, 2023.” 16 Mar. 2023.

¹¹ DESNZ. “Contracts for Difference Allocation Round 5 Results.” *Press Release*, 8 Sep. 2023.

¹² “Renewable Energy Auction Results in No Bids for Offshore Wind.” *Catapult Offshore Wind Energy (ORE)*, 8 Sep. 2023; *Energy UK Analysis: Allocation Round 5*. Energy UK, 2023.

¹³ Coutinho, Claire. “Contracts for Difference (CfD): Core Parameters for the Sixth Allocation Round, 2024.” 16 Nov. 2023.

¹⁴ *ibid*.

event from general stock market movements.¹⁵ To do so, event studies construct a measure of a firm's 'abnormal returns', the difference between a stock's measured return (the daily change in a share price) and 'expected returns'. The expected returns serve as a 'counterfactual', a hypothetical construction of what would have happened to a firm's share price absent an event. Thus, barring the presence of concurrent events which also affect a firm's share price, any difference between a firm's expected and actual returns should be attributable to the event. There are multiple models for estimating a firm's expected and abnormal returns, but this article chose to employ the market model.

Isolating the impact of the AR6 strike price announcement on offshore wind developers' share prices should help illuminate the CfD scheme's present-day role. If the AR6 strike price will cover developers' expected costs, an outcome suggested by industry stakeholders' positive response to the price announcement, then the AR6 strike price announcement essentially represented the return of the CfD scheme as a financially viable route to developing an offshore wind project. Thus, any increase in share prices attributable to the AR6 strike price announcement should suggest that the option of developing a bankable project through the CfD scheme increases the value of offshore wind developments today. In other words, an increase would indicate the CfD scheme's present-day relevance and ability to incentivise development. Instead, if the CfD programme is redundant and market participants expect developers to achieve higher profits through wholesale markets or CPPAs, then the AR6 strike price announcement should not have significantly affected developers' share prices.

As the UK government attempts to achieve its stated goal of deploying 50 GW of offshore wind by 2030, it is important to understand the CfD scheme's present-day role. If government subsidies appear relevant and

attractive versus revenue alternatives, the government should support development by setting the strike price and budget at sufficiently high levels. If instead the CfD scheme appears redundant, the UK government's role may be restricted to one of ensuring a positive regulatory environment for offshore wind, with expedited planning, consents, grid connection, and seabed lease acquisition processes.

Ultimately, this paper uncovered evidence supporting the continued relevance of the CfD scheme. While it appears that most offshore wind developers' share prices did not significantly increase immediately after the government's formal AR6 strike price announcement, there is evidence that investors reacted to leaked information about the offshore wind AR6 strike price in the week prior to the government's announcement. Many of the sample firms experienced statistically significant positive abnormal returns following the first identifiable AR6 strike price information leak on 9 November, and positive abnormal returns were particularly significant when aggregated across the sample and over the time period from the first instance of leakage to the government's formal announcement. These results suggest that the CfD scheme increases the value of offshore wind developments today and indicate the scheme's present-day relevance and ability to incentivise development.

This article opens with a discussion of the CfD scheme and the AR6 strike price announcement. A literature review follows next, examining literature establishing the economic theory behind event studies, papers establishing and critiquing event study methodologies, and event studies evaluating similar policy changes. Next, the paper outlines the sample of firms evaluated in this study and the data sources used in this paper. An extensive methodology section follows, contextualising the succeeding results.

¹⁵ Brooks, Chris. *Introductory Econometrics for Finance*. 4th ed., Cambridge University Press, 2019; MacKinlay, A.

"Event Studies in Economics and Finance." *Journal of Economic Literature*, vol. 35, no. 1, 1997, pp. 13–39.

Finally, the article presents a discussion of the results, a brief conclusion, and a reflection on potential avenues for further research.

II. Background

A. *The Contracts for Difference Scheme*

The United Kingdom initiated its current renewable energy auction scheme, the CfD programme, in 2013.¹⁶ Under the scheme, renewable energy developers competitively bid for ‘contracts for difference’, which guarantee developers a fixed price per MWh of energy they produce for 15 years. Specifically, when the wholesale price of electricity is below the contractually decided support price, the renewable energy developer receives the agreed CfD price, and if wholesale prices surpass the CfD price, developers must return the excess revenues to the government. Multiple renewable technologies have been supported in each CfD round, including geothermal energy, hydroelectricity, tidal energy, solar PV, and onshore and offshore wind.

To win a support contract in a competitive auction, developers should be incentivised to bid to receive the lowest price at which they can cover the upfront and running costs of their renewable energy development.¹⁷ This amount is the “levelized cost of energy” (LCOE) of a project, which is an estimate of the average cost of generating a unit of electricity over the expected lifetime of an energy project.¹⁸ This is important for understanding the role of the CfD scheme and interpreting the event study results. Specifically, the higher strike price should not have represented an opportunity to generate windfall profits through the CfD scheme, a scenario which should have resulted in share price increases regardless of whether the CfD scheme is necessary to developing a bankable wind project today. Instead, the higher strike

price should have represented the return of the CfD programme as a financially viable route for developing offshore wind.

Since 2014, the UK government has held 6 CfD rounds.¹⁹ Each AR has featured a different offshore wind strike price and a different total budget, which determines the capacity supportable at the strike price. In each round, support contracts are awarded to the lowest price bidders until the total budget has been exhausted, and each awardee is offered the support price submitted by the highest-bidding winner.²⁰ Based on UK government estimates of offshore wind LCOEs, CfD strike prices have decreased with each round, falling from £155 in AR1 to £105 in AR2, £56 in AR3, and £46 in AR4.²¹

While there was a concurrent decrease in offshore wind LCOEs, developers increasingly warned the UK government that, should strike prices continue to fall at a similar pace, projects would become financially unviable.²² Nonetheless, the UK government cut prices further for AR5 in 2023, setting a price of £44. At the same time, supply chain shocks and high interest rates and inflation increased the cost of developing an offshore wind farm, and ultimately, no offshore wind developers participated in AR5.²³ Wind industry, energy, environment, and political groups criticised the AR5 strike price and called for the government to re-evaluate and increase the strike price in AR6.²⁴

B. *The Event of Interest: The AR6 Strike Price Announcement*

Following the failure of AR5, the UK government consulted with offshore wind industry leaders, trade associations, energy sector analysts, and renewable energy organisations regarding how to support offshore wind in AR6.²⁵ After an “extensive

¹⁶ Watson and Bolton (n 4) *supra*.

¹⁷ Kell, Nicholas, et al. “Methodology to Prepare for UK’s Offshore Wind Contract for Difference Auctions.” *Applied Energy*, vol. 336, 2023, p. 120844.

¹⁸ Beiter, Philipp, et al. *An Assessment of the Economic Potential of Offshore Wind in the United States from 2015 to 2030*. National Renewable Energy Laboratory (NREL), Mar. 2017.

¹⁹ DESNZ (n 5) *supra*.

²⁰ Watson and Bolton (n 4) *supra*.

²¹ *ibid*.

²² *ibid*.

²³ *ibid*.

²⁴ Catapult ORE (n 12) *supra*; Energy UK (n 12) *supra*.

²⁵ Watson and Bolton (n 4) *supra*.

review of the latest evidence, including the impact of global events on supply chains,” on 16 November 2023, the government announced a new, higher strike price for offshore wind in AR6, increasing the strike price by 66% to £73/MWh.²⁶

The UK government’s announcement of a higher strike price for offshore wind is the ‘event’ investigated in this event study. To be suitable for investigation under the event study methodology, an event must be both ‘relevant’ and ‘novel’.²⁷ Regarding the latter, a relevant event is one which market participants believe will change the future financial value of a firm, and it will thus be reflected in share prices. Events must also present new information that the market is yet to react to, or investors will have already priced the information into their evaluation of a company’s shares.

1. Event Relevance

Previous studies suggest changes to renewable energy support schemes are relevant. Liu et al.²⁸ and Crowley et al.²⁹ both found that share prices are sensitive to changes in feed-in tariff policies which, like the CfD scheme, provide generators a fixed subsidy per unit of energy supplied to the grid. News articles have also recently highlighted fluctuations in offshore wind developers’ share prices concurrent with offshore wind policy announcements. For instance, in October 2023, multiple

newspapers reported that Orsted’s share price dropped 8% following the New York government’s decision not to adjust Orsted’s US subsidy payments for inflation.³⁰

2. Novelty and Information Leakage

Regarding the novelty of the price announcement, nominally the strike price for each CfD AR is unknown by the market until the government’s formal announcement.³¹ Nonetheless, regulatory events are rarely a full surprise due to information leakage.³²

If the AR6 offshore wind strike price was leaked to market players before 16 November, the market’s reaction is likely spread from the first instance of information leakage through the government’s formal announcement, diminishing or removing any share price reaction on the formal announcement day.³³ There is evidence the AR6 offshore wind strike price was leaked to the market in the week preceding 16 November. Specifically, on 9 November, a Bloomberg article announced that people “familiar with the matter” knew that the AR6 offshore wind strike price would sit between £70/MWh and £75/MWh.³⁴ This rumour soon spread, quickly published on an array of prominent news sites.³⁵ Then, on the morning of 15 November, multiple news sites, including Sky News and Utility Week, announced the AR6 offshore wind strike price would be £73/MWh.³⁶

²⁶ Coutinho (n 13) *supra*.

²⁷ Datsenko, Ruslana. *Policy Shifts and Stock Market: Lessons from the US and China*. Norwegian University of Life Sciences, 2017.

²⁸ Liu, Chang, et al. “How Does the Capital Market Respond to Policy Shocks? Evidence from Listed Solar Photovoltaic Companies in China.” *Energy Policy*, vol. 151, 2021, p. 112054.

²⁹ Crowley, Meredith, et al. “Policy Shocks and Stock Market Returns: Evidence from Chinese Solar Panels.” *Journal of the Japanese and International Economies*, vol. 51, 2019, pp. 148-69.

³⁰ Disavino, Scott, and Nichola Groom. “New York Rejects Orsted, Equinor, BP Requests to Charge More for Offshore Wind.” *Reuters*, 12 Oct. 2023; Gillespie, Todd, and Allegra Catelli. “Orsted Slumps as US Wind Cost Ruling Stokes Writedown Fear.” *Bloomberg*, 13 Oct. 2023; Hill, Joshua S. “Orsted Shares Plunge Again as New York Knocks Back Cost Adjustment for Offshore Wind.” *Renew Economy*, 17 Oct. 2023.

³¹ Coutinho (n 13) *supra*.

³² Datsenko (n 27) *supra*.

³³ Brooks (n 15) *supra*.

³⁴ Gillespie, Todd, and Ellen Milligan. “UK Prepares to Hike Wind Farm Prices as Developers Struggle.” *Bloomberg*, 9 Nov. 2023.

³⁵ AF Marketwire. “Ørsted Helped by Rumors of UK Willingness for Higher Subsidies for Offshore Wind.” *EnergyWatch*, 10 Nov. 2023; Ambrose, Jillian. “UK Subsidies for Offshore Windfarms Likely to Increase amid Rising Costs.” *The Guardian*, Nov. 2023; “UK Wind Power Still a Better Deal than Gas.” *reNews*, 13 Nov. 2023.

³⁶ Horgan, Robert. “Higher CfD Strike Price Will ‘Restore Confidence’ in Offshore Wind.” *Utility Week*, 15 Nov. 2023; Kelso, Paul. “Government Set to Hike Prices to Put Offshore Wind Auction Back on Track.” *Sky News*; “UK to ‘Increase Offshore CfD Strike Price Cap’.” *reNews*, 15 Nov. 2023.

With evidence of leakage, this article evaluated changes to offshore wind developers' share prices every day from 10 to 17 November and also evaluated the cumulative change to developers' share prices from 10 to 17 November. Further explained in Section V, the latter calculation is referred to as a firm's 'cumulative abnormal returns' (CAR) and is commonly employed to evaluate policy announcements with leakage.³⁷

III. Literature Review

After establishing the general suitability of the event study methodology, this article provides an extensive literature review to guide finer methodological decisions. The first published event study is usually traced to Dolley,³⁸ who evaluated the impact of 95 stock splits from 1921 to 1931 on firms' share prices. However, the market model approach to conducting an event study was introduced 30 years later in papers by Ball and Brown³⁹ and Fama and colleagues.⁴⁰ Their studies, focused on the effect of earnings reports and stock splits on prices, respectively, outlined the market model methodology that is employed in this paper and most event studies today.⁴¹

A wave of research focused on refining event study methodology followed these initial papers. Particular emphasis has been placed

on developing test statistics better suited to stock returns, which sometimes exhibit non-normality, cross sectional dependence, and event-induced increases in volatility.⁴² Other authors proposed or evaluated alternative methods to the market model for modelling expected share returns, including the constant mean returns model,⁴³ the capital asset pricing model (CAPM) model,⁴⁴ the Fama-French 3-factor model,⁴⁵ the Fama-French-Momentum 4-factor model,⁴⁶ and the Fama-French 5-factor model.⁴⁷

Discussed further in Section V, this article's modelling decisions were strongly influenced by the above methodological discussions as well as more recent papers examining similar policy events. Over the past few decades, an abundance of event study papers has been published examining the impact of firm- and country-level events on companies' shares. A 2022 review of four leading, peer-reviewed international finance journals discovered 700 event study papers, and close to 15% of these papers evaluated the impact of legislative changes on share prices.⁴⁸

Of greatest relevance to this event study, several recent papers evaluate the impact of renewable energy subsidy policies. Both Liu et al.⁴⁹ and Crowley et al.⁵⁰ employed the market

³⁷ Benninga, Simon, and Tal Mofkadi. *Financial Modeling*. 5th ed., MIT Press, 2021.

³⁸ Dolley, J. "Characteristics and Procedures of Common Stock Split-Ups." *Harvard Business Review*, vol. 11, 1933, pp. 316-326.

³⁹ Ball, Ray, and Philip Brown. "An Empirical Evaluation of Accounting Income Numbers." *Journal of Accounting Research*, vol. 6, no. 2, 1968, p. 159.

⁴⁰ Fama, E, et al. "The Adjustment of Stock Prices to New Information." *International Economic Review*, vol. 10, no. 1, 1969, pp. 1-21.

⁴¹ Brooks (n 15) *supra*.

⁴² Boehmer, E. "Event-Study Methodology under Conditions of Event-Induced Variance." *Journal of Financial Economics*, vol. 30, no. 2, 1991, pp. 253-72; Brown, Stephen, and Jerold Warner. "Measuring Security Price Performance." *Journal of Financial Economics*, vol. 8, no. 3, 1980, pp. 205-58; Corrado, Charles. "A Nonparametric Test for Abnormal Security-Price Performance in Event Studies." *Journal of Financial Economics*, vol. 23, no. 2, 1989, pp. 385-95; Cowan, Arnold Richard. "Nonparametric Event Study Tests." *Review of Quantitative Finance and Accounting*, vol. 2, no. 4, 1992, pp. 343-58; Kolari, James, and Seppo Pynnonen.

"Nonparametric Rank Tests for Event Studies." *Journal of Empirical Finance*, vol. 18, no. 5, 2011, pp. 953-71; Patell, James. "Corporate Forecasts of Earnings per Share and Stock Price Behavior: Empirical Test." *Journal of Accounting Research*, vol. 14, no. 2, 1976, p. 246.

⁴³ Brown, Stephen, and Jerold Warner. "Using Daily Stock Returns." *Journal of Financial Economics*, vol. 14, no. 1, 1985, pp. 3-31.

⁴⁴ Sharpe, William. "Capital Asset Prices: A Theory of Market Equilibrium under Constructions of Risk." *Journal of Finance*, vol. 19, no. 3, 1964, pp. 425-42.

⁴⁵ Fama, Eugene, and Kenneth French. "Common Risk Factors in the Returns on Stocks and Bonds." *Journal of Financial Economics*, vol. 33, no. 1, 1993, pp. 3-56.

⁴⁶ Carhart, Mark. "On Persistence in Mutual Fund Performance." *Journal of Finance*, vol. 52, no. 1, 1997, pp. 57-82.

⁴⁷ Fama, Eugene, and Kenneth French. "A Five-Factor Asset Pricing Model." *Journal of Financial Economics*, vol. 116, no. 1, 2015, pp. 1-22.

⁴⁸ El Ghoul, Sadok, et al. "Event Studies in International Finance Research." *SSRN Electronic Journal*, 2022.

⁴⁹ Liu et al. (n 28) *supra*.

⁵⁰ Crowley et al. (n 29) *supra*.

model to estimate the reaction of solar PV companies to feed-in tariff policy changes in China. They found that firms experienced statistically significant abnormal returns after a policy was announced, with the direction of the return dependent on the favourability of the policy update to solar firms. Also using the market model, Datsenko⁵¹ analysed a set of renewable energy policy announcements in the US and China, finding that the impact of policies varied significantly by sector. Each of these papers serves as a proof-of-concept that renewable energy firms' share prices are influenced by energy policy announcements and that this effect can be examined through an event study. Additionally, this study made many of the same methodological choices as the above papers, including employing the market model and many of the same significance tests. These choices are discussed further in Section V.

IV. Data and Sample

In the United Kingdom, private companies own, develop, and operate offshore wind farms and thus bear the cost, or reap the benefits, of generated wind energy.⁵² This group of 'offshore wind developers' with ownership stakes in operational or planned UK projects is therefore the focus of this study. However, because this event study evaluates the impact of the AR6 strike price announcement on share prices, the sample of offshore wind developers evaluated in this paper was limited to publicly listed companies. In March 2024, there were twenty-seven publicly listed companies with ownership stakes in operational, consented, or planned offshore wind projects.⁵³

Nonetheless, not all of these developers owned stakes in projects eligible to receive a government support contract in AR6. To participate in an auction round, the project a

developer aims to receive support for must have applicable government planning consents, electricity grid connection agreements, and a seabed lease from the Crown Estate providing rights to operate in British waters.⁵⁴ Eleven projects met these criteria for AR6, and eight publicly listed developers held a stake in one or more of these eleven eligible projects. CfD regulations also only obligate a developer to build 75% of their project's contracted capacity, so developers awarded a contract for a project in AR5 could receive an AR6 contract for 25% of their project's capacity.⁵⁵ Four projects were eligible for a 25% capacity rebid, and five publicly listed developers held full or partial ownership stakes in these.⁵⁶ In total, there were eleven unique developers with ownership stakes in a project fully, or partially, eligible for a support contract in AR6.

Of these eleven companies, six were included in the final sample: EDP Renewables, ENGIE, Iberdrola, Orsted, RWE, and SSE. Following the suggestion of Escoffier⁵⁷ and Shane and Spicer⁵⁸ to remove firms likely affected by other events or announcements concurrent with the event being studied, this paper did not include HexiconAB, SDIC Power Holdings, Siemens, Tenaga Nasional Berhad (TNB), or TotalEnergies in the final sample analysed in this paper. Described in greater detail below, each of these firms was likely affected by events or announcements concurrent with AR6, so including these firms was likely to introduce omitted variables bias into the results.

Qualitative and quantitative descriptive statistics for each of the eleven AR6-eligible firms are displayed in Table 1, below, including each company's primary industry, primary stock market listing, and market

⁵¹ Datsenko (n 27) *supra*.

⁵² The Crown Estate. *Guide to an Offshore Wind Farm*. Jan. 2019.

⁵³ The Crown Estate (n 3) *supra*.

⁵⁴ DESNZ. *Schedule 5: Application Checks to Be Carried Out by the Delivery Body*. Mar. 2024.

⁵⁵ May, Jordan. "Ørsted Ignites Rebidding Frenzy in Allocation Round 6." *TGS*, 26 Feb. 2024.

⁵⁶ The Crown Estate (n 3) *supra*.

⁵⁷ Escoffier, M. "How Financial Markets React to Total's Strategy of Becoming a Responsible Energy Major?" Working Papers HAL-04159687, HAL, 2020.

⁵⁸ Shane, P, and B Spicer. "Market Response to Environmental Information Produced Outside the Firm." *Accounting Review*, vol. 58, 1983, pp. 521-538.

capitalisation in September 2023, as well as the total capacity of projects owned by each developer eligible for participation in AR6.⁵⁹ The six final sample firms are listed first and feature an asterisk by their name.

All company share price data employed in this article was downloaded from Yahoo!Finance, a global financial news and data provider. Each of the share price indices analysed and used in this paper came from S&P Dow Jones Indices.⁶⁰ Finally, market capitalisation data in Table 1 came from Finbox,⁶¹ a financial data and modelling platform.

Regarding HexiconAB and TNB, these companies were removed as their ownership stake in projects wholly or partially eligible for participation in AR6 was less than 30 MW.⁶² With such a small ownership stake, it is unlikely that these firms' share returns were affected by the AR6 share price announcement. Instead, any change in these companies' share prices around 16 November was likely caused by other market events.

Regarding SDIC Power Holdings, Siemens, and TotalEnergies, these companies were removed as they earn most of their revenues in non-renewable energy markets and were likely affected by confounding events around 16 November. Specifically, the majority of TotalEnergies's revenues come from fossil fuels, and crude oil prices fluctuated widely in November 2023.⁶³ Of particular note, crude oil prices dropped to their lowest level since June 2023 on 17 November 2023, leading to a more than 2% decrease in global oil and gas share price indices.⁶⁴

Siemens primarily operates in the industrial automation and manufacturing industries,

and its ownership stake in AR6 eligible projects is small.⁶⁵ Any major firm-level announcement or event in Siemens's primary industries around 17 November is therefore likely to have caused a greater change to Siemens's share price than the AR6 strike price announcement. Evidence of a confounding event is why Siemens was ultimately removed from the sample: Siemens held its annual press conference on 16 November.⁶⁶

SDIC primarily operates in Asian energy and utility markets and, like Siemens, SDIC's ownership stake in British offshore wind projects is small. The share prices of Asian energy and utility companies have also largely followed a separate trajectory to European- and North American-domiciled companies.⁶⁷ This makes it difficult to assess whether movements in SDIC's share prices were caused by AR6 or instead by events in Asian markets, especially since any impact of the AR6 strike price announcement on SDIC's shares was likely small given its ownership stake. TNB also primarily operates in Asian markets, reinforcing the decision to remove TNB from the final sample.

As confirmation of the sample choice, plotting the share returns of the six included firms reveals striking similarities; each followed the same general trends from June 2023 to June 2024 and track an index of major clean energy firms closely.⁶⁸ Additionally, a search for significant firm-level events affecting each sample company yielded no major findings. Specifically, this study skimmed the first twenty news articles that surfaced in a Google News search for the name of each firm. The search was tailored to only include articles published from 5 to 20 November, and the

⁵⁹ If a company has a partial ownership stake in an eligible project, only the portion of the project owned by the listed developer is included in the AR-6 Eligible Capacity metric.

⁶⁰ Wharton Research Data Services (WRDS). "Historical S&P Dow Jones Indices." Wharton University of Pennsylvania.

⁶¹ "Data Explorer." *Finbox*, 2024.

⁶² The Crown Estate (n 3) *supra*.

⁶³ Fanzeres, Julia, and Mia Gindis. "Oil Plunges to July Low as Algorithms Amplify Supply-Driven Drop." *S&P Global*, 2024.

⁶⁴ *ibid*.

⁶⁵ "Siemens Report for Fiscal 2023." *Siemens*, 2024.

⁶⁶ "Annual Press Conference 2023." *Siemens*, 16 Nov. 2023.

⁶⁷ *S&P China A 300 Utilities (Sector) Index*. S&P Global, 2024.

⁶⁸ *S&P Global Clean Energy Select Index*. S&P Global, 2024; Yahoo!Finance. "Market Data."

search results were presented by Google in order of ‘relevance’.

In contrast to the six final sample firms, none of the excluded firms’ share returns over the past year track the Clean Energy Index or each other. This suggests that the excluded firms’ share returns are primarily driven by events external to the global renewable energy industry and the British offshore wind industry.

V. Methodology

A. Daily Share Price Returns

This paper estimated the impact of the AR6 strike price announcement on companies’ daily share price returns. There are a couple of different methods for calculating daily share price returns. The simplest approach to calculating share returns is to find the percentage change in a company’s share price between two days.⁶⁹ The formula for doing so is:

$$r_t = \frac{P_t}{P_{t-1}} - 1$$

where P_t is the share price on a given day.

Alternatively, it is possible to calculate continuously compounded share returns.⁷⁰ Continuously compounded share returns are calculated as follows:

$$r_t = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

This paper calculated continuously compounded returns. While both methods yield near-identical results, the latter is favoured in finance literature for its advantageous mathematical properties: daily

returns can be added together to obtain the return over a longer period.⁷¹

Finally, this paper used daily opening share prices to calculate returns. This means that the impact of an announcement materialising on a given day will be reflected in the share return calculated for the following day.

B. Abnormal Returns Model Selection

Described in Section III above, researchers have developed several models for estimating expected and abnormal returns in event studies. These primarily include the constant mean returns model, the CAPM, and the Fama-French 3-, 4-, and 5-factor models.

The constant mean returns model is the simplest model to employ. However, Brown and Warner⁷² compared the accuracy of estimated abnormal returns from the constant mean returns model to the market model and found that the constant mean returns model has lower statistical power and suffers more from misspecification than the market model. As such, this study favoured use of the market model over the constant mean returns model.

The CAPM calculates expected returns as a function of the risk-free interest rate and a stock-specific risk premium.⁷³ However, this model has largely been discredited in the literature, with researchers noting structural issues which likely prohibit accurately estimating returns.⁷⁴

The Fama 3-, 4-, and 5-factor models add explanatory variables to the CAPM and thereby predict returns with greater accuracy.⁷⁵ However, the Fama-French models are usually employed on portfolios of firms, not individual companies.⁷⁶ The models have also rarely been employed to study small

⁶⁹ Brooks (n 15) *supra*.

⁷⁰ Benninga and Mofkadi (n 37) *supra*.

⁷¹ Brooks (n 15) *supra*.

⁷² Brown and Warner (n 43) *supra*.

⁷³ Kothari, S, and Jerold Warner. “Econometrics of Event Studies.” *Handbook of Empirical Corporate Finance*, edited by B Espen Eckbo, North Holland, 2009, pp. 3-36.

⁷⁴ Ball and Brown (n 39) *supra*; Banz, Rolf. “The Relationship between Return and Market Value of

Common Stocks.” *Journal of Financial Economics*, vol. 9, no. 1, 1981, pp. 3-18; Basu, S. “Investment Performance of Common Stocks in Relation to Their Price-Earnings Ratios: A Test of the Efficient Market Hypothesis.” *Journal of Finance*, vol. 32, no. 3, 1977, pp. 663-82; Brooks (n 15) *supra*.

⁷⁵ Fama and French (n 45) *supra*.

⁷⁶ Kothari and Warner (n 73) *supra*.

samples, and when attempted, the models have lost their ability to accurately predict share returns.⁷⁷

Given the above issues with the CAPM and Fama models, and the benefits of the market model over the constant mean returns model, this paper employed the market model. This is the most commonly used model in the literature.⁷⁸ The market model is also employed by Crowley et al.,⁷⁹ Datsenko,⁸⁰ and Liu et al.,⁸¹ whose work is closest aligned with the content of this paper.

C. The Market Model

1. Equation and Theory

The market model assumes a stable linear relationship exists between a firm's share returns and a market index's returns, and it uses this relationship to predict a firm's returns given a market index's returns.⁸² Specifically, the market model takes the following form:

$$R_{it} = \alpha_i + \beta_i R_{mt} + u_{it}$$

where R_{it} is a firm's observed share returns, α_i is a constant, β_i is a coefficient which estimates the relationship between a firm's share returns and the market index's returns, R_{mt} is the market index's returns, and u_{it} is an error term. α_i and β_i are estimated by running the above regression with share and index price data from before an event, and this study estimated them in Microsoft Excel.

Once an estimate of α_i and β_i is calculated for a firm, it is possible to use the market model formula to predict R_{it} given observed returns to R_{mt} . R_{it} then becomes a measure of a firm's expected share returns given R_{mt} data.

With estimates of a firm's expected returns and data on a firm's actual returns, abnormal returns can be calculated by subtracting the

firm's expected returns from their actual returns:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

Theoretically, abnormal returns isolate the portion of a firm's returns which cannot be explained by general market movements. AR estimates should therefore capture the share price impact of events that affect a firm differently than the underlying market, such as the AR6 strike price announcement.

2. Market Index Selection

After selecting the market model, one of the first necessary methodological choices was choosing a suitable market index. This paper tested the fit of seven share price indices from S&P Global: S&P's Global Clean Energy Index, Clean Energy Select Index, North America and Europe Clean Energy Index, World Utilities Sector Index, Global 1200 Utilities Index, Utilities Select Sector Index, and Global BMI Utilities Sector Index. It also tested using two 'control' firms as the market index: Greencoat UK Wind and The Renewables Infrastructure Group (TRIG). These firms are involved in the British offshore wind industry but did not have ownership stakes in AR6-eligible projects.

Ultimately, this paper selected the S&P Global Clean Energy Select Index, which measures the performance of the thirty largest clean energy-related businesses from both developed and emerging markets.⁸³ Using this index resulted in the highest average R^2 values in the market model regressions, indicating that changes in this index best predict changes in the sample firms' share returns. Furthermore, in a well-specified model, a firm's abnormal returns over the estimation window should average to zero. This held true for all six sample firms when the Global Clean Energy Select Index was used as the market index.

⁷⁷ Saucedo, Eduardo, and Jorge González. "The Effect of Macroeconomic Variables on the Robustness of the Traditional Fama-French Model: A Study for Mexico Using Different Portfolios." *Journal of Economics, Finance and Administrative Science*, vol. 26, no. 52, 2021, pp. 252-67.

⁷⁸ Benninga and Mofkadi (n 37) *supra*.

⁷⁹ Crowley et al. (n 29) *supra*.

⁸⁰ Datsenko (n 27) *supra*.

⁸¹ Liu et al. (n 28) *supra*.

⁸² Brooks (n 15) *supra*; MacKinlay (n 15) *supra*.

⁸³ S&P Global Clean Energy Select Index (n 68) *supra*.

3. Estimation and Event Windows

Another necessary methodological choice was determining the model estimation and event windows. The estimation window is the period evaluated to determine the ‘normal’ behaviour of a company’s shares absent an event: α_i and β_i are estimated using share price data from this window.⁸⁴ Estimation windows typically range from 100 to 300 trading days.⁸⁵ However, there is a trade-off between increasing the precision of the market model coefficients by lengthening the estimation window and potentially biasing the model, because historical data captures share price relationships which may have changed.⁸⁶ Due to the volatility in clean energy markets over the past couple years, and the potential for this to significantly alter the relationship between a firm’s share returns and a market index,⁸⁷ this study erred on the side of caution and selected a shorter estimation window of 120 daily stock estimations. Specifically, the estimation window used in this article spans from 17 May 2023 to 7 November 2023. To avoid contaminating the expected returns estimates with any share price changes caused by information regarding the AR6 strike price, this window does not include 17 November or the ten days preceding it.

After deciding the estimation window, it was also necessary to determine the ‘event window’, the period over which an event’s impact is estimated.⁸⁸ The government announced the AR6 offshore wind strike price on 16 November. If this caused an increase in developers’ share prices, abnormal returns should be detectable on 17 November. However, as described above, it is likely that developers anticipated strike price increases in the week prior to 16 November. Thus, this

paper estimated abnormal returns on 17 November and over a longer event window. Specifically, the first evidence of leakage was on 9 November, so this paper set 10 November as the first day in the event window. There is no evidence in the media, or in firms’ share returns, that the market’s reaction to the AR6 strike price continued past 17 November. Thus, this paper decided to analyse an event window spanning from 10 to 17 November.

D. Abnormal Returns Metrics

1. Firm-Level Daily Abnormal Returns

Abnormal returns can be evaluated at the individual firm and event day level or aggregated across a sample and / or event window.⁸⁹ This paper first estimated each of the sample firm’s abnormal returns (AR) on each trading day in the event window using the equation described in Section V.C.1:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

To test the statistical significance of the AR estimates, the variance of each estimate was also calculated. The variance of each firm’s AR is equal to the variance of the residuals from the market model over the estimation window:

$$\sigma^2(AR_{it}) = \frac{1}{T-2} \sum_{t=1}^T u_{it}^2$$

where σ^2 is the symbol for variance, u_{it} is the residual for a firm on a given day (the difference between a firm’s expected share return and observed share return), and T is the number of observations in the estimation period.⁹⁰

⁸⁴ Benninga and Mofkadi (n 37) *supra*.

⁸⁵ *ibid*.

⁸⁶ Kinnunen, Rasmus. *Markets and Analysts’ Reactions to Green Hydrogen Investments in European Oil Refiner and Steel & Iron Industry Enterprises*. LUT School of Business and Management, 2023; Peterson, Pamela. “Event Studies: A Review of Issues and Methodology.” *Quarterly Journal of Business and Economics*, vol. 28, no. 3, 1989, pp. 36–66.

⁸⁷ Brown, K, et al. “An Examination of Event Dependency and Structural Change in Security Pricing Models.”

Journal of Financial and Quantitative Analysis, vol. 20, no. 3, 1985, pp. 315–334; Fisher, L, and J Kamin.

“Forecasting Systematic Risk: Estimates of ‘Raw’ Beta that Take Account of the Tendency of Beta to Change and the Heteroskedasticity of Residual Returns.” *Journal of Financial and Quantitative Analysis*, vol. 20, no. 2, 1985, pp. 127–149.

⁸⁸ Brooks (n 15) *supra*.

⁸⁹ *ibid*.

⁹⁰ *ibid*.

2. Daily Average Abnormal Returns

To better understand sample-wide trends and reduce the chance that any AR results were driven by random variability or confounding events, this paper also aggregated abnormal returns across firms. This yields a measure of the ‘average abnormal returns’ (AAR) on a given day. AAR is calculated as follows:

$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_{it}$$

where N is the number of firms in the sample.⁹¹

The variance of the AAR metric is calculated by averaging the variances of each firm’s AR and dividing by N .⁹²

$$\sigma^2(AAR_t) = \frac{1}{N^2} \sum_{i=1}^N \sigma^2(AR_{it})$$

3. Firm-Level Cumulative Abnormal Returns

To capture the impact of leakage, it is also possible to aggregate abnormal returns across days instead of across firms. Briefly alluded to above, such temporal aggregation yields a firm’s ‘cumulative abnormal returns’ (CAR). CAR can be calculated over two or more days using the following formula:

$$CAR_i(T_1, T_2) = \sum_{t=T_1}^{T_2} AR_{it}$$

where T_1 is the first day included in the metric and T_2 is the last day.⁹³ The variance of CAR estimates takes the following form:⁹⁴

$$\sigma^2(CAR_i(T_1, T_2)) = (T_2 - T_1 + 1) \sigma^2(AR_{it})$$

This paper calculated CAR for each firm over a three-day period spanning from 15 to 17 November and a six-day period spanning from 10 to 17 November.⁹⁵ The three-day CAR should capture any effects of the 15 November information leaks as well as the government’s

formal AR6 strike price announcement, and the six-day event period should additionally capture the effect of any price information leaked after 9 November.

4. Cumulative Average Abnormal Returns

Finally, to understand the AR6 strike price announcement’s average impact on the sample firms’ shares across the event window, this paper aggregated abnormal returns across the sample firms and time. This yields a measure of ‘cumulative average abnormal returns’ (CAAR). This paper calculated CAAR for the same three- and six-day windows as the CAR estimates. CAAR is calculated as follows:⁹⁶

$$CAAR(T_1, T_2) = \frac{1}{N} \sum_{i=1}^N CAR_i(T_1, T_2)$$

The variance of CAAR estimates is equal to the average variance of each firm’s CAR divided by N .⁹⁷

$$\sigma^2(CAAR(T_1, T_2)) = \frac{1}{N^2} \sum_{i=1}^N \sigma^2(CAR_i(T_1, T_2))$$

E. Test Statistics

1. T-Test

In this paper, the statistical significance of each of the above metrics was first estimated using a simple t-test. This test statistic is calculated by dividing the AR, AAR, CAR, or CAAR estimates by the standard deviation of each. AR and CAR t-test statistics are distributed with $T - 2$ degrees of freedom, where T is the number of observations in the estimation window (120).⁹⁸ The CAR and CAAR test statistics are instead distributed with $N - 1$ degrees of freedom, where N is the number of firms in the sample (six).⁹⁹

2. Null and Alternative Hypotheses

Calculating a test statistic allows evaluation of the likelihood of a set of hypotheses regarding offshore wind developers’ abnormal returns. The null hypothesis tested in this study was

⁹¹ *ibid.*

⁹² *ibid.*

⁹³ *ibid.*

⁹⁴ *ibid.*

⁹⁵ There is no share price data for 11 or 12 November as these days fell over the weekend.

⁹⁶ Brooks (n 15) *supra*.

⁹⁷ *ibid.*

⁹⁸ *ibid.*

⁹⁹ Muller, Simon. “AAR and CAAR Test Statistics: A Comprehensive Guide to Analyzing Abnormal Returns in Event Studies.” *EventStudy.de*, 2024.

that there was no share price reaction to the AR6 strike price announcement; that is, that the abnormal returns are zero:

$$H_0: AR_{it}, AAR_t, CAR_i(T_1, T_2), CAAR(T_1, T_2) = 0$$

This null hypothesis was tested against the one-sided alternative hypothesis that the returns are greater than zero:

$$H_1: AR_{it}, AAR_t, CAR_i(T_1, T_2), CAAR(T_1, T_2) > 0$$

A one-sided alternative hypothesis was selected over a two-sided hypothesis because of key stakeholders' positive reaction to the AR6 strike price announcement. Specifically, given the scale of the AR6 strike price increase, as well as the public praise of politicians, offshore wind developers, energy organizations, and industry bodies, it is extraordinarily unlikely that the price announcement would have caused offshore wind developers' share prices to fall. This negates the need to test a two-sided hypothesis.

However, conducting a valid t-test requires satisfying several underlying conditions.¹⁰⁰ There is evidence some of these assumptions are violated in event studies.¹⁰¹

F. Statistical Inference Assumptions

1. Independence Assumption

First, a t-test assumes abnormal returns are independent across firms. However, because events affect firms at the same time, abnormal returns are generally cross-sectionally dependent, particularly when the sample firms are from the same industry.¹⁰²

When firms' AR and CAR are calculated, cross-sectional dependence is not an issue because these statistics are unique to each firm.¹⁰³ However, cross-sectional dependence is an issue when calculating statistics that

aggregate abnormal returns across the sample, that is, AAR and CAAR. When calculating these metrics and estimating the statistical significance of each, cross-sectional dependence can lead to biased standard error estimates and over-rejecting the null hypothesis.¹⁰⁴

2. Crude Dependence Adjustment

To help alleviate the issue of cross-sectional dependence, Brown and Warner¹⁰⁵ proposed a "crude dependence adjustment" (CDA). With this adjustment, the test statistic becomes:

$$t_{CDA} = \frac{\bar{\varepsilon}_0}{\sqrt{\sigma^2}}$$

where:

$$\sigma^2 = \frac{1}{T-1} \sum_{t=1}^T (\bar{\varepsilon}_t - \bar{\varepsilon})^2 ;$$

$$\bar{\varepsilon} = \frac{1}{NT} \sum_{t=1}^T \sum_{i=1}^N \varepsilon_{it} ;$$

and:

$$\bar{\varepsilon}_t = \frac{1}{N} \sum_{i=1}^N \varepsilon_{it} .$$

This statistic is t-distributed with $T - 1$ degrees of freedom, where T is the number of trading days in the estimation window (120).

Given the potential for cross-sectional dependence, this paper calculated the Brown-Warner CDA test where possible: the test can only be employed to estimate the significance of AAR and CAAR estimates because it is formed using a measure of the average abnormal returns across a sample. However, AR and CAR estimates are unaffected by cross-sectional dependence, negating the need to employ the Brown-Warner CDA test.

3. Normality Assumption

The t-test and Brown-Warner CDA test are parametric tests; they assume firms' abnormal returns are approximately normally distributed. However, extensive research has

¹⁰⁰ Dutta, Anupam. "Parametric and Nonparametric Event Study Tests: A Review." *International Business Research*, vol. 7, no. 12, 2014; Kim, Tae Kyun, and Jae Hong Park. "More about the Basic Assumptions of T-Test: Normality and Sample Size." *Korean Journal of Anesthesiology*, vol. 72, no. 4, 2019, pp. 331-35.

¹⁰¹ Brown and Warner (n 43) *supra*.

¹⁰² *ibid*; Campbell, Cynthia, and Charles Wesley. "Measuring Security Price Performance Using Daily NASDAQ Returns." *Journal of Financial Economics*, vol. 33, no. 1, 1993, pp. 73-92.

¹⁰³ MacKinlay (n 15) *supra*

¹⁰⁴ Dutta (n 100) *supra*.

¹⁰⁵ Brown and Warner (n 43) *supra*.

found that the distribution of firms' abnormal returns commonly exhibits positive skew and high kurtosis (fat tails).¹⁰⁶

Because departures from normality can bias parametric tests towards over-rejecting the null hypothesis, this paper also employed two non-parametric tests. Non-parametric tests do not rely on the normality assumption holding true; they are robust to the presence of skewed distributions.¹⁰⁷ Researchers have also found that non-parametric tests have greater statistical power than parametric tests in event studies.¹⁰⁸

4. Wilcoxon Signed-Rank Test

For its relative simplicity, the first non-parametric test selected for use in this study was the Wilcoxon signed-rank test. This test takes the sign and magnitude of abnormal returns into account when determining whether there is sufficient evidence to reject the null hypothesis and can be employed to estimate the significance of AAR and CAAR.¹⁰⁹

To conduct the Wilcoxon signed-rank test, the abnormal returns of a sample of firms on a given day, or a set of days, are ranked according to their absolute value, with a higher rank indicating a higher absolute value.¹¹⁰ Under the null and alternative hypotheses tested in this study, the Wilcoxon signed-rank test statistic takes the following form:

$$W = R^-$$

where R^- is the sum of the ranks of the negative abnormal returns in a sample.

For a sample of six firms and a one-sided, 5% significance test, the critical value for rejecting the null hypothesis under the

Wilcoxon signed-rank test is two. Under a one-sided 10% significance test, the critical value is instead three. In other words, if the W-score equals, or is less than, two or three, then an AAR or CAAR estimate is significant to the 5% or 10% significance level, respectively.

5. Corrado Rank Test

Despite its benefits, the Wilcoxon signed-rank test relies on the assumption that the distribution of a firm's abnormal returns absent an event is symmetrical; that is, that there are an equal number of positive and negative abnormal returns. The literature suggests this may not hold true.¹¹¹

Given this limitation, this study also employs the Corrado rank test, which is commonly calculated in the literature.¹¹² The Corrado rank test is Z-distributed and is calculated over the estimation and event window (and any time between the two) according to the following formula:

$$Z = \frac{1}{N} \sum_{i=1}^N (K_{it} - \bar{K}) / S(K)$$

where:

$$S(K) = \sqrt{\frac{1}{T} \sum_{t=1}^T \left(\frac{1}{N} \sum_{i=1}^N (K_{it} - \bar{K}) \right)^2};$$

$$K_{it} = \text{rank}(A_{it});$$

and:

$$\bar{K} = \frac{T}{2} + 0.5.$$

In the Corrado rank test, $A_{it} \geq A_{ij}$ implies $K_{it} \geq K_{ij}$, and $T \geq K_{it} \geq 1$. T is the number of trading days over the estimation window, event window, and any days between the two. $\bar{K}$ is the average rank over this entire time period, which can also be calculated as $\bar{K} = \frac{T}{2} + 0.5$.

¹⁰⁶ *ibid.*

¹⁰⁷ Brooks (n 15) *supra*.

¹⁰⁸ Dutta (n 100) *supra*; Kolari and Pynnonen (n 42) *supra*.

¹⁰⁹ Dutta (n 100) *supra*; Higgins, E, and Peterson, D. "The Power of One and Two Sample t-Statistics Given Event-Induced Variance Increases and Nonnormal Stock Returns: A Comparative Study." *Quarterly Journal of Business and Economics*, vol. 37, no. 1, 1998, pp. 27-50.

¹¹⁰ McClenaghan, Elliot. "The Wilcoxon Signed-Rank Test." *Technology Networks Informatics*, 20 Feb. 2023.

¹¹¹ Corrado (n 42) *supra*.

¹¹² Kruse, T, et al. "Are Financial Markets Aligned with Climate Action? New Evidence from the Paris Agreement." *LSE GRI Working Paper Series*, no. 333, 2020.

The Corrado test is valuable for its lack of reliance on a firm's abnormal returns following a symmetrical and / or normal distribution. However, in its original form, the test can only be used to examine AAR.

6. Corrado-Cowan Cumulated Rank Test

Responding to the limited applicability of the Corrado test, Cowan¹¹³ developed a cumulated rank test now commonly referred to as the "Corrado-Cowan cumulated rank test". The Corrado-Cowan cumulated rank test can be used to examine the statistical significance of CAAR and is also robust to non-symmetrical distributions.¹¹⁴ The Corrado-Cowan cumulated rank test statistic is Z-distributed and takes the following form:

$$Z_R = \sqrt{d} \frac{\overline{K_D} - \bar{K}}{\sqrt{\frac{\sum_{t=1}^T T(\overline{K_t} - \bar{K})^2}{T}}}$$

where $\bar{K}$ is the average rank of firms' abnormal returns over the estimation window, event window, and any days between the two, and T is the number of trading days in this time span. Likewise, d is the number of event days included in the CAAR metric, and $\overline{K_D}$ is the average rank over these days. Finally, $\overline{K_t}$ is the average rank of firms' abnormal returns on a given day t .

While the Wilcoxon signed-rank test, Corrado rank test, and Corrado-Cowan cumulated rank test remain validly specified in the presence of non-normality, they are not robust to cross-sectional dependence. Thus, the results from these tests should be critically analysed with the Brown-Warner CDA test results.

7. Homogeneity of Variance Assumption

Finally, the t-test assumes homogeneity of variance.¹¹⁵ In an event study, this means that the variance of the abnormal returns in the estimation window should be equal to the variance of the abnormal returns in the event window.

However, the variance of a firm's AR typically increases during the event window.¹¹⁶ Without accounting for this event-induced volatility, the variance used in the t-test (which is estimated from returns in the estimation window only) will be too small, and the null hypothesis may be over-rejected.¹¹⁷

Researchers have shown that the Wilcoxon, Corrado, and Corrado-Cowan tests discussed above are robust to event-induced volatility.¹¹⁸ By contrast, the t-test and the Brown-Warner CDA test do not enjoy this feature and may over-reject the null-hypothesis. This increases the importance of evaluating parametric and non-parametric tests.

8. Drawing Statistical Inferences

Together, the above tests respond to the major identified issues with drawing statistical inferences about firms' abnormal returns. While no test is robust to all the identified problems, analysing each test result with the others should provide a robust view of whether there is statistical evidence that the sample firms experienced positive abnormal returns around the time of the UK government's AR6 strike price announcement.

VI. Results and Analysis

This section presents the AR, AAR, CAR, and CAAR estimates from the market model and all the applicable test statistics above. AR estimates are presented first, followed by AAR, CAR, and finally CAAR results.

A. Abnormal Returns

Table 2, below, shows each firm's estimated AR on each day of the event window. t-test results for the significance of each are also shown, with 's' indicating the standard error ($s = \sqrt{\sigma^2}$) and 't' the test statistic. With 118 degrees of freedom, t-values above 1.29 are significant to the 10% significance level, and t-values above 1.66 are significant to the 5% level.

¹¹³ Cowan (n 42) *supra*.

¹¹⁴ Kolari and Pynnonen (n 42) *supra*.

¹¹⁵ Brooks (n 15) *supra*.

¹¹⁶ Brown and Warner (n 43) *supra*.

¹¹⁷ Brooks (n 15) *supra*.

¹¹⁸ Corrado (n 42) *supra*.

Evaluated under the t-test, the model estimated that several firms experienced statistically significant positive AR on 10, 15, 16, and 17 November.

Specifically, the AR estimates for 10 November are positive and statistically significant for Iberdrola, Orsted, and SSE. These returns range from 1-10% and are significant to the 5% level for Orsted and SSE and to the 10% level for Iberdrola. The remaining three firms also experienced positive abnormal returns on 10 November, although these estimates are statistically insignificant. Bloomberg published its article rumouring an increase in the CfD offshore wind strike price on 9 November, so the estimated abnormal returns on 10 November may capture the market's reaction to that news.

The AR estimates for 13 and 14 November are insignificant for all of the firms. This result is predictable under the efficient markets hypothesis if investors had already reacted to the 9 November price leak and no new information was delivered before these days.

The 15 November AR estimates are positive and statistically significant for EDP, RWE, and SSE, ranging from ~2-4%. The AR estimates are also positive, but insignificant, for Iberdrola and Orsted. Like the 10 November estimates, the 15 November results may reflect information leakage. On the morning of 15 November, Sky News posted an article claiming the AR6 strike price would be £73/MWh. While the impact of any article published on 15 November should be reflected in share returns on 16 November, articles take time to publish. It is conceivable that the information covered by Sky News was leaked to key investors right before markets opened on the 15th and that the 15 November AR estimates reflect this information.

The model only yielded one statistically significant AR estimate on 16 November (SSE), and AR estimates are only positive for half of the sample firms on this day. This could reflect that strike price information reached SSE investors at a different time than it reached

investors of the other sample firms. However, it may also mean that SSE's 16 November AR estimate was caused by a confounding event.

The 17 November AR estimates are positive across five firms but only statistically significant for Iberdrola. The lack of significant AR estimates on 17 November could indicate that there was little, or no, market reaction to the AR6 strike price announcement. However, given evidence of leakage and significant abnormal returns in the days prior, it is plausible it instead indicates that the market had already reacted to, and 'priced in', the higher offshore wind strike price after news leaks in the week prior.

Notably, each firm experienced significant positive abnormal returns on at least one of the event days except for ENGIE. This may be driven by the relatively small amount of eligible capacity (110 MW) ENGIE was able to bid into AR6. ENGIE also has the second highest market cap of all the sample firms, so its extensive operations in other industries may shield its share returns from the impact of events in the British offshore wind industry. Adding to the argument that a firm's market cap and ownership stake in AR6-eligible projects may partially determine their AR, the AR estimates for SSE were statistically significant to the 5% level on 10, 15, and 16 November. SSE's AR6 ownership stake was twice as large as ENGIE's, and its market cap is half of ENGIE's.

It is also interesting that the AR estimates for a given day are not uniformly (in)significant across the sample. Briefly alluded to above, this may be the outcome of leakage: rumours of a strike price increase may have reached the sample firms' investors at different times. However, it also supports the possibility that the significant AR above reflect the impact of random variability or firm-level confounding events, not the AR6 strike price announcement.

Evaluating AAR in addition to AR can alleviate some concerns about confounding events. Because returns are aggregated across firms

to calculate AAR, the impact of firm-specific confounding events should theoretically average out. The AAR metric is also valuable because AAR can be evaluated with test statistics robust to cross-sectional dependence, event-induced volatility, and non-normality. In contrast, the above t-test results may be inflated if the t-test assumptions were violated.

B. Average Abnormal Returns

Table 3, below, presents the AAR estimates for each day in the event window, as well as a t-test, Brown-Warner CDA test, Wilcoxon signed-rank test, and Corrado rank test for the significance of each.

Statistically significant positive AAR estimates are observable under all tests on 10 and 15 November. On 10 November, the estimated AAR is 0.027, and on 16 Nov it is 0.022. This suggests the sample firms' share returns were, on average, 2-3% higher than expected, given normal market trends. Importantly, the significance of the 10 and 15 November AAR estimates across all the tests suggests that the positive results on 10 and 15 November are not simply the result of biased standard errors.

Similar to the AR results, the AAR estimates are statistically insignificant under all tests on 13, 14, and 16 November. This is predictable given the AR estimates on these days.

On 17 November, the AAR estimate is statistically significant to the 5% level under the Wilcoxon test and almost significant to the 10% level under the t-test ($t_{0.1,5} = 1.476$). This is moderate evidence in support of the alternative hypothesis. However, any conclusions about the sample firms' share returns on 17 November should be drawn cautiously given the relatively small magnitude of the AAR estimate and its lack of statistical significance under the Brown-Warner CDA test and Corrado test. Any share price reaction on 17 November also appears small compared to 10 and 15 November, which

may be because investors had already reacted to leaked strike price information.

The AAR metric aggregates AR estimates across firms, potentially neutralising the impact of firm-specific confounding events. Thus, the above AAR results may measure the AR6 strike price announcement's impact on the sample firms' share returns more accurately than the AR estimates in Table 2. However, the sample evaluated in this paper is small, so it is also possible that the above results are driven by one or two outlier AR estimates. This is problematic if the outliers were caused by random variability or a confounding event unidentified in the aforementioned Google News search. Nonetheless, the results in Table 2 do not provide strong evidence for this outcome. If outliers are defined as any value that falls outside three standard deviations of a mean,¹¹⁹ then only one AR estimate in Table 2 is an outlier: the estimate for Orsted on 10 November.

While this outlier provides reason to interpret the 10 November AAR results cautiously, it is probable that it simply reflects the fact that Orsted had the most capacity eligible for participation in AR6: 3,450 MW. Furthermore, the 10 and 15 November AAR estimates are significant under both non-parametric tests employed. Non-parametric tests are more outlier-resistant than parametric tests because, while the largest values are given the highest ranks, the magnitude of the estimates with the highest ranks does not matter.

C. Cumulative Abnormal Returns

Table 4, below, presents the model estimates of each firm's three- and six-day CAR, as well as t-test statistics for the significance of each. With 118 degrees of freedom, t-values above 1.29 are significant to the 10% significance level and those above 1.66 are significant to the 5% level.

¹¹⁹ Wooldridge, Jeffrey. *Introduction to Econometrics*. Europe, Middle East and Africa edition ed., Cengage Learning, 2014.

The three-day CAR should capture any share price movements caused by the AR6 strike price announcement and any information leaked in the three days prior. These estimates are positive and statistically significant for EDP, RWE, and SSE. Additionally, all the firms' estimated three-day CARs are positive, ranging from ~1-6%. This is strong evidence that an event caused the sample firms' share prices to deviate positively from other firms in the clean energy market between 15 and 17 November. However, it is not possible to conclude with any standard level of statistical confidence that the entire sample experienced positive three-day CAR.

The six-day CAR metric should capture any share price movements caused by the AR6 strike price announcement and any information leaked on or after 9 November. Significant positive six-day CARs are observable for Orsted, RWE, and SSE. Additionally, the estimated six-day CAR is positive for all firms but ENGIE, ranging from 3-14%. Like above, this supports the conclusion that an event(s) between 9 and 16 November uniquely affected the sample firms' share prices, but it is not possible to conclude with any standard level of statistical confidence that the entire sample experienced positive six-day CAR.

Given the Table 2 results and analysis, it is unsurprising that the three- and six-day CAR estimates are insignificant for ENGIE. Both CAR estimates are also statistically insignificant for Iberdrola, although Iberdrola's CAR was positive under both CAR windows. Like ENGIE, the insignificance of Iberdrola's CAR estimates may be the outcome of Iberdrola's large market cap.

Finally, Orsted's estimated six-day CAR is significant, but the estimate of its three-day CAR is insignificant. This suggests Orsted investors may have trusted early strike price information leaks and fully incorporated this information into their evaluations of Orsted during the first few days of the event window. The opposite may be true for EDP, as only

EDP's three-day CAR estimate is statistically significant.

Like the AR results, caution should be taken in evaluating any of the above results as the t-test statistic may be biased upwards due to non-normality and event-induced volatility.

D. Cumulative Average Abnormal Returns

Finally, Table 5, below, presents three- and six-day CAAR estimates, as well as a t-test, Brown-Warner CDA test, Wilcoxon signed-rank test, and Corrado-Cowan cumulated rank test for the significance of each.

The three- and six-day CAAR estimates are positive and statistically significant across all four tests. This suggests that the statistical significance of the CAAR estimates is not the outcome of employing faulty test statistics. Instead, it is likely that the significant positive results can be interpreted as evidence in favour of the alternative hypothesis that eligible offshore wind developers experienced positive abnormal share returns around the time of the AR6 strike price announcement.

Specifically, the three-day CAAR statistic is significant across all tests to the 5% level. This is strong evidence that, on average, the sample firms' shares outperformed the clean energy market from 15 to 17 November. Magnitude-wise, it is estimated that the samples' share returns were 3.6% higher than expected, given the market index's returns.

The six-day CAAR statistic is significant across the t-test, Brown-Warner CDA test, and the Wilcoxon test to the 5% level, and it is significant to the 10% level under the Corrado-Cowan test. This is likewise strong evidence that AR6-eligible offshore wind developers' share prices deviated positively from other firms in the clean energy market leading up to, and immediately after, the British government's AR6 offshore wind strike price announcement. Specifically, the six-day CAAR estimate suggests that, on average, the samples' share returns were 5.6% higher from 10 to 17 November than expected, given the market index's returns.

Similarly to the AAR results, the positive CAAR results could be driven by outliers, and this is problematic if the outliers capture the impact of a confounding event(s). However, the CAR estimates in Table 4 present little evidence for this outcome: eleven of twelve estimates in Table 4 are positive, and there are no outliers in Table 4 when defining an outlier the same way as in Section VI.B. Instead, it is probable that the significant CAR and CAAR results in Tables 4 and 5 are the outcome of an event which uniquely affected the sample firms.

VII. Discussion

A. Causal Inference

The above results provide substantial evidence against the null hypothesis of no abnormal returns in favour of the alternative hypothesis that AR6-eligible offshore wind developers experienced significantly positive abnormal returns over the event window. With the exception of ENGIE, every firm's AR estimate was statistically significant on at least one of the event days, and most of the sample firms' estimated three- or six-day CAR was statistically significant. Statistically significant results were particularly notable when abnormal returns were aggregated across the sample and / or time, and the significance of the AAR and CAAR estimates was generally robust to the statistical test employed. This suggests that the significance of the AAR and CAAR estimates was not due to using mis-specified test statistics.

The next important step in drawing conclusions about the present-day importance of the CfD scheme is attributing the above results to the government's AR6 offshore wind strike price announcement. There are several reasons why the above results should reflect the impact of this announcement. First, the significant abnormal returns align temporally with leaked and announced information about the AR6 offshore wind strike price. Second, and referring back to the theoretical meaning of abnormal returns, the significant AR estimates suggest that an event affected the sample firms differently than other firms in the clean energy market. The AR6 strike price announcement fits this bill. Finally, the

above-mentioned Google search for confounding events which may explain the AR estimates was fruitless. This is all strong evidence in support of a causal link between the AR6 strike price announcement and the statistically significant positive abnormal returns estimated in this study.

B. Implications for the CfD Scheme

Ultimately, this paper aims to shed light on whether the CfD scheme is relevant to the value of a new British offshore wind farm today. If it is assumed that the sample firms' abnormal share returns and the AR6 strike price announcement are causally linked, and it is also assumed that the share prices of a company are a function of a firm's expected financial performance, then it is possible to use the above results to infer whether the CfD scheme is relevant to the value of British offshore wind developments today or is instead redundant given alternative revenue options (for instance, wholesale markets and CPPAs).

To begin by examining the latter possibility, it is important to remember that, due to the competitive nature of CfD auctions, developers should bid to receive an estimate of their LCOE in a CfD round regardless of whether the strike price is set above this level. In other words, the AR6 strike price announcement should not have represented a new opportunity to generate windfall profits but instead the return of a government-supported way to develop a financially viable offshore wind project. Thus, if the CfD scheme is now redundant and investors believed developers could sell power at rates above their LCOEs outside of the CfD scheme, then the AR6 strike price announcement should not have caused abnormal share returns; the price would have been irrelevant. This outcome is not supported by the event study results presented in this paper. Instead, the significantly positive abnormal returns estimated in this paper suggest that investors believed the CfD scheme increases the value of an offshore wind development today versus a world without the CfD programme.

There are several reasons why the CfD scheme may be valuable, or even necessary, for developing offshore wind projects today which support this conclusion. To begin with, if companies are unwilling to pay a premium for renewable energy and wholesale energy prices remain below developers' LCOE, the CfD scheme may be the only route to developing a bankable project. The AR6 strike price announcement would thus have marked the return of a programme critical to offshore wind developers' business operations.

The CfD scheme may also create value in the offshore wind industry today even if it is not strictly necessary for developing a financially viable offshore wind project. Regardless of whether projects are bankable, and would be developed, without the CfD scheme, the scheme may increase the value of a project through lowering its risk and thus its financing costs. To elaborate, because energy prices are fixed under CfD contracts, offshore wind developers' profits are much more predictable under CfD contracts than in wholesale markets, where prices can fluctuate massively. Thus, CfD contracts are often required by banks to provide financing or significantly improve banks' lending terms.¹²⁰

Ultimately, identifying the specific reason(s) why the CfD scheme may increase the value of projects today is beyond the scope of this article. Nonetheless, this discussion should highlight that several explanations for why the CfD scheme creates value today are probable and support the conclusions reached in this article.

C. Limitations

While the above AR, CAR, AAR, and CAAR estimates suggest that the CfD scheme is relevant today, it is important to discuss some limitations of this event study's design which may impact the accuracy of the estimates and any subsequent conclusions.

To begin with, this study may suffer from low statistical power, primarily due to the small

sample size. MacKinlay¹²¹ simulated an event study to understand how the power of statistical tests varies with sample size. Specifically, he tested 4 levels of abnormal returns (0.005, 0.01, 0.015, and 0.02) and found that, with a sample size of 6 and a 5% significance level, a t-test only detected an actual abnormal return of 0.005 12% of the time. The detection rate improved to 23% for an abnormal return of 0.01, 45% for an abnormal return of 0.015, and 69% for an abnormal return of 0.020. While a power analysis is beyond the scope of this article, MacKinlay's findings suggest that a t-test may have failed to detect some sample firms' abnormal returns. If so, the above event study results are likely a conservative representation of the impact of the AR6 strike price announcement on AR6-eligible developers' share prices.

Nonetheless, some potential power issues should be partially alleviated by employing non-parametric tests. Corrado¹²² tested the power of non-parametric tests in detecting abnormal returns and compared his results to t-test results. Ultimately, he found that the sign and rank tests are more powerful than their parametric counterparts. Most of the AAR and CAAR estimates observed in this study were either statistically significant under all the tests employed or none of the tests employed. Nonetheless, the estimated AAR on 17 November was statistically significant under the Wilcoxon test but not the t-test or Brown-Warner CDA test. This discrepancy may be the outcome of the different power of the parametric versus non-parametric tests and gives some credibility to the Wilcoxon test result over the t-test and Brown-Warner CDA test.

Partially discussed in the results section above, evaluating a small sample also increases the chance of introducing bias into the results.¹²³ With a sample size of only six, each firm's individual AR and CAR can heavily influence the AAR and CAAR, respectively. Thus, if a confounding event caused any one

¹²⁰ Beiter et al. (n 18) *supra*.

¹²¹ MacKinlay (n 15) *supra*.

¹²² Corrado (n 42) *supra*.

¹²³ Brooks (n 15) *supra*.

firm to experience positive abnormal returns, the AAR and CAAR metrics will partially reflect this event, not the AR6 strike price announcement. In a larger sample, it is more likely that the effect of confounding events will cancel out.

Additionally, the assumptions underlying statistical tests, such as normality and independence, are less likely to hold true for small samples, and violations of each can result in mis-specified test statistics.¹²⁴ Nonetheless, Brown and Warner¹²⁵ examined this issue and found that, while the distribution of abnormal returns deviates more from normal in event studies with small samples ($n = 5$), statistical tests were still properly specified in these studies, with the appropriate probability of a Type 1 error. Nonetheless, the higher potential for misspecification with small samples increases the importance of evaluating non-parametric tests as well as parametric ones.

VIII. Conclusions and Further Research

This paper conducted an event study to examine the impact of the UK's AR6 offshore wind strike price announcement on AR6-eligible offshore wind developers' share returns. The results suggest that the majority of examined developers experienced significantly positive abnormal returns in the period from the first AR6 offshore wind strike price information leak to the UK government's formal strike price announcement. The evidence in favour of the alternative hypothesis of significantly positive abnormal returns was particularly strong when abnormal returns were aggregated across firms and / or time. The small sample evaluated in this paper and the potentially low power of the test statistics employed provide reason for interpreting the results with caution. However, the lack of clear outliers in the sample and the robustness of the results across statistical tests alleviate much concern.

Assuming the UK government's AR6 strike price announcement and the abnormal returns estimated in this paper are causally linked, then the event study results suggest that the CfD scheme creates value in the British offshore wind industry today and thereby helps incentivise offshore wind development. This is an important finding given the UK's ambitious offshore wind goals. In 2022, the British government set a goal to deploy 50 GW of offshore wind by 2030.¹²⁶ Today, only 14 GW of offshore wind are operational in British waters, suggesting that meeting the government's goals will require a major acceleration of annual offshore wind development rates.¹²⁷ Thus, provided that the CfD scheme creates value in the British offshore wind industry today, it is this study's contention that the UK government should continue to support the CfD scheme to the fullest extent possible, at least until the UK government is on track to meet its offshore wind targets. Without an acceleration of offshore wind development rates, the UK government's credibility, UK energy security, and climate stability are at stake.

The significance of the finding that the CfD scheme creates value today may also extend beyond the UK. Both the International Renewable Energy Agency (IRENA) and the International Energy Agency (IEA) stand in consensus that keeping global warming within 1.5 degrees Celsius will require a tripling of global renewable energy capacity by 2030.¹²⁸ Many countries have set targets in line with this understanding: 19 countries have 2030 offshore wind targets, and global offshore wind capacity will triple if these are collectively achieved.¹²⁹ However, regional industry bodies have been vocal in expressing that, to meet these goals, governments will need to continue de-risking offshore wind projects through CfD schemes or similar revenue stabilisation methods.¹³⁰ Leading turbine manufacturers, such as Vestas, have

¹²⁴ Kothari and Warner (n 73) *supra*.

¹²⁵ Brown & Warner (n 43) *supra*.

¹²⁶ Walker, Alan, and Nikki Sutherland. *Floating Offshore Wind*. 15 Nov. 2023.

¹²⁷ The Crown Estate (n 3) *supra*.

¹²⁸ Altieri, Katye, et al. "Wind Targets are Achievable but Fall Short of a Tripling." *Ember*, 8 Aug. 2024.

¹²⁹ *ibid*.

¹³⁰ *Industry Position: Key Elements for Offshore Wind Auction Design*. Wind Europe, 2024.

also publicly advocated for the necessity of supportive government auction schemes.¹³¹ The results in this study reinforce the message shared by stakeholders that CfD schemes are, and will remain, essential for driving utility-scale offshore wind deployment.

Further research could strengthen and expand this article's findings. First, the CfD strike price only partially determines the ability of a CfD allocation round to effectively support offshore wind: the overall budget for each round is also critical, as this determines the total amount of offshore wind that can be developed at a given strike price. The government announced its AR6 budget in March 2024.¹³² There is 7,132 MW of offshore wind eligible for participation in AR6 (Table 1), but less than half of this could be supported at the AR6 strike price given the budget. If a market reaction to the budget announcement is detectable, this would support the findings of this article.

Future studies could also examine the impact of the AR6 strike price announcement on broader offshore wind supply chains. The supply chain involved in the British offshore wind industry is extensive, spanning turbine suppliers, offshore foundations manufacturers, cable manufacturers, installation and construction companies, and

offshore vessel and port operators, among others. Understanding how far down the supply chain the impact of the AR6 strike price announcement pervaded should build further understanding of the CfD scheme's relevance.

Finally, and looking beyond the CfD scheme, a global analysis of the impact of renewable energy auction policy announcements on offshore wind developers' share prices could be conducted. This could elucidate the relevance of renewable energy auctions globally—a particularly interesting enquiry as offshore wind will likely reach cost parity with traditional generation sources at different times around the world.¹³³ A comparative analysis of the impact of announcements introducing different types of renewable energy support policies could also help elucidate whether the market reacts more favourably to a specific form of government support. This paper suggests that the CfD scheme adds value to British offshore wind developments today, but whether the CfD scheme is the optimal form of government support remains an open debate.

¹³¹ "This Is Not a Wind Farm: A Guide for Turning Auctions into Action." Vestas, 2024.

¹³² Coutinho (n 13) *supra*.

¹³³ Jansen, Malte, et al. "Offshore Wind Competitiveness in Mature Markets without Subsidy." *Nature Energy*, vol. 5, no. 8, 2020, pp. 614-22.

	Primary Industries	Primary Stock Exchange (SE)	September 2023 Market Cap (\$)	AR6-Eligible Capacity (MW)
EDP Renewables*	Clean Energy	Euronext Lisbon	\$17,335,000,000	110 MW
ENGIE*	Utilities, Clean Energy	Euronext Paris	\$37,185,000,000	110 MW
Iberdrola*	Utilities, Clean Energy	Madrid SE	\$69,886,000,000	2,304 MW
Orsted*	Clean Energy	Nasdaq Copenhagen	\$22,936,000,000	3,450 MW
RWE*	Energy (Clean and Fossil)	Frankfurt SE	\$27,641,000,000	346 MW
SSE*	Clean Energy	London SE	\$21,289,000,000	245 MW
HexiconAB	Offshore Wind Technology	Nasdaq Stockholm	\$21,645,000	10 MW
Tenaga Nasional Berhad (TNB)	Utilities	Kuala Lumpur SE	\$12,314,000,000	29 MW
Siemens	Industrial Automation, Manufacturing	Frankfurt SE	\$113,500,000,000	58 MW
SDIC Power Holdings	Energy Infrastructure	Shanghai SE	\$12,017,000,000	135 MW
TotalEnergies	Energy, Petroleum	Euronext Paris	\$157,900,000,000	335 MW

* Included in Final Sample

Table 1: Offshore Wind Developers

	EDP					
	Renewables	ENGIE	Iberdrola	Orsted	RWE	SSE
10 Nov	0.000481383	0.010805598	0.014684149	0.100091887	0.009582001	0.025897678
<i>t-test</i>	s=0.0179 t=0.026854	s=0.01139 t=0.94853	s=0.01130 t=1.29993*	s=0.03750 t=2.66923**	s=0.01310 t=0.73132	s=0.01194 t=2.16978**
13 Nov	-0.01039685	-0.00559012	0.003145108	0.022073098	-0.00004272	0.011370312
<i>t-test</i>	s=0.01793 t=-0.57999	s=0.01139 t=-0.49071	s=0.01130 t=0.27842	s=0.03750 t=0.58864	s=0.01310 t=-0.00326	s=0.01194 t=0.95264
14 Nov	-0.01495971	-0.01310751	-0.01059662	-0.02198558	0.009728426	-0.01251336
<i>t-test</i>	s=0.01793 t=-0.83453	s=0.011392 t=-1.15059	s=0.01130 t=-0.93806	s=0.03750 t=-0.58631	s=0.01310 t=0.742492	s=0.01194 t=-1.04841
15 Nov	0.043001557	-0.00418071	0.0080456	0.046523357	0.017057776	0.023663149
<i>t-test</i>	s=0.01793 t=2.39886**	s=0.011392 t=-0.36699	s=0.01130 t=0.71224	s=0.03750 t=1.24068	s=0.01310 t=1.30188*	s=0.01194 t=1.98257**
16 Nov	-0.00185695	0.003096552	-0.0041242	-0.03018878	0.01344937	0.034025214
<i>t-test</i>	s=0.01793 t=-0.10359	s=0.011392 t=0.271818	s=0.01130 t=-0.3651	s=0.03750 t=-0.80507	s=0.01310 t=1.02648	s=0.01194 t=2.85073**
17 Nov	0.016620367	0.008699276	0.018563869	0.024811172	0.005658245	-0.00460299
<i>t-test</i>	s=0.01793 t=0.92717	s=0.011392 t=0.76363	s=0.01130 t=1.64338*	s=0.03750 t=0.66166	s=0.01310 t=0.43185	s=0.01194 t=-0.38565

**.05; *.10

Table 2: Abnormal Returns with T-Test

	AAR	t-test	Brown-Warner	Wilcoxon	Corrado
10 Nov	0.02692378	s=0.00799 t=3.36915**	s=0.01249 t=2.15613**	W=0**	$\bar{k}_t=108.33$ z=1.60183*
13 Nov	0.00342647	s=0.00799 t=0.42878	s=0.01249 t=0.27440	W=8	$\bar{k}_t=69.5$ z=0.18272
14 Nov	-0.0105724	s=0.00799 t=-1.32300	s=0.01249 t=-0.8467	W=20	$\bar{k}_t=33.33$ s=27.36911 z=-1.13894
15 Nov	0.02235179	s=0.00799 t=2.79702**	s=0.01249 t=1.78999**	W=1**	$\bar{k}_t=105.33$ z=1.49220*
16 Nov	0.0024002	s=0.00799 t=0.30035	s=0.01249 t=0.19221	W=9	$\bar{k}_t=72.5$ z=0.29235
17 Nov	0.01162499	s=0.00799 t=1.45471	s=0.01249 t=0.93096	W=1**	$\bar{k}_t=94.83$ z=1.10849

**.05; *.10

Table 3: Average Abnormal Returns with T-Test, Brown-Warner CDA Test, Wilcoxon Signed-Rank Test, and Corrado Rank Test

	EDP					
	Renewables	ENGIE	Iberdrola	Orsted	RWE	SSE
15-17 Nov	0.05776497	0.007615118	0.022485264	0.041145752	0.03616539	0.053085372
t-test	s=0.03105 t=1.86048**	s=0.01973 t=0.38594	s=0.01957 t=1.14923	s=0.06495 t=0.63351	s=0.02269 t=1.59361*	s=0.02067 t=2.56785**
10-17 Nov	0.032889794	- 0.00027692	0.029717901	0.141325161	0.055433102	0.077839999
t-test	s=0.04391 t=0.74904	s=0.02791 t=-0.00992	s=0.02767 t=1.07402	s=0.09185 t=1.53862*	s=0.03209 t=1.72720**	s=0.02924 t=2.66246**
**.05; *.10						

**,05; *,10

Table 4: Cumulative Abnormal Returns with T-Test

	CAAR	t-test	Brown-Warner	Wilcoxon	Corrado-Cowan
15 - 17 Nov	0.03637698	s=0.01384 t=2.62815**	s=0.02163 t=1.68192**	W=0**	$\bar{k}_D = 90.89$ z=1.67002**
10 - 17 Nov	0.05615484	s=0.01957 t=2.86877**	s=0.03059 t=1.83590**	W=1**	$\bar{k}_D = 80.64$ z=1.44440*

**,05; *,10

Table 5: Cumulative Average Abnormal Returns with T-Test, Brown-Warner CDA Test, Wilcoxon Signed-Rank Test, and Corrado-Cowan Cumulated Rank Test

Can Acceptance Be Bought? Enhancing Local Social Acceptance of Renewable Energy Projects Through Financial Participation: Insights from Mecklenburg Western Pomerania, Germany

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KEYWORDS

renewable energy, social acceptance, financial involvement, MWP

ABSTRACT

In the wake of the global energy transition, local opposition towards the installation of renewable energy plants among neighbouring municipalities and residents is an increasingly relevant issue. Economic tools to financially engage residents living close to renewable energy projects are considered one solution to alleviate opposition and foster local social acceptance. However, the effectiveness of such financial participation tools in doing so is yet to be proven. The Citizen and Municipal Participation Law (Bürger- und Gemeindebeteiligungsgesetz) is a policy in the German state of Mecklenburg Western Pomerania which mandates the financial participation of citizens and municipalities. Drawing on this policy, the study at hand seeks to contribute to closing this prevailing empirical research gap. Insights from seven semi-structured interviews with eight experts on this policy from municipalities, project developing companies, and superordinate public bodies in Mecklenburg Western Pomerania are used to shed light on the factors influencing the choice, implementation and success of financial participation tools for increasing local social acceptance towards wind farms. The study thus generates knowledge and recommendations for the effective future design and application of different financial participation tools.



I. Introduction

Public acceptance is a key factor influencing the transition to net zero energy systems as it can shape, enable or prevent policy and system changes.¹ This becomes particularly apparent when considering the uptake of renewable energy facilities, such as wind

farms, on a local level. Here, implementation processes are often slowed down or even stopped by citizens' initiatives or lawsuits, representing low levels of acceptance and opposition. Such opposition towards renewable energy projects can arise, among other reasons, due to a sense of distributive

¹ IPCC. *Global Warming of 1.5°C: IPCC Special Report on Impacts of Global Warming of 1.5°C above Pre-Industrial Levels in the Context of Strengthening the Response to*

Climate Change, Sustainable Development, and Efforts to Eradicate Poverty. 1st ed., Cambridge University Press, 2022.

injustice caused by an asymmetric allocation of the costs and benefits of renewable energy plants.² While the benefits of renewable energy projects accrue on a national or even global scale, the external costs such as negative impacts on the aesthetics of the landscape, noise or loss of land, are borne on a local level. Furthermore, market benefits remain with the renewable energy developers who often operate nationwide or globally, instead of the region. Thus, residents in the vicinity of renewable energy projects such as wind farms face a negative net effect, commonly lowering their acceptance towards potential or existing projects.³

The financial involvement of residents living in vicinity of a renewable energy project is considered to be one tool to enable equal distribution and to mitigate opposition. Individual residents or communities who face the external costs of such projects thus financially benefit from the development, construction, and operation of wind energy installations. Some scholars argue that this can counteract opposition and increase acceptance.⁴ However, this consensus is reached mainly on the basis of ex-ante studies such as choice experiments providing insights about which economic tools are preferred by citizens when given a set of choices. While these results deliver relevant findings about citizens' preferences regarding different tools, they do not provide any ex-post empirical evidence on whether such financial participation tools are indeed effective in enhancing residents' acceptance.

Nevertheless, as the pressure to accelerate renewable energy uptake is increasing, various countries such as Denmark, France and Germany are starting to incorporate financial participation policies into their energy transition agendas. Germany is taking a pioneering role in this realm.

In 2021, Germany introduced an amendment to its Renewable Energy Act (Erneuerbare Energiengesetz, EEG). Changes to its sixth paragraph now enable operators of renewable energy sources to make unilateral financial contributions to neighbouring municipalities affected by the construction of their plant. The law thereby seeks to increase local acceptance of renewable energy plants. Various studies show that the energy transition in general—that is, in the sense of a predominantly renewable energy supply—is viewed positively by the German population.⁵ However, such high levels of approval diminish at the local level where renewable energy projects are realised, an effect that leads around 20% of the population to oppose further infrastructure development.⁶ With relevant stakeholders such as the German Agency for Renewable Energies (Agentur für Erneuerbare Energien, AEE) suggesting financial participation in energy transition projects is crucial to tackle this issue, the German government, among others, calls the EEG 2023 the biggest amendment to energy policy legislation in decades.⁷

But even before the amendment of the EEG, several German states had adopted policies to

² Wüstenhagen, Rolf, et al. "Social Acceptance of Renewable Energy Innovation: An Introduction to the Concept." *Energy Policy*, vol. 35, no. 5, May 2007, pp. 2683–91; Lienhoop, Nele. "Acceptance of Wind Energy and the Role of Financial and Procedural Participation: An Investigation with Focus Groups and Choice Experiments." *Energy Policy*, vol. 118, Jul. 2018, pp. 97–105.

³ Wüstenhagen et al. (n 2) *supra*; Lienhoop (n 2) *supra*; Segreto, Marco, et al. "Trends in Social Acceptance of Renewable Energy Across Europe—A Literature Review." *International Journal of Environmental Research and Public Health*, vol. 17, no. 24, Jan. 2020, p. 916.

⁴ Lienhoop (n 2) *supra*; Buchholz, Frank, and Antonia Hüge. "Beteiligung - ein Mittel, um die Bürger bei der Energiewende mitzunehmen? Ein aktueller Zwischenbericht zur Windenergieplanung in Baden-

Württemberg." *Nimm's sportlich - Planung als Hindernislauf*, Verlag der ARL - Akademie für Raumforschung und Landesplanung, 2014, pp. 4–17; Wunderlich, Clemens. *Akzeptanz und Bürgerbeteiligung für Erneuerbare Energien*. Stand: November 2012, Agentur für Erneuerbare Energien, 2012.

⁵ AEE. "Akzeptanz in Den Bundesländern - Überblick Zu Den Akzeptanzmaßnahmen in Der Föderalen Energiewende." *Agentur Für Erneuerbare Energien*, Renew's Kompakt, no. 60, July 2023.

⁶ Wolf, Ingo, et al. *Soziales Nachhaltigkeitsbarometer Der Energie - Und Verkehrswende 2021*. Kopernikus-Projekt Ariadne; Potsdam-Institut für Klimafolgenforschung (PIK), 2021.

⁷ Die Bundesregierung. *Ausbau erneuerbarer Energien beschleunigen | Bundesregierung. Die Bundesregierung informiert | Startseite*, 1 Mar. 2023.

foster financial participation of residents in municipalities affected by renewable energy projects. In 2016, Mecklenburg Western Pomerania (MWP) introduced the so-called Bürger- und Gemeindenbeteiligungsgesetz (BüGembeteilG M-V), the Citizen and Municipal Participation Law (CMPL), which mandates wind farm developers to financially engage both municipalities and citizens while offering them a choice between several tools to do so.⁸ Developers can either offer company shares to municipalities and residents, compensate municipalities via direct annual payments while offering saving products to citizens, or come up with an individual participation concept.⁹ The state's approach represents an interesting and valuable case from which empirical insights regarding the implementation and effectiveness of different financial participation tools can be derived.

This article offers a rare ex-post qualitative evaluation of different financial participation formats by exploring the example of MWP and its CMPL. It seeks to contribute to closing the prevailing empirical research gap concerning the effectiveness of different financial participation tools in increasing local social acceptance. Using insights from seven semi-structured interviews with eight experts from municipalities, project developing companies, and superordinate public bodies in MWP, it sheds light on the factors influencing the choice, implementation and subsequent success of these tools. By doing so, this study appears to be the first of its kind, as a thorough review of the existing literature yielded no other studies focusing in such detail on the mechanisms behind financial participation formats for municipalities and residents in the given context. Thus, this study generates valuable knowledge for the effective future design and application of different financial participation tools to increase local social acceptance for renewable energy projects and specifically, for wind farms. With

these tools becoming an increasingly relevant policy option to counteract local opposition towards renewable energy projects, the insights generated by this article can not only support the implementation of the sixth paragraph of the EEG in Germany, but also future and existing policies in other legislative instruments.

The remainder of this article is organised as follows. Section II offers an introduction to the concept of acceptance and more specifically, of local social acceptance. Furthermore, existing literature on the acceptance of renewable energies and on financial participation as a means to increase such acceptance is reviewed. On the basis of this, three research questions are developed. Section III sets out the context of this study, explaining local social acceptance in Germany and Mecklenburg Western Pomerania. Section IV describes the method and study design applied and offers an introduction to the interviewees and how their respective organisations implement the CMPL. The study's findings will be presented in Section V, addressing each research question, followed by Section VI which outlines policy recommendations on the basis of these results. The final Section summarises key findings, outlines limitations of the study and presents implications for future research.

II. Theoretical Background and Literature Review

A. Defining Social Acceptance of Renewable Energy Projects

Defining and measuring acceptance is challenging, as can be seen by the prevailing lack of coherence in existing literature. Kraeusel and Möst, for instance, define acceptance in the context of new technologies as a "positive attitude towards an issue ... which is expressed in a certain opinion or in a certain behaviour such as endorsement,

⁸ It should be noted that while the CMPL uses the term *citizens* (German: *Bürger*), it does not only refer to people with German citizenship in the respective municipality, but its residents more broadly. Recognising this distinction, the remainder of this paper uses the two

terms interchangeably, as done in most other studies surrounding local acceptance for renewables.

⁹ Bürger- Und Gemeindenbeteiligungsgesetz - BüGembeteilG M-V, vol. GVOBl. M-V 2016, 258, 230-3, 18 May 2016.

approval, [or] approbation.”¹⁰ Similarly, Upham and García Pérez see acceptance as a positive response to technology by members of a given social unit such as a region, community and households.¹¹ In contrast to definitions framing acceptance as an actively positive view, others render it much more passively, defining acceptance as the lack of noticeable opposition to a project.¹² However, both types of definition leave much room for interpretation.

Furthermore, the literature distinguishes between social and public acceptance. While public acceptance is often described as an “aggregated degree of acceptance by individual citizens,” often referring to the wider population’s opinions about a policy or project, social acceptance is considered to encompass the approval or disapproval of more specific social groups, and often takes into account particular cultural, social, or economic dimensions.¹³

In the context of renewable energy innovation, Wüstenhagen et al. have extended the concept by separating social acceptance into three levels.¹⁴ Firstly, socio-political acceptance, which refers to social acceptance of energy innovations at the most general level; secondly, community acceptance, describing the acceptance of local stakeholders such as residents and authorities towards specific policies or projects and their implementation processes; and thirdly, market acceptance, delineating the diffusion of renewable energy innovations and products among consumers, investors and firms. These three levels are considered to be intertwined and mutually

dependent. Schumann adds the dimension of technological acceptance, setting out that for large-scale technologies such as renewable energy projects, mere passive approval or tolerance (instead of positive attitudes or activity) of those concerned suffices as an indicator for acceptance.¹⁵

Lastly, the distinction between acceptance and acceptability should be addressed, as the two terms are often used interchangeably, and some confusion seems to prevail. While acceptability includes the judgement of experts regarding the construction of a particular facility, representing a more ex-ante perspective on the perception of said facility, acceptance can describe ex-ante or ex-post sentiments and views on a facility or project by the general public, regardless of rational judgement.¹⁶

This article focuses on acceptance rather than acceptability. As the study is concerned with the acceptance of renewable energy projects on a municipal level, acceptance is mainly understood as community acceptance. Furthermore, while taking Schumann’s concept of technological acceptance into account, active and passive behaviour are not differentiated, as it is assumed that both indicate some form of acceptance.¹⁷ Acceptance of renewable energy projects can therefore be expressed through passive approval—that is, the absence of active disapproval or opposition towards them—as well as through active approval. This type of acceptance will henceforth be referred to as *local social acceptance*.

¹⁰ Kraeusel, Jonas, and Dominik Möst. “Carbon Capture and Storage on Its Way to Large-Scale Deployment: Social Acceptance and Willingness to Pay in Germany.” *Energy Policy*, vol. 49, Oct. 2012, pp. 642–51 at 645.

¹¹ Upham, Paul, and Jesús García Pérez. “A Cognitive Mapping Approach to Understanding Public Objection to Energy Infrastructure: The Case of Wind Power in Galicia, Spain.” *Renewable Energy*, vol. 83, Nov. 2015, pp. 587–96.

¹² Cohen, Jed, et al. “Re-Focussing Research Efforts on the Public Acceptance of Energy Infrastructure: A Critical Review.” *Energy*, vol. 76, Nov. 2014, pp. 4–9.

¹³ Wolsink, Maarten. “Social Acceptance Revisited: Gaps, Questionable Trends, and an Auspicious Perspective.”

Energy Research & Social Science, vol. 46, Dec. 2018, pp. 287–95 at 288.

¹⁴ Wüstenhagen et al. (n 2) *supra*.

¹⁵ Schumann, Diana. “Public Acceptance.” *Carbon Capture, Storage and Use: Technical, Economic, Environmental and Societal Perspectives*, edited by Wilhelm Kuckshinrichs and Jürgen-Friedrich Hake, Springer International Publishing, 2014, pp. 221–51.

¹⁶ Bertsch, Valentin, et al. “Public Acceptance and Preferences Related to Renewable Energy and Grid Expansion Policy: Empirical Insights for Germany.” *Energy*, vol. 114, Nov. 2016, pp. 465–77.

¹⁷ Schumann (n 15) *supra*.

B. Acceptance of Renewable Energy Projects

Local social acceptance is a crucial prerequisite for the installation and operation of renewable energy projects as its absence may significantly delay or even impede uptake processes. Academia has been concerned with this issue for forty years, with Carlman first defining the problem of social acceptance for wind power and carrying out a study among decision-makers.¹⁸ Other researchers such as Bosley and Bosley, Thayer, and Wolsink joined her in analysing the difficulties of implementing renewable energy technologies and, particularly, the underlying mechanisms behind the roots of public attitudes towards wind energy.¹⁹ However, the topic was largely unattended until the 2000s, when renewables moved further to the centre of political debate.²⁰

Research findings indicate that, in many countries, the general public opinion is favourable towards the energy transition across various renewable energy technologies. However, this does not imply high levels of acceptance on a local level, where residents are directly affected by specific projects and community opposition can be mobilised.²¹ Here, acceptance levels are often significantly lower, making it less likely that projects will advance to the implementation stage.²² Acknowledging this gap between acceptance levels of local communities and the general

public is crucial to foster the uptake of renewable energy technologies.

To understand this gap, more recent research has been focusing on the determinants of local social acceptance to adequately address them. Wüstenhagen et al. argue that renewable energy technologies often face local resistance due to their size and visibility.²³ Unlike conventional power plants, they are smaller, necessitating more plants to guarantee comparable energy supplies. This increases the quantity of siting decisions and makes them more visible to consumers. A large body of research focuses on the Not-In-My-Backyard (NIMBY) attitude this can prompt, describing the alleged phenomenon of local opposition to renewable energy siting due to proximity.²⁴ While proximity to the site is still considered a key factor, other factors such as emotional attachment to the location also significantly influences opposition.²⁵

Additionally, the literature commonly describes two other causes of local opposition against renewable energy projects: procedural and distributive injustice. Procedural injustice occurs when local residents feel insufficiently informed and involved in the planning and decision-making processes between developers and the local government.²⁶ Decisions over projects then tend to be rejected and perceived as illegitimate, even

¹⁸ Carlman, I. *The Views of Politicians and Decision-Makers on Planning for the Use of Wind Power in Sweden*. 1984, pp. 339–43.

¹⁹ Bosley, P, and K Bosley. “Public Acceptability of California’s Wind Energy Developments: Three Studies.” *Wind Engineering*, vol. 12, no. 5, 1988, pp. 311–18; Thayer, R. *The Aesthetics of Wind Energy in the United States: Case Studies in Public Perception*. European Community Wind Energy Conference, 8.06 1988, pp. 470–76; Wolsink, Maarten. “Wind Power for the Electricity Supply of Houses.” *Netherlands Journal of Housing and Environmental Research*, vol. 2, no. 3, Sept. 1987, pp. 195–214.

²⁰ Wüstenhagen et al. (n 2) *supra*.

²¹ Liebe, Ulf, and Geesche Dobers. “Decomposing Public Support for Energy Policy: What Drives Acceptance of and Intentions to Protest against Renewable Energy Expansion in Germany?” *Energy Research & Social Science*, vol. 47, Jan. 2019, pp. 247–60.

²² Jobert, Arthur, et al. “Local Acceptance of Wind Energy: Factors of Success Identified in French and German Case Studies.” *Energy Policy*, vol. 35, no. 5, May

2007, pp. 2751–60; Upreti, Bishnu Raj, and Dan van der Horst. “National Renewable Energy Policy and Local Opposition in the UK: The Failed Development of a Biomass Electricity Plant.” *Biomass and Bioenergy*, vol. 26, no. 1, Jan. 2004, pp. 61–69.

²³ Wüstenhagen et al. (n 2) *supra*.

²⁴ Kinder, P. “NIMBY.” *Encyclopedia Britannica*, 27 May 2024; van der Horst, Dan. “NIMBY or Not? Exploring the Relevance of Location and the Politics of Voiced Opinions in Renewable Energy Siting Controversies.” *Energy Policy*, vol. 35, no. 5, May 2007, pp. 2705–14.

²⁵ van der Horst (n 24) *supra*; Devine-Wright, Patrick, and Yuko Howes. “Disruption to Place Attachment and the Protection of Restorative Environments: A Wind Energy Case Study.” *Journal of Environmental Psychology*, vol. 30, no. 3, Sept. 2010, pp. 271–80.

²⁶ Lienhoop (n 2) *supra*; Gross, Catherine. “Community Perspectives of Wind Energy in Australia: The Application of a Justice and Community Fairness Framework to Increase Social Acceptance.” *Energy Policy*, vol. 35, no. 5, May 2007, pp. 2727–36.

among individuals with neutral or positive attitudes towards the project.²⁷ Fostering community participation in planning and decision-making not only meets citizens' request for decision power, access to information, and cooperation between different stakeholders, but also helps to alleviate concerns and improve mutual trust, increasing levels of acceptance towards the project.²⁸ This makes procedural justice the first main determinant of local social acceptance.

Distributive injustice, as the second main determinant, concerns the perceived unfair distribution of benefits from renewable energy projects. Benefits often accrue on a national or even global level, while local residents bear the external costs, such as noise, landscape impact, or loss of land, without adequate compensation since market benefits remain with the renewable energy developers instead of the region.²⁹ Thus, residents face a negative net benefit, commonly lowering their acceptance towards projects.³⁰

Much of the research surrounding social acceptance towards renewables seems to focus on the procedural justice dimension. Only recently has research started to investigate tools to increase local social acceptance. In the following subsection, existing research on such financial participation tools and their effectiveness in increasing local social acceptance are summarised.

C. Financial Participation in Renewable Energy Projects

Financial incentives for communities and individuals with the aim of increasing their acceptance towards a certain issue have been practiced in numerous contexts, usually those with a high degree of controversy, such as refugee camps, mining projects, nuclear waste storage or coal-fired power stations. Regarding financial compensation for renewable energy projects, various countries offer examples, including Germany, Denmark, Sweden, the United Kingdom, Australia, and Canada.

Some researchers have found that providing compensation to communities or individuals affected by system changes can indeed increase acceptance.³¹ This is, among other things, because it represents a rewarding rather than a punishing policy instrument and acceptance is assumed to be higher when the expected effects of a system change are more positive and less negative for citizens.³² However, in respect of renewable energy projects, this approach is contentious.

To understand the effects of financial participation on social acceptance, one must first understand the different forms this type of participation can take. Knauf and le Maitre provide a helpful overview, distinguishing between citizen investment models and benefit schemes.³³ Citizen investment models thereby mean that financial benefit is directly linked to a development's profitability, and encompass measures such as split ownership, shared equity, saving bonds, or a tax for

²⁷ Gross (n 26) *supra*; Wolsink, Maarten. "Wind Power Implementation: The Nature of Public Attitudes: Equity and Fairness Instead of 'Backyard Motives'." *Renewable and Sustainable Energy Reviews*, vol. 11, no. 6, Aug. 2007, pp. 1188–207.

²⁸ Lienhoop (n 2) *supra*; Segreto et al. (n 3) *supra*; Gross (n 26) *supra*; Ek, Kristina, and Lars Persson. "Wind Farms — Where and How to Place Them? A Choice Experiment Approach to Measure Consumer Preferences for Characteristics of Wind Farm Establishments in Sweden." *Ecological Economics*, vol. 105, Sept. 2014, pp. 193–203; Dimitropoulos, Alexandros, and Andreas Kontoleon. "Assessing the Determinants of Local

Acceptability of Wind-Farm Investment: A Choice Experiment in the Greek Aegean Islands." *Energy Policy*, vol. 37, no. 5, May 2009, pp. 1842–54.

²⁹ Lienhoop (n 2) *supra*.

³⁰ Lienhoop (n 2) *supra*; Wüstenhagen et al. (n 2) *supra*; Segreto et al. (n 3) *supra*.

³¹ IPCC (n 1) *supra*.

³² *ibid*.

³³ Knauf, Jakob, and Julia le Maitre. "A Matter of Acceptability? Understanding Citizen Investment Schemes in the Context of Onshore Wind Farm Development." *Renewable and Sustainable Energy Reviews*, vol. 175, Apr. 2023, p. 113158.

operators.³⁴ With direct citizen investment models, individual residents directly invest and profit from these ventures, whereas with indirect investment models, the community as a whole invests and receives compensation. Benefit schemes, conversely, are provided by developers as standardised payments or an internal budget allocation in the shape of direct payments to the municipalities, community benefit funds, in-kind benefits such as sponsoring of associations or local community facilities as indirect benefit schemes, and, for instance, discounted electricity tariffs or bills, household subsidies and direct household payments as direct benefit schemes.³⁵ Table 1, below, offers an overview of these formats.

Several studies offer insights about citizens' preferences towards different financial participation models. Lienhoop finds that German citizens favour a local tax on wind project developers over direct payments to citizens and direct co-ownership through shares, despite not directly benefiting from them.³⁶ This is likely because citizens, and especially strong supporters of renewable energy projects tend to prefer collective benefits over individual benefits.³⁷ Similarly, Vuichard et al. observe that Swiss citizens prefer community benefits like local tax revenues over saving bonds that generate benefit on an individual level.³⁸ García et al.

and Walker et al. find further support that citizens prefer collective benefits over individual payments in Norway and for offshore wind projects, respectively.³⁹

Simultaneously, citizens seem to prefer compensation payments over co-ownership, as was found by Hyland and Bertschin in their study on different participation types for windfarms in Ireland.⁴⁰ Le Maitre et al. add that this is particularly true for citizens with lower support for renewable energy projects.⁴¹ Lienhoop also finds an overall low interest regarding co-ownership through shareholding, but, in line with the results described above, a simultaneous preference for community compensation payments.⁴² Participants felt that money could not adequately compensate for project impacts and viewed direct payments to citizens as bribery, aimed at silencing rather than involving the community in planning and decision-making. This perception of bribery seems to persist throughout different types of financial participation types, and, in addition to a general sense of financial compensation being immoral, might be why some citizens remain ambivalent towards financial compensation.⁴³

Low interest in shareholding may be explained by concerns for risk and reluctance to participate in potential losses of a project.⁴⁴

³⁴ Kerr, Sandy, et al. "Understanding Community Benefit Payments from Renewable Energy Development." *Energy Policy*, vol. 105, June 2017, pp. 202–11.

³⁵ *ibid.*

³⁶ Lienhoop (n 2) *supra*.

³⁷ Le Maitre, Julia, et al. "Empowering Onshore Wind Energy: A National Choice Experiment on Financial Benefits and Citizen Participation." *Energy Policy*, vol. 173, 2023, p. 113362.

³⁸ Vuichard, Pascal, et al. "Individual or Collective? Community Investment, Local Taxes, and the Social Acceptance of Wind Energy in Switzerland." *Energy Research & Social Science*, vol. 58, Dec. 2019, p. 101275.

³⁹ García, Jorge, et al. "Willingness to Accept Local Wind Energy Development: Does the Compensation Mechanism Matter?" *Energy Policy*, vol. 99, Dec. 2016, pp. 165–73; Walker, Benjamin, et al. "Community Benefits, Framing and the Social Acceptance of Offshore Wind Farms: An Experimental Study in England." *Energy Research & Social Science*, vol. 3, Sept. 2014, pp. 46–54.

⁴⁰ Hyland, Marie, and Valentin Bertsch. "The Role of Community Involvement Mechanisms in Reducing

Resistance to Energy Infrastructure Development." *Ecological Economics*, vol. 146, Apr. 2018, pp. 447–74.

⁴¹ Le Maitre et al. (n 37) *supra*.

⁴² Lienhoop (n 2) *supra*.

⁴³ Kerr et al. (n 34) *supra*; Aitken, Mhairi. "Wind Power and Community Benefits: Challenges and Opportunities." *Energy Policy*, vol. 38, no. 10, Oct. 2010, pp. 6066–75; Cass, Noel, et al. "Good Neighbours, Public Relations and Bribes: The Politics and Perceptions of Community Benefit Provision in Renewable Energy Development in the UK." *Journal of Environmental Policy & Planning*, vol. 12, no. 3, Sept. 2010, pp. 255–275; Leer Jørgensen, Marie, et al. "Distributive Fairness and Local Acceptance of Wind Turbines: The Role of Compensation Schemes." *Energy Policy*, vol. 138, Mar. 2020, p. 111294.

⁴⁴ Lienhoop (n 2) *supra*; Hyland and Bertsch (n 40) *supra*; Brennan, Noreen, et al. "Public Acceptance of Large-Scale Wind Energy Generation for Export from Ireland to the UK: Evidence from Ireland." *Journal of Environmental Planning and Management*, vol. 60, no. 11, Nov. 2017, pp. 1967–92.

However, community-operated projects and local developers are regarded as less risky.⁴⁵ Both Warren and McFadyen and Musall and Kuik support this preference for locally-led projects.⁴⁶ Additionally, shareholding is sometimes considered as unjust and exclusive since it cannot be afforded by everyone. Knauf and le Maitre note the surprisingness of preferences against citizen investment models as giving citizens more control would presumably increase distributional and procedural justice.⁴⁷

While knowledge about citizens' preferences over different financial participation tools is important, this article also focuses on their effectiveness in increasing acceptance towards renewable energy projects. Here, existing knowledge is limited and mixed. Generally, efforts to engage residents or communities in renewable energy projects can boost local acceptance for them and there is a demand by citizens for compensation.⁴⁸ Kerr et al. further suggest that financial compensation can build trust between communities and developers, which Walker et al. find can increase acceptance towards projects.⁴⁹

Several benefit schemes have been identified as linked to increased social acceptance of

renewable energy project development, specifically onshore wind projects. As direct benefit schemes, these are electricity discounts, household subsidies, landowner rent payments and revenue-sharing with residents.⁵⁰ The provision of public facilities, revenue-sharing with municipalities and tax revenues are suggested to be effective indirect benefit schemes.⁵¹

Results for citizen investment models are more varied. Municipal and citizen shareholding are often touted as significant tools for local value creation, as they provide financial benefits to local communities and can be more advantageous for municipalities than independently developed projects.⁵² This is because communities often struggle with securing financing and managing perceived project risks.⁵³ Collaborations between the local community and developers who have more resources and greater ability to bear risks can mitigate these difficulties and foster more positive attitudes toward the energy transition through personal engagement.⁵⁴ Warren and McFadyen as well as Musall and Kuik provide some indications that municipal co-ownership of renewable energy plants in Scotland and, respectively, Germany can increase acceptance for the development of plants.⁵⁵ Similarly, Liebe et al. show that

⁴⁵ Lienhoop (n 2) *supra*.

⁴⁶ Warren, Charles, and Malcolm McFadyen. "Does Community Ownership Affect Public Attitudes to Wind Energy? A Case Study from South-West Scotland." *Land Use Policy*, vol. 27, no. 2, Apr. 2010, pp. 204–13; Musall, Fabian David, and Onno Kuik. "Local Acceptance of Renewable Energy—A Case Study from Southeast Germany." *Energy Policy*, vol. 39, no. 6, June 2011, pp. 3252–60.

⁴⁷ Knauf and le Maitre (n 33) *supra*.

⁴⁸ Aitken (n 43) *supra*; Cass (n 43) *supra*; Langer, Katharina, et al. "Factors Influencing Citizens' Acceptance and Non-Acceptance of Wind Energy in Germany." *Journal of Cleaner Production*, vol. 175, Feb. 2018, pp. 133–44.

⁴⁹ Kerr et al. (n 34) *supra*; Walker et al. (n 39) *supra*.

⁵⁰ Dimitropoulos and Kontoleon (n 28) *supra*; Knauf, J. "Can't Buy Me Acceptance? Financial Benefits for Wind Energy Projects in Germany." *Energy Policy*, vol. 165, 2022; Strazzera, Elisabetta, et al. "Combining Choice Experiments with Psychometric Scales to Assess the Social Acceptability of Wind Energy Projects: A Latent Class Approach." *Energy Policy*, vol. 48, Sept. 2012, pp. 334–47; Sardaro, Ruggiero, et al. "Wind Farms,

Farmland Occupation and Compensation: Evidences from Landowners' Preferences through a Stated Choice Survey in Italy." *Energy Policy*, vol. 133, Oct. 2019, p. 110885; Walter, Götz. "Determining the Local Acceptance of Wind Energy Projects in Switzerland: The Importance of General Attitudes and Project Characteristics." *Energy Research & Social Science*, vol. 4, Dec. 2014, pp. 78–88; Vuichard, Pascal, et al. "Keep It Local and Bird-Friendly: Exploring the Social Acceptance of Wind Energy in Switzerland, Estonia, and Ukraine." *Energy Research & Social Science*, vol. 88, June 2022, p. 102508.

⁵¹ Vuichard et al. (n 38) *supra*; García et al. (n 39) *supra*; Vuichard et al. (n 50) *supra*.

⁵² AEE (n 5) *supra*.

⁵³ Haggett, Claire, and Mhairi Aitken. "Grassroots Energy Innovations: The Role of Community Ownership and Investment." *Current Sustainable / Renewable Energy Reports*, vol. 2, no. 3, Sept. 2015, pp. 98–104.

⁵⁴ Knauf and le Maitre (n 33) *supra*; Breitschopf, Barbara, et al. "Does Financial Participation Promote the Acceptance of the Energy Transition?" *Social Science Research Network*, 4093988, 28 Apr. 2022.

⁵⁵ Warren and McFadyen (n 46) *supra*; Musall and Kuik (n 46) *supra*.

citizen co-ownership of wind turbines in Germany and Poland positively influences local acceptance of these projects.⁵⁶

According to Simora et al., the crowding-out of intrinsic motivation through financial incentives is one suggested downside of financial incentives.⁵⁷ The authors also report a negative effect of direct payments to individual households on increasing acceptance for unwanted projects. Additionally, in their study on Switzerland, Vuichard et al., found no positive effect of community investment schemes such as shares or bonds.⁵⁸

Results about the effectiveness of different financial participation formats are therefore mixed, leaving room for further research. In the following subsection, three research questions resulting from the described findings are developed.

D. Derivation of Research Questions

In order to understand this article's research questions, three things should be noted. First, while many studies discuss preferences over different financial participation tools and their perceived effectiveness in enhancing local social acceptance, the majority of these results is based on ex-ante survey-based studies of hypothetical financial participation models that focus solely on citizens' perspectives. As a result, there is a significant lack of real-world empirical evidence examining relevant stakeholder preferences, including those of operators and public officials, and assessing the actual effectiveness of these tools post implementation. Nevertheless, the relevant literature seems to agree that financial participation can boost local social acceptance.⁵⁹ With different legislative

instruments introducing policies including financial participation measures, this sentiment seems to be echoed among some policymakers. The gap between academic and political consensus and empirical evidence may stem from the relative novelty of the research field and the correspondingly limited number of real-life examples available.

Second, the minimal quantity of empirical knowledge on the effectiveness of financial participation tools in place is remarkable considering that some policies, including those implemented in several German states since the 2010s, have been in place for a considerable amount of time. Initial investigations, including interviews with energy and sustainability agencies in Germany, revealed that the limited empirical data is due to relatively few instances where these policies have been fully implemented. However, existing research does not address the specific reasons for these delays or the broader levers and obstacles during implementation processes of financial participation tools.

Third, while certain financial participation models may mitigate some adverse impacts of renewable energy projects and enhance perceived distributional justice, they alone may be insufficient to alleviate opposition towards new projects.⁶⁰ Procedural justice, the other key determinant of local social acceptance, may be equally required. In their literature review, Knauf and le Maitre suggest that effective financial participation models, particularly citizen investment models, are typically associated with community empowerment and strong local political support.⁶¹ Similarly, Lienhoop reveals that offering procedural participation in addition to shares increases citizens' preference for

⁵⁶ Liebe, Ulf, et al. "A Turbine Is Not Only a Turbine: The Role of Social Context and Fairness Characteristics for the Local Acceptance of Wind Power." *Energy Policy*, vol. 107, Aug. 2017, pp. 300–08.

⁵⁷ Simora, Michael, et al. "Do Financial Incentives Increase the Acceptance of Power Lines? Evidence from Germany." *Regional Science and Urban Economics*, vol. 85, Nov. 2020, p. 103575.

⁵⁸ Vuichard et al. (n 38) *supra*.

⁵⁹ Lienhoop (n 2) *supra*; Buchholz and Hüge (n 4) *supra*; Wunderlich (n 4) *supra*.

⁶⁰ Leer Jørgensen et al. (n 43) *supra*; Cowell, Richard, et al. "Acceptance, Acceptability and Environmental Justice: The Role of Community Benefits in Wind Energy Development." *Journal of Environmental Planning and Management*, vol. 54, no. 4, 2011, pp. 539–57.

⁶¹ Knauf and le Maitre (n 33) *supra*.

shareholding.⁶² However, in current policymaking, procedural justice often seems to play an inferior role.⁶³ This might also be due to the dearth of research on how financial participation models can be designed to adequately address both distributional and procedural justice. Therefore, not only is there little knowledge about the effectiveness of financial participation tools, but also about how they should be designed and implemented in order to be effective. In an extensive review of the existing literature, no studies were identified focusing on the underlying mechanisms behind choosing and implementing financial participation formats, in order for them to be successful. Thus, further investigation is required to understand under what conditions, why and by whom different participation models are favoured and how this in turn, influences their successful implementation as well as their success in enhancing local social acceptance towards renewable energy projects.

Arising from these considerations, three research questions are developed:

1. Why, when and by whom are different kinds of financial citizen participation preferred for implementation? What are the relevant mechanisms behind the decisions for respective instruments?
2. What are the levers and obstacles to the implementation of tools seeking to financially engage municipalities and residents in local renewable energy projects?

3. How effective are different financial participation tools in increasing local social acceptance towards renewable energy projects?

This article argues that the outlined questions are particularly suitable to be addressed in the context of Germany and, more specifically, the case of Mecklenburg Western Pomerania. The next Section will thus turn to the context of the study, explaining local social acceptance in Germany and the state of MWP as well as respective policies to increase it.

III. The Context: Local Social Acceptance in Germany and Mecklenburg Western Pomerania

A. Local Social Acceptance in Germany

While Germany's 2030 energy targets require at least 80% of electricity consumption to come from renewables, the current share of renewables makes up only 51.8%, necessitating a 28-point increase in less than six years.⁶⁴ One barrier to meeting this target is local opposition towards renewables.

According to representative surveys conducted by the Hertie School and the AEE, approval rates for the expansion of renewable energies lie between 75 and 89% in Germany.⁶⁵ However, such high levels of general approval for the expansion of renewable energies do not imply that there is no resistance at a local level, where approval tends to be much lower. When asked about their opinion of renewable energy plants in the vicinity of their home, only 57% of participants showed a positive attitude in 2023.⁶⁶

A range of policies have been launched to allay the concerns of sceptics. The amendment of the Renewable Energy Act (*Erneuerbare-Energien-Gesetz*, EEG) and its sixth paragraph

⁶² Lienhoop (n 2) *supra*.

⁶³ Knauf and le Maitre (n 33) *supra*.

⁶⁴ Arbeitsgruppe Erneuerbare Energien-Statistik. *Erneuerbare Energien in Deutschland Das Wichtigste Im Jahr 2023 Auf Einen Blick*. Umweltbundesamt, Feb. 2024.

⁶⁵ AEE. *Erneuerbare Energien in Deutschland: Zwischen Akzeptanz und Unsicherheit*. Agentur für Erneuerbare Energien, 30 Nov. 2023; Hertie School. *Lokale Klimaschutzeinstellungen in Deutschland*.

⁶⁶ AEE (n 65) *supra*.

in 2021 is one example for this. It allows carriers of renewable energy sources to pay neighbouring municipalities affected by the construction of their plant up to 0.2 cents per kilowatt hour of electricity fed into the grid.⁶⁷ Through this amendment, policymakers seek to increase local acceptance towards renewable energy projects.

Simultaneously, policies have been adopted in a number of Germany's states including Brandenburg, Hamburg, Hesse, MWP, North Rhine Westphalia, Rhineland Palatinate, Saxony, Saxony-Anhalt, Schleswig Holstein, and Thuringia. In exchange for the erection of wind turbines in state forests, Hesse has, since 2016, granted relevant local authorities the right to collect a share of the lease income from energy companies. In Brandenburg, developers must pay €10,000 per year to the municipalities within a radius of three kilometres for each wind turbine commissioned and funds are earmarked to benefit citizens, for instance by promoting social programmes and cultural facilities. Rhineland-Palatinate has been experimenting with so-called voluntary solidarity pacts, enabling local authorities to allocate part of their rental income from the operation of a wind farm in their territory into a joint fund from which all municipalities in the immediate vicinity of the turbines can profit. While these states can be considered early adopters of financial participation laws, others are only now starting to develop and implement such policies, mainly as a consequence of the introduction of the sixth paragraph of the EEG, which has built momentum for the development and advancement of policies operationalising financial participation as a means to foster social acceptance for renewable energy installations. For this reason, examining existing policies can provide relevant insights about their assets and drawbacks as well as their effectiveness and can thus make an essential contribution to the successful design and implementation of policies in other federal states.

This paper will focus on the state of MWP, and its Citizen and Municipal Participation Law (CMPL), which was enacted in April 2016. The decision to focus on this specific state and its corresponding law is based on the law's duration as well as its structure, which will be explained in the next subsection.

B. The Case of Mecklenburg Western Pomerania

In 2016, MWP introduced a state regulation mandating financial participation from residents and municipalities within a five-kilometre radius of wind turbine projects. The law obligates every project company erecting turbines fifty metres or taller, excluding offshore turbines and prototypes, to financially involve the local population and municipalities.⁶⁸ Operators select from different participation options, each including the participation of both municipalities and citizens and must secure approval from the relevant municipalities.

Option 1 mandates that, before constructing a wind farm, project sponsors establish a project company and offer at least 20% of its shares for sale, with half allocated to the municipalities and the remainder to citizens within the five-kilometre radius. Option 2 allows developers to offer municipalities annual compensation payments based on a fixed levy coefficient applied to the net electricity revenues. These payments must be used for enhancing local acceptance of wind turbines through initiatives like improving townscapes, upgrading infrastructure, optimising energy costs, providing information on wind energy, supporting cultural and educational events, or funding local entrepreneurial activities. In addition to compensation payments, developers have to offer something to citizens, such as saving bonds. Option 3, introduced later in response to calls for greater flexibility, allows for customised individual participation agreements between operating companies, citizens, and municipalities. These agreements can encompass a variety of models blending citizen investment with

⁶⁷ Federal Office of Justice. *Gesetz für den Ausbau erneuerbarer Energien - EEG 2023*. 2023.

⁶⁸ Bürger- Und Gemeindenbeteiligungsgesetz: BüGembeteilG M-V (n 9) *supra*.

benefit schemes and are often based on the recommendations of the sixth paragraph of the EEG, supplemented by additional participation offers for citizens.⁶⁹ Although the Ministry of Economic Affairs only allows this as an exception to the standard Options (1 and 2), provided that the alternative concept fulfils the law's objective of increasing acceptance and promoting regional value creation, it has become the most frequently used option.⁷⁰ It should be noted that if municipalities reject Option 1, operators are obligated to make another offer. However, if they reject any other option, this is not the case, as long as the Ministry of Economic Affairs of MWP, as the overseeing authority, approves it.

Only certain parts of the law's implementation are recorded. Publicly available information exists regarding the number of project companies established up until 2023, making up a total of thirteen, and on the number of natural persons who acquired shares in a project company, counting thirty.⁷¹ No metric yet exists to assess the effectiveness of the law.

Because this leaves many unanswered questions, including why Option 3 has become the norm, and whether the law is successful in promoting local social acceptance, MWP and its CMPL is considered a revealing case study. The law's structure, offering operators various choices and having been operational for nearly eight years is believed to provide a robust basis for answering all three research questions.

Furthermore, ongoing reform of the law suggests that insights can be gleaned from its current iteration, despite the details of the revised version not being publicly available. In the following Section, results from seven expert interviews on the CMPL from MWP will be circumstantiated after clarifying the study's methodology and design.

IV. Methodology

A. Research Design

Due to the high potential of a study focusing on understanding and evaluating how financial participation can help to increase municipal acceptance for renewables in an ex-post manner, a qualitative research method was chosen. Insights from seven semi-structured interviews with eight experts of the CMPL are utilised. Expert interviews provide a unique source of inside knowledge, offering researchers rapid and easy access to high-quality results.⁷² This is particularly useful when exploring new policies and their implementation.⁷³ The semi-structured format allows the use of a full potential of dialogues by granting flexibility in questioning, and enables both interviewer and interviewee to elaborate on key points, uncovering potentially unexpected themes.⁷⁴

Interviewee selection was conducted between February and May 2024. Through emails and calls with the State Energy and Climate Protection Agency (Landesenergie- und Klimaschutzagentur, LEKA) and several municipalities, as well as web research, fourteen municipalities were identified in which the CMPL has been implemented since 2016. This preliminary work was necessary as

⁶⁹ LEKA-MV. *Bürger- und Gemeindenbeteiligungsgesetz MV*.

⁷⁰ *ibid.*

⁷¹ Landtag Mecklenburg-Vorpommern. *Kleine Anfrage Des Abgeordneten Martin Schmidt, Fraktion Der AfD: Umsetzung Und Auswirkungen Des Bürger- Und Gemeindenbeteiligungsgesetzes Und ANTWORT Der Landesregierung*. Kleine Anfrage, 8/2075, Landtag Mecklenburg-Vorpommern, 29 June 2023.

⁷² Bogner, Alexander, et al. "Introduction: Expert Interviews — An Introduction to a New Methodological Debate." *Interviewing Experts*, edited by Alexander Bogner et al., Palgrave Macmillan UK, 2009, pp. 1–13; Tracy, Sarah. "Qualitative Quality: Eight 'Big-Tent'

Criteria for Excellent Qualitative Research." *Qualitative Inquiry*, vol. 16, no. 10, Dec. 2010, pp. 837–51.

⁷³ Dorussen, Han, et al. "Assessing the Reliability and Validity of Expert Interviews." *European Union Politics*, vol. 6, no. 3, Sept. 2005, pp. 315–37.

⁷⁴ Lewis-Beck, Michael, et al. *The SAGE Encyclopedia of Social Science Research Methods*; Braun, Virginia, and Victoria Clarke. *Successful Qualitative Research: A Practical Guide for Beginners*. SAGE, 2013; Brinkmann, Svend. "Unstructured and Semistructured Interviewing." *The Oxford Handbook of Qualitative Research*, edited by Patricia Leavy, 2nd ed., Oxford University Press, 2020, pp. 424–56.

there is no official record of all cases where the law has been applied. Next, the project developer for each municipality was identified. A list of twenty-six potential interviewees, including LEKA and another superordinate public body, was created, and representatives were contacted via email. Eight individuals from seven different organisations agreed to interviews: four municipal stakeholders from three different municipalities, two wind energy project developers and the two superordinated public institutions. By covering this broad range of perspectives, the study provides a relatively balanced representation of different stakeholder groups to minimise sample bias and ensures a diverse range of opinions.⁷⁵ Section IV.B will introduce the experts' institutions and their application of the law in more detail. All institutions, except LEKA, requested anonymity.

Each interview used a guide including eight to ten questions, tailored to the interviewee's organisation, starting with an introduction and the study's aim. Trust-building background information questions regarding the specific project or the law as a whole were posed, followed by a set of core questions specific for each stakeholder group.⁷⁶ Questions were developed based on the three research questions and on the chronological sequence of implementing financial participation, starting with reaching a decision about which format to use (RQ1), continuing with factors that facilitated or hindered their implementation (RQ2) and ending with the perceived effectiveness of instruments in enhancing local social acceptance (RQ3). Additional questions, based on further readings, were added for supplementary insights. All questions were developed with the aim of generating practical policy recommendations. Finally, interviewees were given the opportunity for comments or final thoughts.

The transcripts were then qualitatively coded in two rounds using atlas.ti 24, following the thematic analysis method.⁷⁷ Both theoretical and inductive thematic analysis was employed to develop initial themes based on the research questions and complement these with inductively developed themes, in line with grounded theory.⁷⁸ This combination of approaches provided flexibility and comprehensive content inclusion, resulting in a final codebook with sixteen subcategories. Quotes and statements were anonymised in the final stages of the analysis.

B. Background Information on the Interviewed Institutions

In the municipality interviewed in Interview 1 (I1), a project for a wind farm with nineteen wind turbines began in 2014. Due to strong initial resistance coupled with nature conservation concerns, only eight wind turbines were approved and operated since 2019. Following an offer by the project sponsor in October 2023, the municipality purchased 6.5% of company shares worth €950,323. So far, no mode of direct participation has been offered to citizens.

The municipality represented in Interview 2 (I2) has aimed to actively participate in the energy transition since 2011. A wind farm is currently in the planning phase. Their proposed participation model envisages active municipal engagement in the project company via shareholding and using profits for charitable purposes. Furthermore, the investor actively promotes civic participation by offering citizens within five kilometres of the wind farm a one-time payment of €300-600 as landscape impact compensation. Furthermore, the lease agreements stipulate that 10% of lease income is donated to local charities. Finally, the municipality also plans to utilise the opportunities offered by the sixth paragraph of the EEG in the future.

⁷⁵ Braun and Clarke (n 74) *supra*; Bryman, Alan. *Social Research Methods*. 5th ed., Oxford University Press, 2016.

⁷⁶ Jacob, Stacy, and S Furgerson. "Writing Interview Protocols and Conducting Interviews: Tips for Students

New to the Field of Qualitative Research." *Qualitative Report*, vol. 17, no. 42, Oct. 2012, pp. 1-10.

⁷⁷ Braun, Virginia, and Victoria Clarke. "Using Thematic Analysis in Psychology." *Qualitative Research in Psychology*, vol. 3, no. 2, Jan. 2006, pp. 77-101.

⁷⁸ *ibid.*

Interview 3 (I3) was conducted with a municipal stakeholder who, as their so-called participation manager, represents a total of five municipalities affected by the CMPL. In 2021, all five municipalities were offered both municipal and citizen shares for a wind turbine. While the citizens did not buy any shares, four municipalities opted for the municipal shareholding option and each bought a share for €5,000 and one city opted for the compensation payment. In addition, sponsorship agreements directly support local associations and projects. A future initiative will offer citizens discounts on their electricity bills via an online portal funded by the project developer, allowing direct benefits without changing providers.

The project developer from Interview 4 (I4) is currently managing four CMPL projects. While previously, the developer has mainly worked with Option 1, they are no longer pursuing citizen shareholding due to poor levels of response from citizens and extensive planning and approval expenses which cost the project developer around €450,000 wind project only. Instead, citizens now receive an annual invoice bonus on their electricity bill. Nevertheless, municipal shareholding is still used, in addition to direct payments under the sixth paragraph of the EEG.

The project developer in Interview 5 (I5) also experienced low participation in municipal and citizen shareholding and thus primarily offers compensation payments to the municipalities in accordance with the sixth paragraph of the EEG and discounted electricity tariffs for citizens.

The State Energy and Climate Protection Agency MV (LEKA) interviewed in Interview 6 (I6) connects stakeholders in the energy transition in MWP by communicating knowledge to decision-makers and providing neutral free advice to municipalities, companies, and citizens on topics relating to sustainable energy supply and the CMPL. As the state's overarching public advisory centre, LEKA therefore has a good overview of existing projects in which the law is employed.

Interview 7 (I7) was conducted with a representative from another supervisory body involved in implementing and reforming CMPL, providing essential insights regarding the implementation of different participation formats and their effectiveness.

Table 2, below, summarises all interviewees, their organizational backgrounds, and the financial participation instruments they are familiar with.

V. Results and Discussion

A. *The Difficulties in Choosing Financial Participation Formats*

When discussing the difficulties that arise when choosing one or several financial participation formats offered by the CMPL, most interviewees explained that differing opinions arise regularly. They stem from the controversial nature of energy projects but can also be attributed to unclear, non-transparent decision-making processes. According to LEKA, conflicts regularly arise from municipalities feeling powerless, as project developers decide which format to offer. This sometimes leaves municipalities empty-handed if, for instance, they reject compensation payments (I6). Additionally, the ministry's power to decide whether the law is fulfilled can lead to situations where local needs are inadequately addressed (I1, I5, I6) and municipalities' autonomy might be limited (I2, I5). All experts agree on the need for change but stress the importance of retaining an overarching authority if negotiations fail.

Often, there seems to be a degree of mistrust between municipalities and project developers. The success of negotiations on the participation format is therefore often dependent on the behaviour of the project developer before and during proposing a participation format (I7). Conflicts arise when developers inadequately communicate decisions, presenting them as a *fait accompli* (I1, I7). Early involvement of local authorities and sufficient communication are therefore essential (I1, I2, I7) to prevent the perception

of a 'take it or leave it' attitude from developers (I4).

Another difficulty in the decision-making process is that municipalities and citizens often lack the training or knowledge needed to evaluate the medium and long-term effects of participation formats, which sometimes leads to unrealistic expectations. According to one operator, municipalities often fail to realise that the 10% company shares are divided among all affected municipalities, resulting in lower profits than anticipated (I4). Moreover, they are often surprised that profits can potentially only accrue after several years once initial capital investments are recouped (I4, I6). Such deviating expectations highlight the need for more information from the outset. However, the lack of advisory capacity on the part of the authorities, despite the universally recognised benefits of LEKA, remains a significant obstacle in addressing these challenges.

Simultaneously, there are frequent feelings of disadvantage on the part of citizens. They often feel that they are informed too late, but commonly only get involved once the authorisation for a participation format has already been granted and citizens no longer have an effective say (I6). Ensuring sufficient, low-threshold opportunities for citizen involvement is therefore crucial for effective decision-making.

In Interview 2 the expert reported no decision-making difficulties in their municipality. This was largely because the proactive mayor had communicated early on about the desired participation format for the municipality.

B. Determinants of Decisions For and Against Financial Participation Formats

Besides understanding the possible difficulties arising when choosing a financial participation format, it is also important to understand the reasons why and by whom certain formats are preferred over one another. Three main determinants of decisions for or against specific participation formats were identified through the

interviews: (i) financial costs and affordability of a format, (ii) the bureaucratic effort involved in implementing it, and (iii) the intrinsic motivation for change among stakeholders.

For project developers, minimising financial and administrative costs associated with involving municipalities and citizens is crucial to maintain competitiveness against players not bound by regulations like the CMPL. Municipal regulations on how articles of association to involve municipalities and citizens should be drafted, for instance, can complicate and lengthen the process. Additionally, developers' choices are influenced by their intrinsic motivations. According to LEKA, some companies strongly support the energy transition and advocate for flexible participation models, while others are primarily motivated by financial gains.

The same applies to local authorities. Here, the financial situation is the most decisive factor. Factors like municipalities' size, location, and infrastructure determine their financial capacity and which investment instruments they can afford. For instance, acquiring company shares requires a substantial budget. Once budgetary constraints are met, the decision hinges on the municipality's motivations and whether they aim to influence long-term company development or seek financial gains with minimal effort. At the same time, a municipality's decision is primarily dependent on the balance between security and risk. Thus, municipalities with ample resources, a long-term vision for shaping developments, and a willingness to take risks are more inclined towards municipal shareholding as only then are they prepared to take on the high bureaucratic costs (I7). Conversely, those with fewer financial or human resources, expertise, or a preference for minimal effort often opt for compensation payments as they are safer and easier to implement (I6, I2). All interviewees, particularly project developers, described them as the simplest way to involve municipalities financially, but not the most profitable one for them.

Municipal compensation payments under the sixth paragraph of the EEG, on the other hand, are considered profitable for both municipalities and developers. This is because developers are entitled to reimbursements of the compensation payments by the grid operator. However, as the latter can ultimately pass on the additional costs to electricity customers, the concept is sometimes criticised by citizens as fraudulent (I6). From this point of view, LEKA favours shareholding while acknowledging the attractiveness of compensation payments for local authorities, mainly because they offer predictable and relatively high financial returns.

Overall, decisions often depend on the dedication of individuals like mayors or project managers, as well as on socio-cultural and economic circumstances. According to some interviewees, MWP is a federal state focused on the common good and with high levels of commitment to change in many places. At the same time, financially strong municipalities tend to be the exception as more than half of the municipalities are currently in budget protection, meaning they are insolvent and cannot freely dispose of their budget. According to the interviewees, it is therefore not surprising that relatively few municipalities have opted to become shareholders in renewable projects since the law was introduced (I5, I6).

On the part of citizens, who only have decision-making power for participation formats that require a personal investment (saving bonds and citizen shares), popular reasons for or against these include financial constraints, experience, and intrinsic motivation. Many households in MWP cannot afford direct participation or investing in savings bonds, and there is widespread scepticism due to a lack of investment experience. Savings bonds are particularly doubted because of their fixed term and low profitability (I3, I4, I6). Therefore, when citizens do invest this is usually due to a high intrinsic motivation to participate in the energy transition. Due to low demand for

these two instruments, both interviewed project developers refrain from offering them in future as financial and bureaucratic costs are disproportionately high and because a larger number of shareholders can deter investors, complicating project financing (I4). One alternative solution mentioned in the interviews involves introducing an intermediary entity to purchase project shares and sell them on to citizens, reducing investment risks and bureaucratic burdens.

However, project developers often simply opt for an alternative participation format for citizens such as subsidised electricity tariffs or bills. While there are limited application examples to reference, both developers interviewed noted that setting up internal contracts for these options can be overly complex, hindering widespread adoption. Another alternative is sponsorship agreements between the developers and municipalities where developers support charitable projects or associations through annual payments. A similar concept involves clauses in utilisation contracts for solar and wind areas, where landowners voluntarily allocate 10% of their lease to local foundations or charitable associations. Direct one-time payments to residents near energy plants were also mentioned. These measures are seen as relatively straightforward to implement but have not yet seen widespread adoption.

C. Obstacles and Levers in Implementation Processes

1. Obstacles

When discussing obstacles to the implementation of participation formats, almost all interviewees emphasised the significant bureaucratic burden, especially for shareholding and saving bonds. Numerous obligations and legal formulations in the articles of association when founding a project company under Option 1 are particularly cumbersome, leading to high implementation costs for direct participation (I4, I5, I6). The aforementioned uncertainty of citizens and municipalities regarding formats requiring personal investment was described as a

further obstacle (I5). Despite efforts to set low-share limits to encourage broader participation, costs remain a hurdle, particularly for those sceptical of the energy transition (I5, I7). As a result, savings bonds in particular are often not purchased, even when offered.

On the municipal side, two interviewees (I1, I2) reported that there are often considerable disputes with the municipal supervisory authorities who act as “protectors” (I1) of the municipalities, tasked with preventing municipalities from making mistakes. These authorities often obstruct processes, resulting in municipalities feeling undermined in their autonomy (I1). Municipal interviewees perceive this as a lack of trust in their ability to manage investments effectively, prompting calls to amend the municipal constitution in MWP to strengthen local decision-making roles, especially because the non-expert authorities are often unable to realistically assess the risks of project participations (I1, I2) and the associated bureaucratic requirements make financial participation complicated. Smaller municipalities with less experience are particularly affected by this (I1, I2).

2. Levers

On the other hand, most experts emphasised that building trust in the process, in each other, and in the fact that municipalities and their citizens truly benefit from the participation is the most important lever for the successful implementation of participation instruments, as there are often doubts as to whether announced benefits will actually materialise. To this end, it is important that the benefits of participation are allocated directly and comprehensibly, for example by clearly labelling measures that are financed by the energy project (I5).

Consistent with earlier research highlighting the role of communication in fostering trust and acceptance, all interviewees stressed the importance of timely and clearly understandable provision of information and ongoing communication between project

developers, municipalities, and citizens. This was especially emphasised for municipal shareholding, where regular face-to-face meetings between stakeholders were highlighted as particularly valuable (I2, I4). For citizen-related participation formats such as saving bonds or discounted electricity bills, continuous information dissemination through various communication channels is crucial to reach a broad audience (I6, I7). Utilising information events and platforms helps ensure all citizens are aware of and can easily access these opportunities. Additionally, interviewees highlighted two other significant communication channels.

Firstly, the LEKA, which, as a helpdesk, organises information events and supports local authorities with consultations, was repeatedly highlighted as crucial for municipalities and the overall success of participation (I1, I3). Secondly, the idea of a participation manager within municipalities was emphasised. This position could streamline processes by clarifying responsibilities and maintaining consistent points of contact (I3, I6). It could also address gaps in economic knowledge among local politicians, ensuring well-informed decisions and better representation of municipal interests (I3). Both communicators can help to build relevant networks with other projects and stakeholders, facilitating the sharing of experiences (I3).

Other key factors for the successful implementation of the participation formats include openness and flexibility, particularly on the part of the municipalities towards new approaches and professional conduct marked by respectful and appreciative interactions among stakeholders. Additionally, having a regional rather than an international project developer who approaches the municipalities with understanding was highlighted (I6).

Finally, it is important that the formats prescribed by law are themselves relatively easy to implement. Experts agree that the current complexity of direct participation formats for municipalities and citizens as the

standard option under the CMPL has hindered their adoption, while the exemption regulation under the sixth paragraph of the EEG has been more popular due to its simplicity and ease of implementation.

D. Effectiveness of Financial Participation Formats in Increasing Local Social Acceptance

1. Municipal Shares and Compensation Payments to Municipalities

In line with previous research findings, most interviewees stated that municipal shareholding can increase acceptance. This is because it can become profitable relatively quickly, depending on the level of investment, and because it permits a fairer and more direct distribution of the financial benefits from wind energy projects between municipalities, enabling community projects like playgrounds or the organisation of events which increase residents' quality of life and are otherwise often neglected (I6, I3). An important aspect here is that funds are not earmarked, and municipalities are therefore free to decide how they use them (I3). However, concerns were raised about the high costs associated with municipal shareholding which tends to thus benefit financially stable municipalities more than those in greater need (I4). This can exacerbate regional disparities, that, according to the experts, can also have a negative impact on local acceptance.

Assessing the effectiveness of compensation payments, however, is difficult. In one case, this tool was "not at all" effective according to the project developer (I4); however, this was due to communication failures and the delivery of outcomes citizens were not consulted on. Other experts explained they were unable to make a judgement about the effects of the format on local acceptance. Nevertheless, it was stated that compensation payments lead to potentially lower revenues compared to municipal shareholding, but that also fewer resources are required to implement them. Payments in accordance with the sixth paragraph of the EEG appear to be a *via media* that not only requires relatively little bureaucratic effort for developers and

municipalities but also generates reasonably high revenues for municipalities, which in turn can be used for the benefit of citizens.

It is evident from the interviews that the effectiveness of municipal shareholding and compensation payments relies on transparent communication about costs, benefits, and general events, as well as involving citizens in these processes. The LEKA expert explained that "[c]itizens begin to accept energy projects when they realise that their municipal representatives and the mayor are credible and actively involved on the ground." A lack of credible communication can lead to suspicion and frustration, especially if citizens believe those responsible are benefiting personally due to a lack of transparency about how the income is used (I6). Citizens often accept municipal benefits from energy projects if they see revenues being used sensibly (I6). Although budget information is publicly available, many citizens do not seek it out, making proactive communication from the municipality about the use of payments necessary. Involving residents in decisions about revenue use could be even more effective (I6).

2. Citizen Shares and Saving Bonds

In accordance with previous studies, such as that of Vuichard et al.,⁷⁹ the interviews revealed widespread scepticism among experts, particularly project developers, regarding the effectiveness of citizen shares and saving bonds in enhancing acceptance. Experience shows that these options are underutilised, even though the potential number of participants is high. One reason for this could be the financial resources required for participation which only allow a certain income bracket to participate, and that returns for individuals are only appreciable through larger investments.

Additionally, saving bonds may offer minimal returns when divided among numerous participants. Both developers cited an example where demand for wind farm's saving bonds far exceeded availability,

⁷⁹ Vuichard et al. (n 38) *supra*.

resulting in smaller shares that dissuaded many potential participants due to high costs relative to prospective returns. For many households, the costs, including the bureaucratic effort, therefore exceeded the benefits of the investment. Because only a few households benefit from these participation formats overall, it is therefore unlikely that citizen shares and saving bonds will lead to noticeable additional acceptance (I4, I7). Conversely, they can contribute to an increased perception of distributive injustice (I5).

Given these challenges and the significant monetary and administrative burdens for developers, these forms of participation are now infrequently offered. However, interviewees emphasised the importance of maintaining these options, as their uptake depends significantly on local socio-economic conditions and may find relevance in other contexts (I5, I6).

E. Other Insights on the Design of Financial Participation Formats

Most of the experts surveyed consider the CMPL to be generally suitable for increasing local acceptance of renewable energy projects, as it enables genuine participation (I1, I2, I3, I7) and can generate tangible added value for citizens (I3). In some cases, it is reported that much less vehement resistance is noticeable. There are reports of reduced resistance and increased cooperation among citizens who recognize the inevitability of renewable energy expansion (I3). At the same time, it is emphasised that this is also a result of the zeitgeist. After all, people increasingly realise that more plants are required and will be built (I6). The key for citizens and local authorities is utilising the opportunity to benefit from these developments in their immediate neighbourhood.

Nevertheless, the law must be improved. The 2016 version is seen as a good initial step but is criticised for being overly bureaucratic, complicated, and outdated. All experts agree that the law therefore needs to become leaner.

All respondents emphasised the importance of offering stakeholders a choice among different participation formats. This preference seeks to ensure that decisions align with regional and local circumstances and implies that community representatives know best what is wanted locally and project developers know best what can be feasibly implemented (I2, I4). One of the experts even stated that the law is only effective due to the flexibility it now offers, noting that its basic version, limited to municipal and citizen shareholding alone, may not suffice to enhance acceptance (I5). Several experts also argued in favour of expanding the possibilities offered by the law (I1, I7), one alternative participation option being citizen energy cooperatives (I7).

Experts diverge on who should have decision-making authority over participation instruments and how agreements should be reached. One municipal representative advocates for granting more decision-making power to municipalities, arguing that the energy transition is a societal task and municipalities are closest to citizens (I2). Another municipal representative believes in equal-footing negotiations without reversing decision-making powers (I3). A third municipal representative stressed that municipalities already have significant influence, but that legally binding participation of municipalities is required, not voluntary, to avoid dependency on the goodwill of investors (I1). Conversely, both project developers assert their right to make the initial decision and warn that current regulations, reducing a project's profitability from the outset, verge on expropriation. As the returns on energy projects are currently declining, they argue that project developers should be granted sufficient decision-making rights to keep projects financially attractive (I5). One public body expert proposes a compromise for these diverging interests: project developers and municipalities should negotiate together to consider all interests appropriately, leading to better, more acceptable solutions with less effort (I1, I7).

The earmarking of income from compensation payments is also criticised, as it can be challenging, particularly for very small municipalities, to utilise the funds to increase local acceptance, for example, by investing in local infrastructure or cultural assets. In some communities, this approach may not be practical and acceptance can only be enhanced if municipalities had greater flexibility to include these funds in their general equalisation scheme or use them freely (I4). This alternative should be considered in future amendments to the CMPL.

Finally, one practical problem identified in the interviews is the five-kilometre radius stipulated by the law. According to one expert, this radius often comprises too many inhabitants and municipalities, including those that are only partially affected or consist mainly of undeveloped land, leading to complicated communication and coordination processes (I7). Another geographical challenge is that the law occasionally divides municipalities, requiring only half of their citizens to be offered company shares. This in turn can cause great resentment within the local population (I3).

To make the numerous insights presented in this chapter more tangible and applicable, Section VI sets out relevant policy recommendations while tying them back to the three research questions of this paper.

VI. Policy Recommendations

A. Enabling Fair, Favourable Decisions about Financial Participation Formats

With regard to RQ1, the interviews revealed that decisions on the part of both developers and municipalities depend mainly on the financial costs, and corresponding affordability of a format, the bureaucratic effort involved in implementing it, and the intrinsic motivation for change of the players involved. Shareholding is generally associated with increased bureaucracy and costs for everyone involved but is considered more profitable than compensation payments. Compensation payments under the sixth paragraph of the EEG, which are based on the

amount of electricity generated, seem to be a happy medium. In terms of relevant mechanisms behind decisions for respective instruments, two key aspects to enabling fair and favourable decisions were identified through the interviews.

First, the important role that economic and socio-cultural circumstances play when choosing a format should be recognised. What works in one place does not necessarily work elsewhere. This is also why independent joint decision-making by municipalities, project developers, and citizens should be strengthened. Regardless of who initiates financial participation, all relevant stakeholders should be involved at an early stage into the decision-making processes. To strengthen the role of municipalities in particular, the power of municipal supervisory authorities should be limited to an extent that grants municipalities an appropriate level of decision-making power over their own resources to prevent slowing down or impeding participation. This also applies to the Ministry of Economic Affairs as the supervisory body that decides if the CMPL is fulfilled or not. While having some superordinate body in place is relevant, it is more efficient to only involve such a body once parties report an issue, trusting that stakeholders know the best option in their case.

Second, to enable informed decisions by developers, municipalities, and citizens, providing sufficient information through various and continuous low-threshold information channels is crucial. Here, the installation of a superordinate institution similar to the LEKA in MWP, which not only creates relevant networks between stakeholders but also informs and advises them about the different participation options, is recommended. Additionally, appointing a participation manager in the affected municipal administration would help to streamline processes, ensure well-informed decisions and the appropriate representation of municipal interests, and build relevant networks. This is also in line with other

studies' recommendations, such as the research by le Maitre et al., who point out the relevance of a community liaison officer.⁸⁰

B. Facilitating the Successful Implementation of Financial Participation Formats

These two communicators are also equally important for the success of the entire implementation process of a participation format, which brings us to RQ2, the levers and obstacles to the implementation of policies concerning the financial participation of local residents in nearby renewable energy projects. Here, too, communication is the most important keyword. Increasing mutual trust between project developers, municipalities and citizens through continuous, regular, and in person communication is crucial. Simultaneously, keeping the administrative as well as corresponding monetary expenses as low as possible is critical. This, however, is only possible if the law itself is designed in such way that is easy to understand, easy to implement, and cheap, as demonstrated by the alleged popularity of the EEG option.

Nevertheless, even if ways are found to successfully implement the different kinds of financial participation, the question remains how effective they are in increasing local social acceptance towards renewable energy projects (RQ3). While municipal shareholding is generally considered effective in increasing residents' acceptance, with the constraint that in particular wealthier municipalities may benefit from the format, reducing distributive injustice only partially, the effectiveness of compensation payments remains unclear. Citizen shareholding and saving bonds, on the other hand, are deemed rather ineffective, as indicated by the low use by citizens. While these results do not offer much basis for conclusions, many insights were derived regarding how to make participation formats effective.

C. Making Participation Formats Effective in Increasing Acceptance

First, despite the alleged ineffectiveness of some instruments, they should continue to be

offered as options. As demonstrated in this article as well as in other studies, policymakers should offer stakeholders a variety of participation formats to choose from.⁸¹

Second, to make it more attractive for developers to offer citizen shares and for citizens to actually make use of them, the installation of the aforementioned intermediary entities that assume the risks for citizens may be useful. Simultaneously, when offering citizens company shares or saving bonds, measures must be taken to ensure communities are not split, possibly leading to feelings of unfairness and discontent.

Third, policymakers should determine the radius around the renewable energy plant in which citizen participation is to be pursued thoughtfully. Five kilometres might be too wide, making participation more complicated, and is also questionable to remain in place in MWP, as the nationwide EEG only sets out 2.5 kilometres.

Fourth, it should be ensured that municipalities cannot be left empty-handed. For this, of course, the law needs to be binding and include a clause ensuring participation is not required only if municipalities do not wish it.

Fifth, it must be considered whether municipal profits should be earmarked, as municipal experts reported on the advantages of deciding freely over their profits. At the least, policymakers should include exceptions in the law, so that municipalities who cannot use the profits in the intended manner are exempt.

Sixth, however, if municipalities do invest profits in the interest of the community, the benefits resulting from such participation must be directly and comprehensibly attributable. For example, by clearly labelling measures funded as a result of the renewable energy project. The effectiveness of municipal shareholding and compensation payments

⁸⁰ Le Maitre et al. (n 37) *supra*.

⁸¹ Knauf (n 50) *supra*.

depends heavily on the communication of the balance between these benefits and costs. More generally, proactive communication on the part of the municipality is necessary to create trust among citizens. This brings us to the last, and most important condition to make financial participation work: procedural participation.

D. The Role of Procedural Participation

Throughout all interviews the central importance of procedural participation by citizens and municipalities during all project stages was apparent. Experts emphasised that the effectiveness of financial participation in fostering local acceptance depends greatly on the context and on how much the population feels they can participate. Early involvement of citizens, including during authorisation phases, and transparent communication about the project and financial participation formats as well as their benefits and detriments, is crucial for successfully implementing a participation format and reducing opposition. Involving and communicating with residents is thus crucial for both the successful implementation of financial participation formats and for them to be effective in increasing local acceptance. In other words, if procedural participation of citizens goes well throughout the entire process, financial participation contributes effectively to an increase in local social acceptance. Ultimately, financial participation is only one of several components that contribute to local social acceptance. However, varying circumstances in every municipality and region also determine the effectiveness of tools. There is no one-size-fits-all solution. This is why it is particularly effective to enable what is desired locally.

VII. Conclusion and Outlook

This study investigated different economic tools to financially engage citizens in renewable energy projects in their close vicinity to enhance local social acceptance of renewable energy projects, using the real-life example of Mecklenburg Western Pomerania and its Citizen and Municipal Participation Law. Results from seven extensive interviews

with individuals familiar with implementing the law created valuable insights into the mechanisms and reasons behind preferences for the different financial participation formats set out by it. In addition, relevant levers and obstacles when implementing such formats were identified and some indication about the instrument's effectiveness in enhancing local social acceptance was derived. Being the first of its kind, this study thus contributes to closing the prevailing empirical research gap concerning the effectiveness of different tools and furthers the scientific progress of renewable energy acceptance research. Qualitatively investigating the reasoning, motivation and criticism of experts allowed the generation of a number of practical policy recommendations for the successful future application and updating of policies using such financial participation tools to increase acceptance, including the CMPL in MWP. Most importantly, these included the consistent communication between all relevant stakeholders throughout all steps of implementing financial participation and the availability of different tools that require as little bureaucratic effort as possible, enabling what is desired locally.

Nevertheless, it is important to acknowledge several limitations of this study and corresponding suggestions for future research. First, while it intends to analyse economic tools to increase local acceptance towards renewable energies in general, all results are based on tools concerning wind energy projects as the CMPL only applies to developers of wind energy projects. Thus, the applicability of the findings to other renewable energy installations such as solar farms or biogas plants is questionable and further qualitative research is needed to see if and how findings differ. Furthermore, as it was discovered that preferences and motives behind the choices for different tools depend on the socio-cultural and economic circumstances, further research in different settings is needed. Because the structure of the law, in its current form, really only allows statements to be made about four different formats, citizen and municipal shareholding,

direct payments to municipalities and saving bonds, future research should also focus on other formats as set out in Table 1, below.

Second, this paper is unable to deliver concise statements about the effectiveness of individual participation formats in increasing local social acceptance. This is, among other reasons, because citizens were not included as an interviewed stakeholder group. While there are practical reasons for this decision, such as failing to find a citizen initiative concerned with the topic in MWP, evidence on the effectiveness of financially involving citizens in renewable energy projects is a research gap that continues to prevail. Because, in addition to this, the importance of such evidence for policymakers and stakeholders was repeatedly emphasised in most of the expert interviews, this paper stresses the need for future research to fill this gap. Particularly research utilising quantitative means such as the Difference-in-Differences method, using acceptance panel data from before and after the implementation of participation formats, is needed.

On the other hand, this study finds that the effectiveness of financial participation might depend less on the tool employed and more on how an agreement about it is reached and how it is being implemented. It appears that only the combination of procedural and financial participation can enhance local social

acceptance. Therefore, further research should address this interaction, especially when it comes to investigating possible negative effects of financial participation, such as crowding out of intrinsic motivations for change, for which there is very little evidence or proven solutions.

Finally, it must be emphasised that, in the wake of the global energy transition, the number of renewable energy projects will inevitably grow. Thus, policymakers have a choice between forcefully pushing through projects regardless of local sentiments, or utilising the great potential these projects offer to engage surrounding municipalities and thereby increase the quality of life for their residents. However, because knowledge about tools making use of this potential is still in its infancy and they are thus rarely used in reality, more research and testing is needed to understand and communicate if and how they can work.

	Citizen Investment Models	Benefit Schemes
Definition following Kerr et al. (2017)	“financial benefit is directly linked to (...) the profitability of the development”	Provider by the developers as “standardised payments” or “internal budget allocation”
Direct (payment made directly to individuals)	Citizen shareholding, saving bonds, citizen cooperatives	Discounted electricity tariffs / bills, household subsidies, direct payments to households
Indirect (payment made indirectly to municipality)	Municipal shareholding, shared equity, tax for operators	Direct payments to municipalities, community benefit funds, in-kind benefits, sponsoring of associations or local community facilities

Table 1: Overview of Citizen Investment Models and Benefit-Sharing Schemes for Renewable Energy Projects, Adapted from Knauf and le Maitre (2023)

Interview	Interviewee's Organisation Type	Familiar Financial Participation Formats
1 (two interviewees)	Municipality	Municipal shareholding
2	Municipality	Municipal shareholding, citizen compensation via para 6 EEG, one-off compensation payment to households, sponsorship
3	District administration / municipality	Municipal shareholding, compensation payments to municipalities, sponsorship, discounted electricity bills
4	Wind project developer	Municipal / citizen shareholding, compensation payments to municipalities, citizen compensation via para. 6 EEG, saving bonds, discounted electricity bills
5	Wind project developer	Municipal / citizen shareholding, compensation payments to municipalities, citizen compensation via para. 6 EEG, saving bonds, discounted electricity tariffs
6	Superordinate public body (LEKA)	All
7	Superordinate public body	All

Table 2: Interviewee Information

Oceans and Climate Change: Synergy and Conflict in International Law

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KEYWORDS

climate change, oceans, UNFCCC, IMO, CBDR, NMFT, CCUS, CDR

ABSTRACT

The science is clear that climate change has profound impacts on oceans and vice versa. The Intergovernmental Panel on Climate Change (IPCC) states that climate change is projected to cause ocean warming and ocean acidification, among others. At the same time, oceans have the potential to contribute greatly to adaptation and mitigation efforts that will allow us to achieve the goals of the Paris Agreement. From the implementation of marine protected areas to the more controversial ocean fertilisation efforts, the global ocean, which covers 71% of the Earth's surface, has the potential to play a major role in climate action. Despite these strong linkages, the development of international law on oceans and climate change has been relatively slow. It was only in recent years that the United Nations Framework Convention on Climate Change (UNFCCC) has dedicated a work stream for oceans through the Ocean Pathway, an initiative which paved the way for the Ocean Dialogue, a recurring process with the purpose of strengthening ocean-based action. As these various environmental agreements come up with new policies and mandates, instances of legal conflict cannot be avoided. This paper will take an in-depth study of the current international legal frameworks governing oceans and climate change to determine where opportunities for synergy can be optimised and conflicts can be resolved by examining two cases of legal overlap.



I. The Science: The Intergovernmental Panel on Climate Change (IPCC)

In 2016, the Intergovernmental Panel on Climate Change (IPCC) published a Special

Report on the Ocean and Cryosphere in a Changing Climate¹ following two other Special Reports on Global Warming of 1.5°C² and on Climate Change and Land.³ The report, the

¹ Intergovernmental Panel on Climate Change (IPCC). *Special Report on the Ocean and Cryosphere in a Changing Climate Summary for Policymakers*, edited by H-O Portner et al., 2019.

² IPCC. *Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C Above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the*

Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty, edited by V Masson-Delmotte et al., 2018.

³ IPCC. *Climate Change and Land: an IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*, edited by P Shukla et al., 2019.

findings of which are grounded in a thorough assessment of scientific evidence, stated with medium confidence that climate-induced projected shifts in fish distribution and abundance will affect income, livelihoods, and food security of communities that are dependent on marine resources.

The low-lying coastal zone is currently home to around sixty-eight million people and is projected to reach more than one billion by 2050.⁴ These communities are particularly exposed to climate impacts such as sea level rise, rising ocean temperatures, and storm intensity that may lead to loss of livelihood, loss of lives, damaged assets, and a disruption of basic services.⁵ This is compounded by the fact that the people with the highest exposure and vulnerability to climate change impacts are often those with lowest capacity to respond.⁶

On the other hand, the ocean may provide major opportunities for climate action, as it holds fifty times more carbon dioxide than the atmosphere and has absorbed more than 25% of emitted anthropogenic CO₂. It has also absorbed 90% of the atmospheric warming that has occurred in recent decades due to increasing greenhouse gases (GHGs).⁷ Some climate models suggest that ocean-based mitigation actions could contribute up to 12% of the emission reductions required by 2030 to keep warming to less than 1.5°C while ocean-based adaptation could alleviate the devastating impacts of climate change to marine biodiversity and coastal communities.⁸

Apart from its contribution to the climate system, the ocean and cryosphere offer various benefits to humanity. These benefits include the provision of food and water, renewable energy sources, as well as contributions to health, well-being, culture, tourism, trade, and transportation. Efforts to restore habitats on land and oceans, as well as

ecosystem management tools such as relocating species and cultivating coral, can greatly improve local ecosystem-based adaptation. Reviving coastal green spaces like mangrove forests, salt marshes, and seagrass beds—also known as ‘coastal blue carbon’ habitats—shows promise in counteracting climate change by increasing carbon uptake and storing roughly 0.5% of global emissions each year.⁹ Additionally, renewable energy sources from the ocean, including offshore wind power, tidal and wave energy, and energy from thermal and salinity gradients, as well as biofuels from algae, offer additional ways to mitigate climate change.¹⁰

As the rise in global average temperature threatens to surpass the 1.5°C goal of the Paris Agreement with each passing year, the need to exponentially expand mitigation actions becomes more urgent, and innovative ways of addressing emissions become more attractive. The international legal system must be prepared to address these actions in a transparent and just manner that respects and upholds ecological integrity so as to avoid inadvertently causing more destruction to people and the environment.

II. Climate Considerations under the International Law on Oceans and Marine Conservation

A. *The United Nations Convention on the Law of the Sea (UNCLOS) and the Prevention, Reduction, and Control of Pollution of the Marine Environment*

The United Nations Convention on the Law of the Sea (UNCLOS) was a product of the 3rd UN Conference on the Law of the Sea which took place from 1973 to 1982. UNCLOS is often referred to as the “constitution for the oceans” as it deals with all matters relating to the law of the sea. It is a living instrument, designed to adapt to changing threats to the marine environment by taking account of current

⁴ IPCC (n 1) *supra* at 5.

⁵ *ibid.*

⁶ *ibid* at p. 29, [C.1].

⁷ “The Ocean – The World’s Greatest Ally Against Climate Change.” *United Nations Climate Action Webpage*.

⁸ Trebilco, Rowan, et al. “Warming World, Changing Ocean: Mitigation and Adaptation to Support Resilient Marine Systems.” *Reviews in Fish Biology and Fisheries*, vol. 32, no. 1, 2022, pp. 39-63.

⁹ IPCC (n 1) *supra* at p. 30, [C.2.4].

¹⁰ *ibid.*

scientific and technical realities to fulfil its object and purpose of addressing “problems of ocean space.”¹¹

Aside from overseeing the overall protection and conservation of the marine environment, UNCLOS also addresses land-based pollution, pollution from seabed activities subject to national jurisdiction, pollution from activities in the area, pollution by dumping, from vessels, and from and through the atmosphere. Article 207 under Section 5 (International Rules and National Legislation to Prevent, Reduce, and Control Pollution of the Marine Environment) requires States to adopt laws and regulations relating to the pollution of the marine environment from land-based sources.¹² States are also required under Art. 212 to adopt laws and regulations relating to pollution of the marine environment from or through the atmosphere.¹³ In relation to pollution by dumping, Art. 210 requires States to adopt laws and regulations to prevent, reduce, and control such pollution.¹⁴

UNCLOS defines “pollution of the marine environment” in Article 1(1)(4) as: “the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality of use of sea water and reduction of amenities.”¹⁵ A cursory reading of this definition would put GHGs under the ambit of “pollution” however, as it is not specifically stated under the UNCLOS or any subsequent agreement, it is open for debate whether these provisions apply.

This is the subject of the case brought to the International Tribunal Court for the Law of the Sea (ITLOS) by the Commission of Small Island States on Climate Change and International Law (COSIS). COSIS argued that anthropogenic GHG emissions meet the definition of “pollution of the marine environment” under the Convention because GHG emissions bring both energy (heat) and substance (carbon) into the marine environment that results in damaging physical and chemical changes to the marine environment.¹⁶ The Advisory Opinion (AO) requested by COSIS sought answers on the following: what are the specific obligations of State Parties to the UNCLOS to prevent, reduce, and control pollution of the marine environment as it relates to the impacts of climate change? Do Parties have an obligation to protect and preserve the marine environment in relation to climate change impacts?¹⁷

The AO of the ITLOS on this case was rendered and published on 21 May 2024. Remarkably, the ITLOS concluded that anthropogenic GHG emissions into the atmosphere are considered within the definition of “pollution of the marine environment.”¹⁸ The AO also states that while the UNFCCC and the Paris Agreement are the primary legal treaties on climate change, issues related to climate change are not exclusive thereto and that the obligations under the UNCLOS on pollution prevention will not be satisfied through compliance with the obligations under the Paris Agreement.¹⁹ Furthermore, the standard of due diligence in complying with such obligations is stringent, commensurate to a State’s capabilities and available resources, and based on best available science.²⁰

¹¹ Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law (Case No. 31). *Written Statement of the Commission of Small Island States on Climate Change and International Law (COSIS)*, 16 June 2023, [51]-[52].

¹² United Nations Convention on the Law of the Sea (UNCLOS), 16 Nov. 1994, 1883 UNTS 3, Art. 207, Sec. 5.

¹³ *ibid* at Art. 212.

¹⁴ *ibid* at Art. 210.

¹⁵ *ibid* at Art. 1(1)(4).

¹⁶ COSIS (n 11) *supra* at Chapter 5.

¹⁷ *ibid* at [6]-[7].

¹⁸ *Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law*. Advisory Opinion, 21 May 2024, [179].

¹⁹ *ibid* at [223].

²⁰ *ibid* at [241].

While the AO has been welcomed as a seminal step towards protecting both the oceans and the atmosphere,²¹ it remains to be seen how this will be received by the UNFCCC and Paris Agreement Parties and translated into more ambitious emissions reduction commitments from Parties.

B. The International Convention for the Prevention of Pollution from Ships (MARPOL) and the International Maritime Organization (IMO)

The International Maritime Organization (IMO) is the United Nations specialised agency that oversees the safety and security of shipping and the prevention of marine and atmospheric pollution by ships. It sets international standards for the safety, security, and environmental impact of maritime transport.²² Additionally, it serves as the administrative body for the International Convention for the Prevention of Pollution from Ships (MARPOL), which became effective in 1973.²³ In 2011, the IMO approved amendments to MARPOL Annex VI that introduced mandatory energy efficiency measures, both technical and operational, to lower CO₂ emissions from global shipping. The Energy Efficiency Design Index (EEDI), together with the Ship Energy Efficiency Management Plan (SEEMP), have been enforceable since 2013 and is the first global obligatory framework for reducing greenhouse gas emissions within an international industrial sector. The EEDI enforces standards for energy efficiency relative to cargo capacity for various types and sizes of vessels, while the SEEMP encourages shipowners and operators to adopt innovative technologies and methods to enhance a vessel's operational efficacy.²⁴

In 2023, the IMO implemented its GHG Strategy aimed at lowering greenhouse gas

emissions from ships. This strategy outlines a long-term vision and specific goals for lessening emissions within the international maritime sector, as well as the guiding principles. The document also details potential measures to be considered for the medium and long term, timelines, and potential effects on various countries. Additionally, it addresses obstacles to these goals and measures that could support them, such as capacity building, technical cooperation, and research and development. A key objective of the strategy is to achieve at least a 40% reduction in the carbon intensity of global shipping by 2030. Furthermore, it sets an ambitious target to increase the adoption of technology, fuels, and energy sources with zero or near-zero emissions to at least 5%, and aims for 10%, of the sector's total energy use by 2030.²⁵

Since the first meeting of the UNFCCC COP, the IMO reports to the UNFCCC during sessions of its SBSTA.²⁶ These reports include the IMO's latest progress and achievements relating to GHG emissions from international shipping and are considered under the SBSTA agenda item on "emissions from fuel used for international aviation and maritime transport."

C. The Treaty of the High Seas or the Marine Biodiversity of Areas Beyond National Jurisdiction (BBNJ)

Newest in the legal arsenal for marine environment protection is the Treaty on the Marine Biodiversity of Areas Beyond National Jurisdiction, or the Treaty of the High Seas (BBNJ). The BBNJ, adopted on 19 June 2023, aims to better implement the principles of UNCLOS in protecting and conserving marine areas outside national jurisdiction through better cooperation and coordination of various

²¹ see Khatri, Upsana, and Joie Chowdhury. "How a Historic Opinion on Climate Change and Ocean Protection Sets the Bar for Climate Action." *Centre for International Environmental Law*, 27 June 2024; "ITLOS Sets Groundbreaking Victory for Ocean and Climate Protection." *Greenpeace International*, 21 May 2024.

²² "Introduction to the IMO." *International Maritime Organization (IMO) Webpage*.

²³ "Marine Environment." *IMO Web*.

²⁴ "Improving the Energy Efficiency of Ships." *IMO Web*.

²⁵ IMO Marine Environment Protection Committee, 2023 *IMO Strategy on Reduction of GHG Emissions from Ships*, Annex 15 Resolution MEPC.377(80), MEPC 80/17/Add.1, 7 Jul. 2023.

²⁶ "Emissions from Fuels Used for International Aviation and Maritime Transport." *UNFCCC Webpage*.

stakeholders.²⁷ As of October 2024, the Treaty has been ratified by thirteen countries and has one hundred and five signatories.²⁸ In pursuit of its objectives, the BBNJ establishes a framework that governs access to marine genetic resources, including issues related to benefit-sharing.²⁹ It mandates the performance of environmental impact assessments for proposed activities³⁰ and the establishment of area-based management tools, such as marine protected areas, to support conservation and sustainable use of biodiversity.³¹

The Preamble and core provisions of the BBNJ stress the importance of confronting the decline of ocean biodiversity and the deterioration of marine ecosystems due to climate change impacts including ocean warming, reduced oxygen levels, and ocean acidification.³² The Treaty also acknowledges concerns related to pollution, particularly plastic pollution, and unsustainable use, highlighting the need for targeted actions to mitigate these challenges.³³

The BBNJ offers a platform for dialogue and integration, aligning efforts for biodiversity conservation and measures for climate change. The Group of 77 (G77) negotiating bloc, composed of developing countries, anticipates that BBNJ will solidify this connection, emphasizing the significant role of oceans in the carbon cycle and in climate change mitigation strategies. Additionally, BBNJ is expected to bolster scientific and technical capacities, providing SIDS with enhanced resources to comprehend and confront the impacts of climate change they are experiencing.³⁴

III. Oceans and Marine Conservation in the United Nations Framework Convention on Climate Change and Related Agreements

The UNFCCC regime has been a laggard in addressing ocean-related concerns as it relates to climate change impacts and actions. The ocean is mentioned once in the text of the UNFCCC under Art. 4(1)(d) on sinks and reservoirs³⁵ while the Paris Agreement mentions it in the Preamble³⁶ and indirectly through reference in Art. 5(1) on sinks and reservoirs.³⁷ Clearly, this is an inadequate reflection of the critical role that the ocean plays in the climate system and could play in taking climate action. Moreover, recognition of the adverse impacts of climate change on the health of the ocean is not mentioned.

With the concerted efforts of the ocean community, the *Strategic Action Roadmap on Oceans and Climate: 2016 to 2021* was prepared and published by the International Expert Working Group on Oceans and Climate composed by thirty-seven experts and forty-six partner organizations of the Oceans Day at the UNFCCC COP 22 in 2016.³⁸ The Roadmap addresses six issue areas: The central role of oceans in regulating climate, role of oceans in mitigation, role of oceans in adaptation, displacement, financing, and capacity development.³⁹

The Roadmap was followed by a report entitled *Assessing Progress on Ocean and Climate Action: 2018*, launched during COP 24. This report highlighted the issues and goals for the ocean and the progress achieved in the six issue areas of the Roadmap. The report provides examples of action or other

²⁷ *Agreement Under the UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ)*. UNGA A/Conf.232/2023/4*, 19 June 2023.

²⁸ “Law of the Sea, BBNJ.” *United Nations Treaties*.

²⁹ *ibid* at Part II, Arts. 9 to 16.

³⁰ *ibid* at Part IV, Arts. 27 to 39.

³¹ *ibid* at Part III, Arts. 17 to 26.

³² *ibid* at Preamble.

³³ *ibid*.

³⁴ Chandrasekhar, Aruna, and Guiliana Viglione. “Q&A: What Does the ‘High Seas Treaty’ Mean for Climate Change and Biodiversity.” *Carbon Brief*, 8 Mar. 2023.

³⁵ UNFCCC, 1992, A/AC.237/18 (Part II)/Add.1; 31 ILM 849, Art. 4(1)(d).

³⁶ Paris Agreement to the United Nations Framework Convention on Climate Change (Paris Agreement), Dec. 12, 2015, TIAS No 16-1104, Preamble.

³⁷ *ibid* at Art. 5(1).

³⁸ “Sustainable Development, Roadmap to Oceans and Climate Action.” *United Nations Department of Economic and Social Affairs Webpage*.

³⁹ Cicin-Sain, Biliana, et al., “Toward a Strategic Action Roadmap on Oceans and Climate: 2016 to 2021.” *Global Ocean Forum*, 2016.

developments relevant to each issue area and describes the negative impacts of climate change on ocean ecosystems and coastal and island populations. This report goes further in discussing issues such as blue economy and the central role of NDCs in separate chapters.⁴⁰ The Oceans Pathway was also launched at COP 23 in 2017 as an initiative by the Fiji presidency to increase the role of the ocean considerations in the UNFCCC process and significantly increase action in the priority areas impacting by ocean and climate change.⁴¹

In 2019, responding to the UNFCCC's request, the IPCC published its *Special Report on the Ocean and the Cryosphere in a Changing Climate* that covers expected changes with ongoing global warming as well as the risks and opportunities these changes will bring to ecosystems and people. This is not the first time that the IPCC has included ocean-related considerations, having done so in its first to fifth Reports, each time highlighting the adverse impacts of climate change on oceans. In this Special Report, mitigation, adaptation, and governance options for reducing risks are also discussed.⁴²

Also, at COP 25 in 2019, the Chile Madrid Time for Action was adopted which mandated the Ocean and Climate Change Dialogue.⁴³ Since then, there have been three Dialogues held in 2020, 2022, and 2023. The first Ocean and Climate Change Dialogue, held virtually in 2020 due to the pandemic, discussed how to strengthen adaptation and mitigation action on ocean and climate change under the UNFCCC and across the United Nations and at the national level, as well as cross-cutting

support for action.⁴⁴ In 2022, the second Dialogue focused on strengthening and integrating national ocean climate action under the Paris Agreement and enabling ocean climate solutions and optimizing institutional connections.⁴⁵ The 2023 Dialogue on the other hand, focused on coastal ecosystem restoration, including blue carbon, and fisheries and food security.⁴⁶ The next Ocean and Climate Change Dialogue will be held in June 2024 alongside the 2024 Bonn Climate Change Conference and the 60th sessions of the Subsidiary Body for Implementation (SBI) and the SBSTA. The topics of the dialogue will be on (i) marine biodiversity conservation and coastal resilience and (ii) technology needs for the ocean / climate action, including financial links.⁴⁷

Aside from these developments, Parties have incorporated marine and ocean-related actions into their adaptation and mitigation reports. NAPs for example, are guided by ocean-related supplementary information to the technical guidelines drafted by the Convention on Biological Diversity and the Food and Agriculture Organization. Currently, over 70% of new or revised NAPs address ocean and coastal zones.⁴⁸ The Nairobi Work Programme (NWP), which seeks to improve understanding and assessment of impacts, vulnerability, and adaptation, also has a focus area on the ocean, coastal areas, and ecosystems. The NWP's Thematic Expert Group on Oceans has published a supplement to the NAP technical guidelines in March 2022 to guide Green Climate Fund (GCF) proposal development.⁴⁹

⁴⁰ *ibid.*

⁴¹ "Ocean Pathway Launched at COP 23." *International Institute for Sustainable Development SDG Knowledge Hub*, 21 Nov. 2017.

⁴² IPCC (n 1) *supra*.

⁴³ UNFCCC COP, Twenty-Fifth Session, *Chile Madrid Time for Action*, FCCC/CP/2019/L.10, 15 Dec. 2019, [31].

⁴⁴ "Ocean and Climate Change Dialogue to Consider How to Strengthen Adaptation and Mitigation Action Informal Summary Report by the Chair of the SBSTA." *UNFCCC SBSTA*, 29 Apr. 2021.

⁴⁵ "Ocean and Climate Change Dialogue 2022 Information Note by the Chair." *UNFCCC SBSTA*, 30 May 2022.

⁴⁶ "Ocean and Climate Change Dialogue 2023 Informal Summary Report by the Co-Facilitators of the Ocean and Climate Change Dialogue 2023-2024." *UNFCCC SBSTA*, 15 Sep. 2023.

⁴⁷ UNFCCC, *Message to Parties, United Nations Organizations and Intergovernmental and Non-Governmental Organizations Admitted as Observers and Other Non-Party Stakeholders, The Ocean and Climate Change Dialogue 2024*, 19 Apr. 2024, Ref ISCP/MTP/O/Ocean and Climate Change Dialogue 2024.

⁴⁸ "Ocean Action Under the UNFCCC." *UNFCCC*.

⁴⁹ "Oceans, Coastal Areas, and Ecosystems." *UNFCCC*.

As for mitigation, National Greenhouse Gas Inventories and REDD+ include information on and action for coastal wetlands and mangrove forests. The UNFCCC SBSTA also monitors the work of the IMO on bunker fuels used in shipping. Additionally, out of 148 countries that have submitted their NDCs as of 1 October 2023, ninety-seven have included coastal and marine nature-based solutions (NbS). Out of these ninety-seven, fifty-five countries recognized the mitigation and adaptation co-benefits of coastal and marine NbS, and forty-four noted the resultant socioeconomic benefits for coastal communities. There are also more references to the ocean in updated NDCs; certain countries further recognised ocean changes (for instance, acidification and coral bleaching) and / or climate-driven impacts on the ocean (for instance, sea-level rise and coastal erosion). Compared to the first set of NDCs, fourteen out of 142 countries have added such references. The outcome of the GST of the Paris Agreement that concluded during COP 28 also invited Parties to scale up ocean-based mitigation action, as appropriate.⁵⁰

IV. Conflicts in International Ocean and Climate Change Law: Case Studies

The Secretary-General's report, prepared pursuant to General Assembly resolution 72/277 and titled *Towards a Global Pact for the Environment*, discussed the gaps and deficiencies of international environmental law (IEL). The Secretary-General found that customary IEL is limited, leading to implementation gaps, and that IEL is reactive, as demonstrated by the multitude of environmental treaties. These treaties disregard the interconnectedness and interdependence of the Earth's ecosystem and work in silos leading to fragmented

implementation and multiple coordination challenges.⁵¹

Unfortunately, this is quite an accurate description of how the climate change and law of the sea regimes have worked over since the early 1990s. The UNFCCC has managed to avoid discussions relating to oceans until the past few years. This has led to many conflicts, and has wasted opportunities for joint implementation. This paper will focus on two issues that are currently debated and have delayed progress for climate action.

A. Implementation of the Principle of Common but Differentiated Responsibilities (CBDR) under the IMO and UNFCCC

1. CBDR under the UNFCCC

The climate change regime is distinguished in its practice and application of the Common but Differentiated Principle (CBDR). This principle recognizes and respects the different capabilities and responsibilities of each country in addressing climate change. This is a reflection of the historical responsibility held by developed countries who hold the largest share of historical and current global GHG emissions as compared with developing countries whose share is relatively and collectively low.⁵² CBDR is enshrined under the Preamble of the UNFCCC where it acknowledges "that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions."⁵³

Reflecting this principle, the UNFCCC divided countries into Annex I, Annex II, and non-Annex I countries. Annex-I countries include industrialized countries that were members of the Organization for Economic Cooperation and Development (OECD) in 1992 and

⁵⁰ UNFCCC Conference of the Parties, Twenty-Eighth Session. *Outcome of the First Global Stocktake*. UN Doc FCCC/PA/CMA/2023/L.17, 13 Dec. 2023, [35].

⁵¹ UNGA Res A/73/419.

⁵² Tian, Wang and Gao Xiang. "Reflection and Operationalization of the Common but Differentiated

Responsibilities and Respective Capabilities Principle in the Transparency Framework Under the International Climate Change Regime." *Advances in Climate Change Research*, vol. 9, no. 4, 2018, pp. 253-263.

⁵³ UNFCCC (n 35) *supra* at Preamble.

countries with economies in transition (EIT), which included the Russian Federation, the Baltic States, and other countries from Central and Eastern Europe.⁵⁴ Annex II countries on the other hand, referred to developed countries under Annex I, but not EIT countries, while Non-Annex I consist mostly of developing countries.⁵⁵

Under Articles 4.2 (a) and 4.2 (b) of the Convention, Annex I countries are individually or jointly obligated to return to their 1990 levels of GHG emissions by the year 2000.⁵⁶ Annex II countries are additionally required to provide financial resources and promote the development and transfer of environmentally friendly technologies to allow Non-Annex I countries to undertake mitigation and adaptation actions.⁵⁷

This type of differentiation was further highlighted under the Kyoto Protocol, which legally bound Annex I countries to meet specific targets and reduce country emissions. Over the period of 2008-2012, the Protocol obligated Annex I Parties (thirty-seven countries) to reduce emissions based on legally binding targets amounting to a 5% reduction compared to the 1990 baseline.⁵⁸ Many found this quite problematic because, aside from not being ambitious enough, countries that were some of the largest emitters at that point in time, including the United States (US), who had not ratified the agreement, and developing countries, mainly China and India, were not bound by any reduction targets. By 2012, global GHG emissions had increased by 44% from 1997 levels, highlighting the failure of the Protocol to curb emissions. By the second commitment period, some countries, including Canada and Japan, encouraged by the American stance, pulled out of the Protocol adding more doubt as to its viability. This paved the way for talks of a second agreement that would bind all

Parties to legal binding emission targets, and, in 2015, the Paris Agreement was adopted.⁵⁹

Under the Paris Agreement, this type of classification was removed, and Parties can now individually determine their contribution to the global goals. However, the Agreement continues to differentiate developed and developing countries for some obligations. Article 2 clarifies that the Agreement is to be implemented in a way that reflects CBDR,⁶⁰ and this is exemplified in various articles such as in Article 4 where it is stated that peaking will take longer for developing country Parties and that developed country Parties should continue taking the lead by undertaking economy-wide absolute emission reduction targets.⁶¹ Developed countries are also expected to provide means of implementation including finance, capacity building, and technology development and transfer to assist developing countries in implementing the Paris Agreement. Article 9 states that “developed country Parties shall provide financial resources to assist developing country Parties with respect to both mitigation and adaptation in continuation of their existing obligations under the Convention.”⁶² Article 10 on the other hand, states that support, “including financial support, shall be provided to developing country Parties for the implementation of this Article, including for strengthening cooperative action on technology development and transfer at different stages of the technology cycle, with a view to achieving a balance between support for mitigation and adaptation.”⁶³ On capacity building, Article 11 states that “all Parties should cooperate to enhance the capacity of developing country Parties to implement this Agreement. Developed country Parties should enhance support for capacity-building actions in developing country Parties.”⁶⁴ This clearly shows that while the interpretation and strict

⁵⁴ *ibid* at Annex I.

⁵⁵ *ibid* at Annex II.

⁵⁶ *ibid* at Art. 4.2 (a) and Art. 4.2 (b).

⁵⁷ *ibid* at Art. 4(3).

⁵⁸ Kyoto Protocol to the United Nations Framework Convention on Climate Change, 11 Dec. 1997, 37 ILM 22, Art. 3(1).

⁵⁹ Bassetti, Francesco. “Success or Failure? The Kyoto Protocol’s Troubled Legacy.” *Foresight*, 8 Dec. 2022.

⁶⁰ Paris Agreement (n 36) *supra* at Art. 2 (2).

⁶¹ *ibid* at Art. 4.

⁶² *ibid* at Art. 9.

⁶³ *ibid* at Art. 10.

⁶⁴ *ibid* at Art. 11.

application of CBDR might have changed, and the obligations of developing countries have been expanded, it remains to be an important guiding principle of the Paris Agreement.

2. The IMO's Principles of Non-Discrimination, Equal Treatment, and No More Favourable Treatment

One of the IMO's aims, under Article 1 of the Convention on the International Maritime Organization, is "to promote the availability of shipping services to the commerce of the world without discrimination."⁶⁵ This is reflected under the principle of non-discrimination and equal treatment or the "flag neutrality principle." Unlike in the climate change regime where obligations are differentiated, IMO regulations are applied to all ships regardless of the flag it is using.⁶⁶

Additionally, UNCLOS, under Article 5(7), extends the enforcement jurisdictions of coastal and port states over foreign flagged ships.⁶⁷ This is called the No More Favourable Treatment (NMFT) principle. It ensures that ships are not disadvantaged due to its flag state ratifying the IMO Convention. As such, when a country ratifies an IMO instrument, the regulations apply not only to ships registered under its flag but also to foreign-flagged vessels visiting its ports.⁶⁸ NMFT mandates equal treatment for all ships, irrespective of flag state, industrial development, or ownership. It aims to ensure fair standards for all ships, including those flying flags of convenience, without infringing on the sovereignty of non-party states.⁶⁹ An example of NMFT in application can be found under the port State control provisions of Title 5 of the Convention, which states that ships

from all countries, regardless of whether they have ratified the Convention, can be inspected in any country that has ratified it. If these ships fail to meet the minimum standards outlined in the Convention, they may be subject to inspection and potential detention.⁷⁰

Guided by the NMFT principle, the 2011 MARPOL Convention's mandatory technical and operational measures to improve ships' energy efficiency are applied equally to all ships regardless of their flag.⁷¹ However, major developing countries expressed serious reservations, arguing that GHG regulations should only apply to Annex I parties in line with the CBDR principle. This debate regarding the interpretation and application of CBDR has persisted throughout the legislative process and has hindered efficiency and consensus in regulating GHG emissions from international shipping.⁷² In 2011, after many lengthy discussions, the IMO adopted a new Chapter 4 on "regulations on energy efficiency for ships" to Annex VI of MARPOL.⁷³ Instead of specific emission reductions, new ships of 400 gross tonnage and above should meet minimum energy efficiency levels and follow certain operations to improve energy efficiency.⁷⁴

In July 2023, the IMO adopted the 2023 *IMO Strategy on Reduction of GHG Emissions from Ships*, incorporating, for the first time, a net-zero GHG emission goal from international shipping by or around the year 2050.⁷⁵ Significantly, the Strategy lists both NMFT and CBDR in its guiding principles and adds reference to a "just and equitable transition" in its Vision Statement.⁷⁶ While it adequately

⁶⁵ Convention on the International Maritime Organization, 17 Mar. 1958, Art. 1.

⁶⁶ Chen, Yuli. "Reconciling Common but Differentiated Responsibilities Principle and More Favourable Treatment Principle in Regulating Greenhouse Gas Emissions from International Shipping." *Marine Policy*, vol. 123, 2021, p. 104317.

⁶⁷ UNCLOS (n 12) *supra* at Art. 5(7).

⁶⁸ Chen (n 66) *supra* at p. 4.

⁶⁹ *ibid.*

⁷⁰ *ibid.*

⁷¹ International Maritime Organization, *Amendments to MARPOL Annex XI on Regulations for the Prevention of*

Air Pollution from Ships by Inclusion of New Regulations on Energy Efficiency for Ships, MEPC 62/24/Add.1 Annex 19, 15 Jul. 2011, Regulation 1.

⁷² Chen (n 66) *supra* at p. 4.

⁷³ International Maritime Organization, *Amendments to the Annex of the Protocol of 1997 to Amend the International Convention for the Prevention of Pollution from Ships, 1973, As Modified by the Protocol of 1978 Relating Thereto*, Resolution MEPC.203(62), 15 Jul. 2011.

⁷⁴ *ibid* at [2].

⁷⁵ IMO (n 25) *supra* at [3.3].

⁷⁶ *ibid* at [3.5](1).

addresses the difficulties that developing countries would face to align with this Strategy and provides plans to develop information sharing programmes, financial support mechanisms, and capacity building, it remains to be seen how the Strategy will be implemented and how successful it will be in achieving its goals.

B. Carbon Dioxide Removal under the London Protocol and the UNFCCC

1. Carbon Dioxide Removal (CDR) as Climate Action

The IPCC, in its Special Report on Global Warming at 1.5°C, provided pathways on how to achieve this ambitious temperature goal. The report shows that carbon dioxide removal (CDR) of 100-1000 GtCO₂ will be required over the 21st Century, but notes that this accelerated level of removal is unprecedented and unproven, and that further work needs to be done on its feasibility and sustainability.⁷⁷ In the Synthesis Report for the 6th Assessment Report (AR6), the IPCC goes as far to say that CDR is “necessary to achieve net-negative CO₂ emissions.”⁷⁸

CDR technologies are tools aimed at reducing concentrations of atmospheric carbon dioxide.⁷⁹ The IPCC glossary classifies these types of technologies as a special type of mitigation.⁸⁰ CDR itself is an umbrella term for various types of technologies such as: afforestation and forest ecosystem restoration, direct air capture and storage, bioenergy with carbon capture and storage, enhanced weathering and ocean alkalinity, and ocean fertilisation.⁸¹

CDR projects may be implemented onshore or offshore. A coalition called Geoengineering Monitor, composed of the ETC Group, Biofuelwatch, the Heinrich Boell Foundation and the Global Forest Coalition, monitors

active geoengineering projects all over the world. As of October 2024, there are a total of forty-seven ongoing ocean-based greenhouse gas removal projects and thirty-six planned projects.⁸² This includes projects involving artificial upwelling, bioenergy with carbon capture and storage (BECCS), biochar, carbon capture and storage (CCS), carbon capture use and storage (CCUS), direct air capture, enhanced weathering, and ocean fertilisation.⁸³

However, the IPCC also notes in AR6 that widespread use of CDR is associated with various feasibility and sustainability concerns.⁸⁴ This is echoed by Parties, in relation to the marine environment, during the 2022 Ocean and Climate Change Dialogue. The Information Note by the Chair states that the “urgent need to mitigate emissions has raised interest in ocean-based carbon dioxide removal or altering ocean albedo. Multiple approaches are under consideration, including macroalgal culture and sinking into the deep sea; alkalinity addition, ocean fertilisation, upwelling and downwelling approaches, and deep carbon dioxide injection into deep water and the deep ocean crust. Scientific research is needed to evaluate the effectiveness of these mitigation measures and their consequences for ocean ecosystems when applied at scale.”⁸⁵ While Parties to the Paris Agreement generally do not directly mention CDR in their NDCs, some forms of CDR strategies are included such as those relating to soil and forest carbon. Parties also include CDR strategies in their optional Long-Term Low Emission Development Strategies reports that address scenarios beyond 2050.⁸⁶

At COP 28 in 2023, Parties recognized the role of removal technologies in the GST outcome decision, stating that the need for deep, rapid, and sustained reductions in GHG emissions in

⁷⁷ IPCC (n 2) *supra* at [C.3].

⁷⁸ IPCC. *Synthesis Report of the IPCC Sixth Assessment Report (AR6)*, edited by H Lee et al., 2023, [B.5.1].

⁷⁹ “Emerging Technologies Terminology – A Living Guide.” *Carnegie Climate Governance Initiative*.

⁸⁰ IPCC (n 2) *supra*, Glossary.

⁸¹ *ibid.*

⁸² “Geoengineering Map.” *Geoengineering Monitor*.

⁸³ *ibid.*

⁸⁴ IPCC (n 78) *supra* at [B.7].

⁸⁵ UNFCCC SBSTA (n 45) *supra*.

⁸⁶ Arlota, Carolina, and Korey Silverman-Roati. “Recent Developments on Carbon Dioxide Removal: Increasing Policy Support but Governance Issues Remain.” *Climate Law: A Sabin Center Blog*, 2023.

line with the 1.5C pathways will need contributions in “accelerating zero- and low-emission technologies, including, inter alia, renewables, nuclear, abatement, and removal technologies such as carbon capture and utilization and storage, particularly hard-to-abate sectors, and low-carbon hydrogen production.”⁸⁷ However, Parties at COP 28 failed to adopt recommendations on methodologies and removals from the UN’s Art. 6.4 Supervisory Body. In effect, with these developments, the climate change regime seems to support the acceleration and roll out of removal technologies without any MRV requirements or methodologies.

2. Carbon Dioxide Removal under the London Protocol

Perhaps quite surprisingly, of all international legal frameworks relating to CDR, the London Protocol reacted most swiftly to amend instruments to address and regulate the implementation of these types of activities. In response to growing public concern regarding ocean fertilization activities, the States party to the London Convention and London Protocol published a statement of concern in 2007 about ocean iron fertilization and advised a process for a thorough evaluation of all proposals to ensure compliance with these agreements.⁸⁸ In 2009, the State Parties formally acknowledged that ocean fertilization fell within the scope of the London Convention and London Protocol and endorsed Resolution LC.LP.1 on the Regulation of Ocean Fertilisation. This classified ocean fertilisation for legitimate scientific research as distinct from mere disposal under the agreements and emphasised that such activities should be assessed individually. Additionally, the Resolution clarified that fertilisation activities that are not considered legitimate scientific research are not exempt from the definition of dumping under the London Convention and London Protocol and should be prohibited.⁸⁹ Later in 2010, the

Assessment Framework for Scientific Research Involving Ocean Fertilisation was established by the Scientific Groups to the London Convention and London Protocol to help regulators determine whether proposals for ocean fertilisation constitute legitimate scientific research under the London Convention or Protocol.⁹⁰ While Resolution LC.LP.1 had not reached the requisite two-thirds acceptance to enter into force, the COP provisionally adopted the Resolution in 2019. This allows States who have adopted the amendment to proceed with transboundary export of CO₂ for CCUS activities. This list of States includes Norway, UK, Netherlands, Iran, Finland, Estonia, Sweden, Denmark, Korea, and Belgium, who have submitted their instruments of acceptance.⁹¹

The London Protocol has also sought to supervise sub-seabed storage for CCUS activities. In 2006, Parties adopted amendments to Annex I to regulate activities related to large point sources of CO₂ emissions.⁹² In 2009, Parties also amended Art. 6 of the Protocol on the export of wastes for dumping purposes. This allowed transboundary sharing of sub-seabed geological formations for CCUS so long as the prescribed protection standards are met. However, as of publication, this amendment has not yet entered into force as it has not met the required two-thirds acceptance by Parties. Instead in 2019, Parties adopted a resolution that would allow the provisional implementation of this amendment and allow interested countries to deposit a formal declaration and export CO₂ for geological storage between them according to existing guidelines.⁹³

This fragmented policymaking on CCUS within the international climate change and law of the sea regimes have led to confusion and have stunted the growth and roll out of equitable and environmentally safe technologies for

⁸⁷ UNFCCC (n 50) *supra* at [28](e).

⁸⁸ Scott, Karen. “Exploiting the Oceans for Climate Change Mitigation: Case Study on Ocean Fertilisation.” *The Limits of Maritime Jurisdiction*, edited by Clive Schofield et al., Martinus Nijhoff Publishers, 2013.

⁸⁹ *ibid*.

⁹⁰ *ibid*.

⁹¹ “Regulatory Barriers to A European Market for CO₂ Transport by Ship.” *Slaughter and May Webpage*, 15 Feb. 2024.

⁹² “Carbon Capture and Sequestration.” *IMO*.

⁹³ *ibid*.

CCUS. At the same time, there is a dangerous lack of safeguards that can ably monitor and guide proponents. The risks involved in CCUS can be catastrophic, depending on the type of technology employed. Some uncalculated risks of sub-seabed storage include seismic activity and toxic brine displacement,⁹⁴ while ocean fertilisation could lead to eutrophication, widespread algal blooms, and loss of biodiversity.⁹⁵

V. Reconciling Conflict in International Ocean and Climate Change Law

Given the wide scope and coverage of international climate change law and the limitations to the siloed approach to international environmental conservation law, instances of conflict and overlap are all but inevitable. By nature, ecological processes are interdependent and interlinked.⁹⁶ While it can be beneficial for legal regimes to recognize that some issues are out of the scope of their expertise and outsource it to institutions that are more adept at them, strong collaboration is needed to ensure that the end goals are still met and that foundational principles are respected.

The United Nations General Assembly (UNGA) in recent years has been promoting enhanced coordination, synergy, and interconnected implementation between the 2030 Agenda and the Sustainable Development Goals (SDGs) and the establishment of a Global Pact for the Environment that can consolidate principles of international environmental law for stronger implementation.⁹⁷ The Secretary-General said that “more efforts could be made to establish or strengthen mechanisms to harness interlinkages and promote synergies for more effective implementation.”⁹⁸ Among

other recommendations endorsed by the UNGA, a Resolution related to the creation of the Global Pact invited the scientific community to develop further research on the linkages and cross-cutting issues between multilateral environmental agreements. It also calls for increased policy coherence and improved implementation at the national and international levels between the different multilateral environmental agreements.⁹⁹

Some efforts have also been made at the UN level to address this fragmentation, such as UN Oceans, an inter-agency mechanism established in 2014 that aims to improve coordination, coherence, and effectiveness of various agencies under the UN and the International Seabed Authority.¹⁰⁰ The UNFCCC Secretariat is a member of UN Oceans and regularly invites UN Oceans to hold side events at UNFCCC events.¹⁰¹ However, it is questionable whether these efforts and the outcome of the collaboration impacts Parties. It is telling that within the UNFCCC Ocean Dialogue process, submissions by many stakeholders have advocated for more collaboration between norms, decision-making procedures, and organizations working on the same issues. In fact, institutional interactions were mentioned by 47% of all submissions while 77% mentioned normative interactions with the ocean system.¹⁰²

In dealing with complexity in international environmental law, some ways that coherence can be achieved is by clarifying a form of hierarchy, coordinating efforts, and designating a division of labour.¹⁰³ At the offset, the general rule is that there is no

⁹⁴ Fendt, Lindsey, et al. “Deep Trouble, The Risks of Offshore Carbon Capture and Storage.” *Center for International Environmental Law*, 16 Nov. 2023.

⁹⁵ Santos, Francisca, et al. “Negative Emission Technologies.” *Bioenergy with Carbon Capture and Storage, Using Natural Resources for Sustainable Development*, edited by José Carlos Magalhães Pires and Ana Luísa Da Cunha Gonçalves, Elsevier, 2019.

⁹⁶ Wolfrum, Rudiger and Nele Matz. *Conflicts in International Environmental Law*. Springer, 2003.

⁹⁷ UNGA (n 51) *supra*.

⁹⁸ *ibid* at [80].

⁹⁹ UNGA Res A/73/333.

¹⁰⁰ “UN-Oceans.” *UN System Chief Executives Board for Coordination*.

¹⁰¹ “Ocean Action Coordination with UN and Non-Party Stakeholders.” *UNFCCC*.

¹⁰² Dobush, Bobbi-Jo, et al., “A New Way Forward for Ocean-Climate Policy as Reflected in the UNFCCC Ocean and Climate Change Dialogue Submissions.” *Climate Policy*, vol. 22, no. 2, 2022, pp. 254-271.

¹⁰³ Bodansky, Daniel and Harro van Asselt. *The Art and Craft of International Environmental Law*. 2nd ed., Oxford University Press, 2024.

hierarchy between treaties,¹⁰⁴ and it cannot be said that the UNCLOS supersedes the UNFCCC or vice versa as they are equally binding to their respective Parties. Hierarchy in this context means understanding how the UNFCCC clarifies, complements, or amends the UNCLOS and vice versa to clearly identify and define Parties obligations.¹⁰⁵ This will allow the coordination of efforts to avoid duplication or conflicting rules of implementation and the designation of a clear mandates.

The ITLOS provided a noteworthy example on how such coherence can be achieved between climate change and ocean governance in its Advisory Opinion (AO) as requested by the COSIS. As previously discussed, the AO concluded that anthropogenic GHG emissions constitute pollution of the environment under Art. 1[1] of UNCLOS. It further clarifies that while the UNFCCC and the Paris Agreement are the primary legal documents in addressing climate change and is relevant in interpreting and applying UNCLOS relating to marine pollution from GHG emissions, complying with the obligations and commitments under the Paris Agreement is not solely enough to satisfy obligations and commitments under UNCLOS.¹⁰⁶ Simply put, the Paris Agreement does not supersede the UNCLOS when it comes to the regulation of marine pollution from GHG emissions, but rather it provides guidance in its implementation. In deciding as such, the ITLOS provides clarity in the scope of UNCLOS and seeks to improve ways in which the treaty's overarching goals on marine conservation and protection could be achieved. At the same time, it respects the obligations that Parties have agreed to under both UNCLOS and the UNFCCC.

The ITLOS AO also defers to the IPCC as to best available science on climate change and ocean acidification,¹⁰⁷ and requires Parties to cooperate to promote studies, undertake scientific research, and encourage the exchange of information and data on marine pollution from GHG emissions.¹⁰⁸ This deference and trust built with the IPCC for authoritative assessments on the scientific knowledge on climate change will support coherence as it will ensure a common baseline and basis for policymaking on all issues relating to climate change and will further develop the UNCLOS' understanding and interpretation of ocean-climate science.¹⁰⁹ If there is any hierarchy to be made among outputs, one that is grounded on science rather than politics is the gold standard.

Coherence and collaboration, however, should not be limited to regime secretariats and Parties. Non-State actors who work in the intersection of oceans and climate change could also lessen the coherence gap significantly if they are given more avenues to participate and influence international discussions and negotiations. Interdisciplinary collaboration can lead to solutions that are more comprehensive and needs oriented. In the face of the triple planetary crisis and the growing urgency for action, only an integrated strategy and strong coordination can break through the silos that we have built around us.

¹⁰⁴ Seidl-Hohenveldern, Ignaz. "Hierarchy of Treaties." *Essays on the Law of Treaties, A Collection of Essays in Honour of Bert Vierdag*, edited by Jan Klabbers and Rene Lefeber, Brill, 1998, pp. 7-8.

¹⁰⁵ *ibid* at p. 9.

¹⁰⁶ ITLOS (n 18) *supra* at 80.

¹⁰⁷ *ibid* at 75.

¹⁰⁸ *ibid* at 111.

¹⁰⁹ Friar, Greta. *An Interdisciplinary Approach to Fighting Climate Change Through Clean Energy Solutions*. MIT Laboratory for Information and Decision Systems, 2023.

The Right to a Healthy Environment and Transnational Corporate Accountability: Bridging Gaps between Global North and Global South Perspectives

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ABSTRACT

The 2022 UN General Assembly's recognition of the right to a clean, healthy, and sustainable environment marked a significant step in advancing environmental protection through human rights mechanisms. States in the Global South have led the way in conceptualising the right to a healthy environment in a holistic and broad manner which has allowed for enhanced efforts at corporate environmental and climate accountability. However, this approach has been largely absent from Global North frameworks, which has focused instead on corporate human rights due diligence and the establishment of normative frameworks which entrench certain neoliberal conceptions about the divide between state and corporate responsibility.

This article explores the potential of the right to a healthy environment to enhance corporate accountability for environmental harm, particularly in the context of the UNGA resolution recognising the right, emerging international climate litigation and the development of mandatory human rights due diligence legislation. Divided into four parts, this article first traces the historical development of the right to a healthy environment, examining its intersection with the business and human rights movement. It argues that a gap exists between the right to a healthy environment and corporate accountability, particularly given the Global South's leadership in interpreting the right in this context. It then analyses the 2022 UN resolution and subsequent UN reports that have further developed this right, highlighting innovative approaches to corporate responsibility. Finally, the article considers future pathways for applying the right to hold non-state actors accountable for environmental harm, offering insights into how this right may influence corporate behaviour through litigation and policy mechanisms.



I. Introduction

The 2022 UN General Assembly (UNGA) recognition of the right to a clean, healthy, and sustainable environment (hereinafter ‘right to a healthy environment’) was widely welcomed by human rights activists as an important step forward in the effort to protect the environment from continued degradation and harm.¹ While a large number of states in the Global South had recognised and interpreted a right to healthy environment, the UNGA resolution recognising the right was an important step forward for full international recognition. International recognition of the right presents a valuable opportunity to consider the future of environmental protection, and what role, if any, human rights can play in this protection. While much of the focus of human rights and environmental obligations has been on state actors, little consideration has been given to how the right to a healthy environment could play a role in enhancing the obligations of non-state actors and in particular businesses. Many transnational corporations possess resources and capacities which far exceed those of developing countries, while at the same time taking advantage of lax enforcement mechanisms or a lack of capacity to exploit the environment within these countries. At the same time, the right to a healthy environment has not typically played much of a role in Global North states when regulating these companies, with the Global North now primarily focusing on the concept of ‘human rights due diligence’ which must be conducted by corporations across their supply chains. Human rights due diligence derives from the principle that businesses must have respect for human rights, as noted in the leading international instrument on businesses and human rights, the (non-binding) UN Guiding Principles on Business and Human Rights. There is as a result a gap between how the Global South has conceptualised corporate accountability in the context of the right to a healthy environment and the approach taken by the Global North to the right to a healthy environment.

This article therefore aims to fulfil two objectives. Firstly, it will analyse the current impact of the right to a healthy environment in the context of the human rights obligations of non-state actors. This will involve both a historical consideration of the role the right to a healthy environment played in business and human rights law and policy prior to formal UN recognition of the right. In particular it will focus on Global South leadership on interpreting the right to a healthy environment in a manner consistent with the need for greater corporate accountability for environmental and climate harm. Secondly, it will consider potential future pathways for the application of the right to a healthy environment to enhance the human rights obligations of non-state actors. This will examine the overall potential effectiveness of the right in the context of emerging international climate litigation and Global North efforts to introduce mandatory human rights due diligence legislation.

The article will be divided into four parts. Section II will consider the history of the right to a healthy environment and its intersection with the broader business and human rights movement. It will be shown that the right developed primarily as a Global South instrument and played little role in the development of business and human rights. It will be argued that this has presented a gap between the right to a healthy environment and business and human rights that should be bridged as part of a wider effort to enhance corporate environmental and climate accountability. Section III will examine the UN resolution that recognised the right to a healthy environment, and subsequent reports from relevant UN bodies and associated Rapporteurs which have offered their interpretation of the right. It will be shown that while the resolution itself did little to address the role of non-state actors in both breaching and ensuring fulfilment of the right, subsequent reports from UN human rights bodies show a sense of innovation which will be critical to enhancing the effectiveness of

¹ UNGA Resolution A/RES/76/300.

the right. Section IV will consider the potential future role of the right to a healthy environment in identifying and holding non-state actors to account for human rights violations. It will question what role the right could play in future litigation, as well as in broader business and human rights legal mechanisms such as the recent development of human rights due diligence legislation.

II. History of the Right to a Healthy Environment and Business and Human Rights

To understand the impact and potential future influence of the UN resolution to a right to a healthy environment, it is important to understand how the right developed and what role it played in the broader business and human rights movement.

A. Global South Interpretation and Jurisprudence on the Right to a Healthy Environment

The right to a healthy environment was conceptualised primarily in parts of the Global South.² While the 1972 Stockholm Declaration (the first UN declaration on environmental protection) did recognise that man has a “solemn responsibility to protect and improve the environment for present and future generations,”³ the Global North played little role in further developing this principle into a concrete right centred around environmental protection.⁴ The Global South on the other hand began to introduce the right to a healthy environment into various constitutions and legal frameworks.⁵ In many of these countries,

the right has been tied to existing Indigenous, local, or collective understandings of the importance of living in balanced harmony with nature. The Philippines, for example, introduced a constitutional “right of the people to a balanced and healthful ecology in accord with the rhythm and harmony of nature”⁶ while Ecuador established rights of nature grounded in principle of *sumac kawsay*, the indigenous Kichwa concept of living in harmony with others and with nature.⁷ This perspective, also known as *Buen Vivir* or *Vivir Bien*, focuses on constructing a symbiotic relationship between humans and nature, placing an emphasis on the community as a collective, with collective work and mutual aid (through, for instance, looking after children) helping to strengthen bonds.⁸ It also emphasises respect for ancestral knowledge and “an economy based on solidarity and community life, in which harmonious relations with nature are extended to the rest of the community for the common good.”⁹ There are a number of other Indigenous perspectives which embrace a more holistic conception of the relationship between humans and nature. For example, the Haida Indigenous community values *Isda ad diigii isda*, which emphasises the importance of giving and receiving particularly with regard to the natural world.¹⁰ Ojeda writes that “by seeing nature as gifts provided to people, rather than natural resources that can be exploited or ecosystem services that could be commodified, liquidated, or replaced, a conservation ethic is deeply embedded in Haida culture.”¹¹ Similarly, the Zulu / Xhosa / Ndebele / Sesotho / Shona concept of *Ubuntu*

² Gonzalez, Carmen. “The Right to a Healthy Environment and the Global South.” *AJIL Unbound*, vol. 117, 2023, pp. 173-178, at 174-175.

³ Stockholm Declaration (1972), Principle 1.

⁴ Gonzalez (n 2) *supra*; Limon, Marc. “United Nations Recognition of the Universal Right to a Clean, Healthy and Sustainable Environment: An Eyewitness Account.” *Review of European, Comparative, and International Environmental Law*, vol. 31, 2022, p. 15.

⁵ Gonzalez (n 2) *supra*; Kotze, Louis. “Human Rights, the Environment, and the Global South.” *International Environmental Law and the Global South*, edited by Shawkat Alam et al., Cambridge University Press, 2015, pp. 171-195.

⁶ *ibid*; Gonzales, Carmen. “Environmental Justice, Human Rights, and the Global South.” *Santa Clara Journal of International Law*, vol. 13, 2015, pp. 151-195, at 153-155.

⁷ *ibid*.

⁸ Artaraz, Kepa. “Introduction: *Vivir Bien* / *Buen Vivir* and Post-Neoliberal Development Paths in Latin America: Scope, Strategies, and the Realities of Implementation.” *Latin American Perspectives*, vol. 48, 2021, pp. 4-16.

⁹ *ibid*.

¹⁰ Ojeda, Jaime, et al. “Reciprocal Contributions between People and Nature: A Conceptual Intervention.” *BioScience*, vol. 72, 2022, pp. 952-962; Jones, Russ, et al. “Haida Marine Planning: First Nations as a Partner in Marine Conservation.” *Ecology and Society*, vol. 15, 2010, pp. 1-16.

¹¹ *ibid*.

emphasises the interconnected nature of the environment and humanity, focusing on communal cooperation to solve problems and the use the environment in a way that benefits the whole community.¹² Kotze has also noted that many of the conceptions of the right to a healthy environment in the Global South have been formulated according to both customary and cultural conceptions of the environment and the unique environmental conditions that are experienced by particular countries.¹³

This holistic approach to the right to a healthy environment is relevant to considering how the Global South views corporate accountability, in that, what may in the Global North be viewed as ‘just’ environmental harm (that is, still a negative, but negative due solely to physical environmental impacts), environmental harm can also be construed in accordance with how it impacts culture, ethics, and indigenous traditions.¹⁴ The Global South is not a monolith, but, as Gonzales has noted, “one explanation for the Global South's embrace of the right to a healthy environment is its disproportionate exposure to environmental and human rights abuses from extractive and polluting industries that benefit Northern states, transnational corporations, and national elites.”¹⁵ The interest and innovation shown in the Global South with regard to this right presents a useful foundation through which the Global South can play an effective role in enhancing the wider utility of the right following UNGA recognition.

The potential role of the Global South as a leader in enhancing interpretations of the right to a healthy environment is already reflected in the context of regional and national Global South jurisprudence on the

interplay between the right to a healthy environment and accountability for non-state actors for environmental harms. Given that the Global South often finds itself exploited by Global North transnational corporations,¹⁶ jurisprudence in the Global South has had to reckon with this exploitation, even as the Global North shied away from a broad recognition of the right to a healthy environment.¹⁷ Clear examples of this dynamic jurisprudence can be seen in the work of the African Court of Human and People's Rights and African Commission on Human and People's Rights. The African Charter of Human Rights contains a right for all persons to a “general satisfactory environment favourable to their development.”¹⁸ In *Social and Economic Rights Action Center (SERAC) & Anor v the Federal Republic of Nigeria*, the Commission found that the state of Nigeria had violated the right to a satisfactory environment as a result of their failure to protect the Ogoni people from oil pollution.¹⁹ In *SERAP v the Federal Republic of Nigeria*, the Economic Community of West African States (ECOWAS) Court of Justice held that the Nigerian government was responsible for its failure to protect against abuses by oil companies noting that “Nigeria had not seriously and diligently held accountable any of the perpetrators of the many acts of environmental degradation which occurred in the Niger Delta Region.”²⁰ The case further held that “the duty assigned by Article 24 is “both an obligation of attitude and an obligation of result,” and that Article 24 requires the State to adopt legislative or other measures to give effect to the right, and that such measures must be implemented to promote accountability and to ensure adequate reparation for environmental

¹² The concept is found in a variety of African cultures. see Edityeibo, Edwin. “Ubuntu and the Environment.” *The Palgrave Handbook of African Philosophy*, edited by A Afolayan and T Falola, Palgrave Macmillan, 2017; Kyei-Nuamah, David, and Zhengmei Peng. “Ubuntu Philosophy for Ecological Education and Environmental Policy Formulation.” *Journal of Philosophy of Education*, vol. 58, 2024, pp. 540–561.

¹³ Kotze (n 5) *supra*.

¹⁴ *ibid*.

¹⁵ Gonzalez (n 2) *supra*.

¹⁶ Gonzales (n 6) *supra*.

¹⁷ Kotze (n 5) *supra*.

¹⁸ African Charter of Human Rights, Article 24.

¹⁹ *Social and Economic Rights Action Center (SERAC) & Anor v the Federal Republic of Nigeria (SERAC v Nigeria)* [2001] ACHPR 35, African Commission on Human Rights Communication 155/96.

²⁰ *Socio-Economic Rights and Accountability Project (SERAP) v the Federal Republic of Nigeria & Anor*, ECOWAS Court of Justice No. ECW/CCJ/JUD/18/12 (2012).

damage.²¹ This means in effect that the Court viewed the role of the state as being to effectively regulate private corporations to avoid further damage. The right to a satisfactory environment was linked to concepts like accountability to pressure the state to use its powers to curtail harmful corporate activity. This jurisprudence underscores that the activities of states and corporations can be intertwined in such a manner as to render it impossible to protect the right to a healthy environment without considering how this right applies to corporations. As Lugard notes, “this decision underscores the long-held view that the Nigerian government either shields the oil companies from environmental liability because of the economic benefits of their operations, or the regulatory agencies are incapable of summoning effective institutional response necessary to set the pace for sustainable petroleum operations.”²² In other words, the Commission was willing to acknowledge that both states and corporations can form part of the problem with regard to defending corporate interests, but equally that states can be obligated to act in a manner that curtails corporate interests such that the corporations should be obligated to mitigate the impact on the environment.

The Inter-American Court of Human Rights has also been ambitious in its interpretation of the right to a healthy environment, as first recognised by the Court in the landmark case of *Indigenous Communities Members of the Lhaka Honhat Association v Argentina*.²³ In its Advisory Opinion on human rights and the environment, the Court noted that the right to a healthy environment could be interpreted to encompass protection for “components of the environment, such as forests, rivers and seas, as legal interests in themselves, even in the absence of the certainty or evidence of a risk

to individuals.” In other words, nature itself was to be protected for its own sake and for the sake of other organisms, and not just with regard to how it related to particular human interests. The Advisory Opinion then made explicit reference to how the right interacts with businesses noting that the Court takes note that, according to the “Guiding Principles on Business and Human Rights, business enterprises should respect and protect human rights, and prevent, mitigate and assume responsibility for the adverse human rights impacts of their activities.” The UN Guiding Principles on Business and Human Rights (2011) will be discussed in further details in Section II.B, but what is important for the moment is the embedding of the non-binding Principles into an enforceable Global South legal framework. This shows an interest in both broadening the conceptions of the right to a healthy environment to be more holistic, and an interest in increasing scrutiny on corporations which may be violating this holistic conception of the right.

In *La Oroya v Peru*, the Inter-American Court used this established connection between the right to a healthy environment and the UNGPs to concretise its heightened obligations on business actors. The Court had to consider whether Peru had violated the right to a healthy environment through its failure to regulate mining companies in the city of La Oroya, leading to serious pollution and health issues for the local population.²⁴ The Court held that Peru had violated the right to a healthy environment due to its failure to adequately regulate the business and protect the population. The Court further stipulated that it requires States to prevent activities within their jurisdiction from causing significant environmental damage, applying this requirement to both public and private entities.²⁵ The jurisprudence of the Court

²¹ *ibid.*

²² Lugard, Sunday Bontur. “The Human Right to a Satisfactory Environment and the Role of the African Court on Human and Peoples’ Rights.” *KAS African Law Study Library*, vol. 8, 2021, pp. 402-413.

²³ *Indigenous Communities Members of the Lhaka Honhat Association v Argentina*, Inter-American Court of Human Rights, Series C, no. 400, 6 Feb. 2020.

²⁴ *Caso Habitantes de La Oroya v Peru*, I-ACtHR, Series C, no. 511, 27 Nov. 2023; see Saldana, Jose, “People from La Oroya vs Peru, Inter-American Court of Human Rights: How Effective is International Law to Protect the Environment in Extractive Contexts?” *EJIL Talk*, 11 Apr. 2024.

²⁵ *ibid.*

shows a gradual increase in obligations on businesses, using its capacity to order increased supervision of corporate activities to place indirect obligations on business to comply with domestic environmental law, and exceed compliance with these laws where internationally recognised standards like the UN Guiding Principles on Business and Human Rights may contain even higher obligations. The case is a recent example of how the right to a healthy environment has been interpreted by regional Global South courts in a manner that works within the existing international framework on business and human rights to ensure greater efforts are made to hold businesses accountable, even within the limited state-centric framework of the overall human rights system.

The Philippines Human Rights Commission has been even more innovative in its leadership on the question of the link between climate change, the right to a healthy environment, and the role of non-state actors in perpetuating climate harm. The Commission investigated the impact of major fossil fuel companies on the right to a healthy environment, recognised in Philippine law since the 1990s, in its “Carbon Majors” Inquiry.²⁶ While the Commission can only issue non-binding recommendations, its documents and reports can be used in Philippine domestic courts, allowing for it to shape norms and precedent.²⁷ The Commission noted that climate change has “disrupted” the “rhythm and harmony” of this nature.²⁸ It also determined that it could consider “allegations involving violations of human rights of Filipino people, even when occurring outside Philippine territory” such that it did not matter whether a particular business was or was not domiciled in the Philippines so long as a link could be shown between its emissions and human rights violations in the Philippines.²⁹ The Inquiry

then interpreted the right to a healthy environment as including acts which “diminishes the capacity of the environment to provide life-sustaining services [which] consequently impact human well-being.”³⁰ It used testimony from indigenous peoples to bolster this interpretation, with the testimony noting the impact environmental degradation was having on their capacity to obtain traditional food and medicines.³¹ The Commission therefore entrenched and interlinked the right to a healthy environment with wider cultural and well-being concerns, consistent with a broad interpretation of the right.

Turning to the role and responsibility of corporations, the Commission first laid out general obligations on all corporations to respect human rights, which it viewed as including appropriate due diligence efforts encompassing analysis and mitigation of climate impacts. The carbon majors, who were viewed to have obfuscated the truth behind climate impact and contributed to climate misinformation, were held to a higher standard, being obliged to “desist from all activities that undermine the findings of climate science” and “contribute to a green fund for the implementation of mitigation and adaptation measures.”³² Further, the Commission noted that greater efforts at accountability could be made in the context of the non-state actors, using particularly egregious acts like the obfuscation of climate science as a base for liability, though it did not go into details regarding what the nature of this liability may be. The right to a healthy environment therefore formed part of a broad basis of rights used to both assess the general responsibility of corporations for climate harm and to impose sweeping obligations on those corporations to mitigate and provide

²⁶ Philippines Human Rights Commission, *National Inquiry on Climate Change*, 2022.

²⁷ Climate Law Accelerator, *The Carbon Majors Inquiry*, 2022.

²⁸ Philippines Human Rights Commission (n 26) *supra*.

²⁹ *ibid*; Boom, Keely, et al. “A Mandate to Investigate the Carbon Majors and the Climate Crisis: The Philippines

Commission on Human Rights Investigation.” *Australian Journal of Asian Law*, vol. 53, 2022, pp. 57-72.

³⁰ Philippines Human Rights Commission (n 26) *supra*.

³¹ *ibid*.

³² *ibid*.

remediation for this harm.³³ The findings of the Commission are not enforceable, and indeed, it would be challenging for the Philippines to pursue carbon majors that largely hold power and assets outside of their jurisdiction. Nonetheless, a Global South human rights-led inquiry of this kind is groundbreaking in its effort to hold the carbon majors, primarily Northern companies, to account for the climate chaos wrought upon the region, and demonstrates how the Global South has used the right to a healthy environment to shed light on actions and activities the Global North has undertaken which have had a disproportionate impact on their environment and society.

The cases above largely pertain to the role of states in regulating corporations in the context of the environment and human rights. This is natural given that these courts at present only have direct jurisdiction over states. Nonetheless they demonstrate clear linkages between the right to a healthy environment and an obligation for corporations to act to protect this right, whether through mandated action via regulation or through encouragement of states to hold corporations accountable via remediation measures. Global South courts have demonstrated that they believe the right to a healthy environment cannot be adequately protected unless corporations are placed under some obligation to also respect and protect the right.³⁴ As such, the right to a healthy environment thus far has shown positive signs of avoiding the traditional criticisms of broader human rights law that it is merely a tool for Global North domination and cultural suppression of the Global South.³⁵ These cases and their impacts are undoubtedly restricted by the capacity of the relevant

courts and states to enforce the rulings, but nonetheless, an opportunity was created by this conceptualisation to ensure the Global South could position itself as a figure of itself within the debate regarding the links between human rights and the environment.

B. The Development of Business and Human Rights as a Normative Framework

In contrast, business and human rights as an instrument of law and policy was primarily developed in the Global North, but with a focus on violations arising in the Global South. The anti-apartheid movement, and subsequent highlighting by activists of harm being caused to local indigenous communities by major corporations (particularly the actions of Shell in the Niger Delta region) in the 1990s is usually dated as the beginning of formal discourse on business responsibilities in the context of human rights,³⁶ though a more general focus on potential human rights violations committed by businesses does predate this.³⁷ Despite this typical conception, it has been noted by Wettstein that “more fragmented, contextualized local movements emanating from the Global South itself may have existed much earlier, though of course under different, if any, labels.”³⁸ However, these movements had little influence on the emergence of the first businesses and rights instruments, including the Global Compact, and the first attempts to establish (Draft) Norms on the Responsibilities of Transnational Corporations.

The Global Compact is a set of voluntary corporate commitments established by the UN Secretary General which align principally with the view that corporations should, per the Compact, operate in a way “that, at a minimum, meet fundamental responsibilities

³³ Savaresi, Annalisa. “Using Human Rights Law to Address the Impacts of Climate Change: Early Reflections on the Carbon Majors Inquiry.” *Climate Change Litigation in the Asia Pacific*, edited by Jolene Lin, Cambridge University Press, 2020, pp. 73-93.

³⁴ Cantú, Rivera Humberto. “Business and Human Rights in the Inter-American Systems.” *Teaching Business and Human Rights*, edited by Anthony Ewing, Edward Elgar, 2023, pp. 230-243.

³⁵ Mende, Janne. “Are Human Rights Western—And Why Does It Matter? A Perspective from International Political

Theory.” *Journal of International Political Theory*, vol. 17, 2019, pp. 38-57.

³⁶ Wettstein, Florian. “The History of ‘Business and Human Rights’ and Its Relationship with Corporate Social Responsibility.” *Research Handbook on Business and Human Rights*, edited by Surya Deva and David Birchall, Edward Elgar, 2020, pp. 23-45.

³⁷ Santoro, Michael. “Business and Human Rights in Historical Perspective.” *Journal of Human Rights*, vol. 14, 2015, pp. 155-161.

³⁸ Wettstein (n 36) *supra*.

in the areas of human rights, labour, environment and anti-corruption.”³⁹ From the outset, the Compact draws a distinction between human rights and the environment, with the two being divided into different broader principles with separate recommendations.⁴⁰ This is unsurprising given that the right to a healthy environment had yet to be formally recognised by the UN at the time. However, the Compact has been criticised as putting “a palatable, social-democratic façade on neo-liberal corporatism, while upholding the institutional interests of multinational corporations (MNCs).”⁴¹ This is largely down to the voluntary nature of the Compact coupled with the absence of effective enforcement mechanisms. The (Draft) Norms on the Responsibilities of Transnational Corporations were aimed to be a more ambitious effort to ensure that “transnational corporations and other business enterprises have the obligation to promote, secure the fulfilment of, respect, ensure respect of and protect human rights recognized in international as well as national law, including the rights and interests of indigenous peoples and other vulnerable groups.”⁴² These Norms noted that transnational companies “and other business enterprises shall carry out their activities in accordance with national laws, regulations, administrative practices and policies relating to the preservation of the environment of the countries in which they operate, as well as in accordance with relevant international agreements, principles, objectives, responsibilities and standards with regard to the environment as well as human rights”⁴³

and recommended that corporate activities be conducted in a manner that contributed to the wider goal of sustainable development.⁴⁴ While not formally recognising the connection between human rights and the environment, the effort to enact direct obligations on transnational corporations presented a groundbreaking opportunity to hold these corporations accountable for their actions in the Global South.⁴⁵ However, in the face of opposition from the business community and Northern states like the US, the Norms were rejected.⁴⁶ By opposing the adoption of the Norms, efforts to establish an international business and human rights framework become more pragmatic,⁴⁷ which in turn entailed embracing, where possible, a foundation for business and human rights obligations favourable to Northern conceptions of business and human rights⁴⁸ and largely adverse to any direct bridge being established between human rights, businesses, and the environment.

This sense that the Global North has set out the terms through which business and human rights is illustrated through the adoption of the UN Guiding Principles on Business and Human Rights (UNGPs). The UNGPs are the leading international instrument on business and human rights, consisting of a set of voluntary guidelines for states and corporations, divided into three pillars: the state responsibility to protect human rights, the corporate responsibility to respect human rights and the obligation on states and corporations to ensure access to remedies for alleged violations of human rights.⁴⁹ The

³⁹ UN Global Compact (2000).

⁴⁰ *ibid* at Principles 1-2 and 7-9.

⁴¹ Schlicht, Gordon Alexander. “Reflecting on the UN Global Compact: What Went Wrong.” *LSE Business Review Blog*, 26 Jul. 2022; see also Knight, Graham, and Jackie Smith. “The Global Compact and Its Critics: Activism, Power Relations, and Corporate Social Responsibility.” *Discipline and Punishment in Global Politics*, edited by Janie Leatherman, Palgrave Macmillan, 2008, pp. 191-214.

⁴² (Draft) Norms on the Responsibilities of Transnational Corporations (2003) A[1].

⁴³ *ibid* at G[14].

⁴⁴ *ibid*.

⁴⁵ Miretski, Pini Pavel, and Sascha-Dominik Bachmann, “Global Business and Human Rights—The UN ‘Norms on

the Responsibility of Transnational Corporations and Other Business Enterprises with Regard to Human Rights’—A Requiem.” *Deakin Law Review*, vol. 17, 2012, pp. 1-37.

⁴⁶ *ibid*.

⁴⁷ Wettstein (n 36) *supra*; Karp, David Jason. “Business and Human Rights in a Changing World Order: Beyond the Ethics of Disembedded Liberalism.” *Business and Human Rights Journal*, vol. 8, 2023, pp. 135-150.

⁴⁸ Karp (n 47) *supra* at 135-150; Hamm, Brigitte. “The Struggle for Legitimacy in Business and Human Rights Regulation—A Consideration of the Processes Leading to the UN Guiding Principles and an International Treaty.” *Human Rights Review*, vol. 23, 2022, pp. 103-125.

⁴⁹ UN Guiding Principles on Business and Human Rights (2011).

UNGPs were drafted through a multi-stakeholder process and received significant support from prominent Northern states.⁵⁰ On the one hand, this process did provide opportunities for members of the Global South to critique what would eventually become the UNGPs. On the other hand, it has been pointed out by Deva that “the advice of all stakeholders, including NGOs, was sought and valued, but only within the framework set by the SRSG. ... the core of the Ruggie project was not open for change and ... hardly changed despite extensive consultations.”⁵¹ In other words, the UNGP process gave legitimacy to the three pillars but did not necessarily take full account of Global South concerns, nor indeed did it take particular account of the conceptualisation of environmental harm and the right to a healthy environment seen in Global South countries.⁵² This is further evidenced through the fact that the UNGPs does not make direct reference to any form of right to a healthy environment, instead noting that “processes for assessing human rights impacts can be incorporated within other processes such as risk assessments or environmental and social impact assessments.”⁵³ The lack of environmental obligations imposed on corporations by the UNGPs highlights a more traditional perspective to human rights, better understood by the Global North. Indeed the UNGPs further state “the responsibility of business enterprises to respect human rights refers to internationally recognized human rights—understood, at a minimum, as those expressed in the International Bill of Human Rights and the principles concerning fundamental rights set out in the International Labour Organization’s Declaration on Fundamental Principles and Rights at Work.”⁵⁴ The examples given focus primarily on social and employment related rights rather than the more holistic conceptions of human rights and

rights obligations seen when the Global South has considered the right to a healthy environment.

Thus, the UNGPs, while largely a welcome development and one that can be built upon in the context of the UN recognition of the right to a healthy environment, had from the outset too close an association with the neoliberal world order to ensure the Global South’s aspirations for effective corporate accountability were put into practice. As Karp has noted “the sharp separation of the ‘state duty to protect’ from the ‘corporate responsibility to respect’ replicates the same divisions between the political and the economic, between the public and the private, between states and markets, which have characterized neoliberal world order since the 1980s. Instead of two interpenetrating spheres, states and corporate actors are modelled by the UNGPs as existing in separate and distinct fields in terms of their obligations.”⁵⁵ While the Global South has made use of the UNGPs to attempt to impose more ambitious obligations, as outlined in Section II.A, it is doing so within the limitations of the overall model that enforces a demarcation between state and corporate responsibilities not necessarily conducive to fully effective corporate accountability.

C. Gaps between These Theories

What can be seen from the history discussed above is that Global South courts have shown interest and ability to interpret the right to a healthy environment in a manner aimed at curtailing corporate environmental harm through direct punitive measures or indirect pressure being placed on states to increase their regulation of corporate activity.⁵⁶ Business and human rights on the other hand has primarily focused on establishing general voluntary obligations based on supply chain

⁵⁰ Hamm (n 48) *supra*.

⁵¹ Deva, Surya. “Treating Human Rights Lightly: A Critique of the Consensus Rhetoric and the Language Employed by the Guiding Principles.” *Human Rights Obligations of Business: Beyond the Corporate Responsibility to Respect?*, edited by S Deva and D Bilchitz, Cambridge University Press, 2013, pp. 78-104, 85; Hamm (n 48) *supra*.

⁵² *ibid*.

⁵³ UNGPs (n 49) *supra* at 21.

⁵⁴ *ibid* at 14.

⁵⁵ Karp (n 47) *supra* at pp. 142-143.

⁵⁶ Gonzalez (n 2) *supra*; Sathiyabama, S. “A Climate Warrior for the Global South.” *Volkerechtblog*, 22 Mar. 2023.

due diligence,⁵⁷ which are now slowly shifting toward a mandatory approach in major economic regions like the EU. The right to a healthy environment developed organically and dynamically across the Global South taking into account unique cultural contexts, and establishing a base foundation for holding Northern companies accountable for the disruption of this right. Business and human rights on the other hand has developed in accordance with neoliberal norms, and primarily focused on traditional individualistic conceptions of human rights. The Global South has for the most part wielded the more positive aspects of this framework (that is, the fact that the UNGPs have become a globally accepted standard) to heighten obligations on corporations, but it lacks the capacity to ensure these corporations follow through on their recommendations. At the same time, the Global North has avoided heavy enforcement in the manner the Global South has outlined through the weak enforcement mechanisms associated with the current business and human rights framework. The Global North has also yet to fully integrate the right to a healthy environment within this framework, creating further gaps between Global South and Global North conceptions of what it means to hold corporations accountable for environmental harm.

There is as such an initial gap between the potential shown by the human right to a healthy environment in Global South jurisprudence and the current conceptualisation of the role of business in the wider human rights framework. The question is therefore whether the UN recognition of the right to a healthy environment is (i) cognisant of this gap and (ii) has played a role in bridging this gap through its recognition and subsequent interpretations.

III. UN Recognition of the Right to a Healthy Environment

⁵⁷ Bonnitcha, Jonathan, and Robert McCorquodale. "The Concept of 'Due Diligence' in the UN Guiding Principles on Business and Human Rights." *European Journal of International Law*, vol. 28, 2017, pp. 899-919.

A. The UNGA Resolution on the Right to a Healthy Environment

The right to a clean, healthy, and sustainable environment recognised by the UN General Assembly is an important step forward in demonstrating the case for using human rights to hold corporations accountable for environmental and climate harm. The resolution recognising the right was passed in 2022, following a similar resolution issued by the UN Human Rights Council in 2021. The latter resolution recognised the right to a clean, healthy, and sustainable environment, and noted this right was also related to other rights in accordance with international law. It then invited the UNGA to further consider the Resolution, leading in turn to full consideration of the right by the UNGA. While the UNGA Resolution passed overwhelmingly (161 votes in favour, eight abstentions), examining the content of the Resolution is relevant to determining what approach was taken to interpreting the right, and what relevance UNGA recognition will be to businesses.

Firstly, there are a number of references to the role of businesses in protecting the right to a healthy environment. The UN General Assembly Resolution which recognised the right explicitly states "recalling the Guiding Principles on Business and Human Rights which underscore the responsibility of all business enterprises to respect human rights"⁵⁸ and "calls upon states, international organizations, *business enterprises* [emphasis added] and other relevant stakeholders to adopt policies, to enhance international cooperation, strengthen capacity-building and continue to share good practices in order to scale up efforts to ensure a clean, healthy and sustainable environment for all."⁵⁹ In other words, the resolution recognising the right creates an explicit link between the recognition of this right and the role of business organisations in ensuring its implementation. The right is also tied to the

⁵⁸ UNGA Resolution A/RES/76/300.

⁵⁹ *ibid.*

UNGPs insofar as it demonstrates an awareness of the current consensus on the role of business to respect human rights. This is positive as it advances the case that the right to a healthy environment should be seen as an “internally recognised right” and therefore falls within the scope of rights considered to be within the remit of the UNGPs.

Secondly, environmental harm appears to be conceived of in a ‘traditional’—that is, Northern—manner. The Resolution notes that “environmental degradation, climate change, biodiversity loss, desertification and unsustainable development constitute some of the most pressing and serious threats to the ability of present and future generations to effectively enjoy all human rights.”⁶⁰ This would link harm associated with violating the right to a healthy environment to physical harm, or harm to the climate, though the latter remains relatively undefined outside of a reference in the Resolution to the obligates states have under existing climate agreements, the most prominent example being the Paris Agreement to limit global temperatures below 1.5°C.⁶¹ Reference to sustainable development does open a more holistic conception of harm, and further clarification of what actions would violate the right to a healthy environment may arise, particularly as the effects of climate change worsen and raise broader questions about the role of international law. For example, there may be wider consideration of whether the right to a healthy environment would encompass a right to a stable climate or whether the latter should be conceived of as a separate right.⁶² Nonetheless, this conception is useful from a business and human rights perspective in framing what harm businesses may need to address when considering their own obligation to respect the right.

Further, recognition of the right by the UNGA does little to identify what specific conception of the right to a healthy environment is envisioned by the international community and what specific obligations are associated with protecting and respecting this specific conception.⁶³ Indeed, this was noted by several states during the debate prior to the adoption of the resolution, with some noting that there was a lack of a common internationally agreed understanding on the content and scope of the right.⁶⁴ The UK and Poland voted in favour of the right but noted that further discussion was required as to its meaning, and that it remained to be determining what the full scope of this right would be.⁶⁵ Given this was a UNGA Resolution, rather than a right recognised through an amendment of, or creation of a human rights treaty, the Resolution itself remains non-binding. Thus, even though the right could arguably be considered to be “internationally recognised” (a term which is not defined by the UNGPs, though a “core list” of these rights references the leading human rights treaties, for instance, the International Bill of Human Rights, coupled with the principles concerning fundamental rights in the eight ILO core conventions as set out in the Declaration on Fundamental Principles and Rights at Work)⁶⁶ there is no definitive conclusion that the right would fall within the scope of rights considered by the UNGPs, or, if it does—which it likely does given the reference in the Resolution to the UNGPs—what conception of the right should businesses seek to abide by.

The lack of definition leaves open two primary possibilities in the context of the obligations of businesses. The first possibility is that relevant human rights bodies, including the UN human rights bodies, human rights courts, and those seeking to introduce relevant business and human rights legislation, may

⁶⁰ *ibid.*

⁶¹ *ibid.*

⁶² Diaz-Cruce, Eliana. “Human Rights at the Climate Crossroads: Analysis of the Interconnection between Human Rights, Right to Climate, and Intensification of Extreme Climate Events.” *Laws*, vol. 13, 2024, pp. 1-23.

⁶³ “With 161 Votes in Favour, 8 Abstentions, General Assembly Adopts Landmark Resolution Recognizing

Clean, Healthy, Sustainable Environment as Human Right.” *UN Press*, 28 Jul. 2022; Tang, Ke, and Otto Spikjers. “The Human Right to a Clean, Healthy and Sustainable Environment.” *Chinese Journal of Environmental Law*, vol. 6, 2022, pp. 87-107.

⁶⁴ *ibid.*

⁶⁵ *ibid.*

⁶⁶ UNGPs (n 49) *supra*.

look to comparative examples of how similar institutions have conceptualised the right to a healthy environment. This presents an opportunity for the Global South to assume a leadership position in defining the right to a healthy environment and recommending specific obligations that are associated with the right.⁶⁷ This would mean that the prior jurisprudence of the Global South, including the corporate obligations outlined by the Philippines Human Rights Commission and the bold statements made by regional human rights courts on the obligations of states to supervise corporate activity could become influential in laying out the norms and expectations with regard to business compliance with the right. Were this approach to be taken, Global South interpretations of the right to a healthy environment could become universalised, which would in turn impose higher obligations on businesses.

The second possibility is that the lack of a definition means that the Global North may seek to water down its provisions, or tie it closely to more familiar procedural rights, such as the right to access to information in the context of environmental decision-making.⁶⁸ Were this approach to be taken, businesses may not find they need to increase their obligations beyond existing environmental due diligence efforts, nor will it be clear how major environmental crises like climate change may play a role in enhancing the wider human rights due diligence obligations proposed by regulators. Alternatively, the environment could continue to be seen as being a critical aspect for the enjoyment of wider human rights, but not necessarily an independent right associated with culture and wellbeing,⁶⁹ even if rights-based language is being used in the discourse.⁷⁰ This could in turn exacerbate the existing gaps in the conceptualisations of

business and human rights, with the Global North continuing to lay out the norms, and thus there being little practical effect on efforts to hold businesses accountable for environmental harm. Recognition of the right will therefore remain symbolic and do little to shift the criticisms of international human rights law being seen as a Northern instrument.

It should also be noted that, when considering these approaches, there remain significant challenges with enforcing rights obligations, and the corporate sector is unlikely to react well to attempts to enforce rights obligations regardless of whichever approach is taken. The question of enforcement is not so much a concern with regard to interpreting the right to a healthy environment but a more general question of how to increase enforcement capacity within the international system and the regional human rights bodies.⁷¹ While full consideration of the enforceability of human rights against non-state actors is beyond the scope of this article, it is important to bear in mind that future interpretations of the right to a healthy environment will be occurring in this enforcement vacuum.⁷² Nonetheless, as will be shown below, there are new and emerging opportunities to integrate human rights considerations within the broader climate strategic litigation movement, as well as increased interest within the UN human rights system in examining how the intersection of corporate accountability and climate and environmental harm may be understood within the general intersection of human rights and the environment. As a starting point for understanding which of the above approaches may be the one currently taken, it is useful to examine what subsequent UN bodies and Rapporteurs have stated about the right to a healthy environment in the context of business.

⁶⁷ Gonzalez (n 2) *supra*.

⁶⁸ see Peters, Birgit. "Unpacking the Diversity of Procedural Environmental Rights: The European Convention on Human Rights and the Aarhus Convention." *Journal of Environmental Law*, vol. 30, 2018, pp. 1-27.

⁶⁹ Chalbi, Azadeh. "A New Theoretical Model of the Right to Environment and its Practical Advantages." *Human Rights Law Review*, vol. 23, 2023, pp. 1-19.

⁷⁰ *ibid*; Tang and Spikjers (n 63) *supra*.

⁷¹ Venn, Alice. "Rendering International Human Rights Law Fit for Purpose on Climate Change." *Human Rights Law Review*, vol. 23, 2023, pp. 1-25.

⁷² *ibid*.

B. Subsequent UN Interpretations and Reports on the Right to a Healthy Environment and Non-State Actors

The two primary UN bodies relevant in examining how the right to a healthy environment has been interpreted are the UN Working Group on Business and Human Rights, which is tasked with promoting, disseminating and helping to implement the UNGPs, and the Special Rapporteur on Human Rights and the Environment, who is tasked with examining human rights obligations in relation to the environment.

The UN Working Group on Business and Human Rights has published a number of reports since the UNGA recognition of the right to a healthy environment, but these reports have largely avoided any attempt to avoid or clarify the nature and scope of the right. In one report, the Working Group noted that “the responsibility to respect human rights refers to internationally recognized human rights, which include civil, cultural, economic, political and social rights, as well as collective rights. Rights holders are all those who have these rights, including groups such as Indigenous Peoples.”⁷³ This largely reiterates the language seen within the UNGPs, but, with the positive exception of the explicit reference to Indigenous Peoples, does little to address how the right to a healthy environment should be considered in the context of the UNGPs. In another report, the Working Group recommended that corporations operating in the extractive sector “include mandatory human rights, environmental and climate change due diligence provisions”⁷⁴ noting that “a just transition should not only focus on achieving

environmental sustainability as quickly as possible but also prioritize human rights, ensuring that no one is left behind.”⁷⁵ This maintains a broadly siloed approach to environmental concerns and human rights issues, which does not necessarily reflect the more interconnected approach advocated for by the UNGA Resolution—that is, that protection of the environment should be in and of itself a component of wider human rights, and by extension, that environmental sustainability could not be achieved without protection of human rights regardless.⁷⁶ Clarifying the relationship between the UNGPs and the right to a healthy environment would be an ambitious next step for the Working Group in reducing the siloes between environmental and human rights due diligence. In doing so it can take inspiration from Global South jurisprudence in considering obligations that would arise from this relationship, though it remains to be seen whether to what extent this approach will be reflected in practice.

The Special Rapporteur on Human Rights and the Environment has taken greater steps to outline the full scope and application of the right to a healthy environment to businesses. In one report, the Rapporteur outlined in detail how specific actions associated with investor-state dispute settlement (ISDS) may affect the right to a healthy environment.⁷⁷ This is important in that ISDS has often been criticised by the Global South as a tool for Northern based investors to hamper regulation and ‘lock in’ unfair terms of business designed to benefit private Northern interest.⁷⁸ The Rapporteur identified that many ISDS projects violate the right to a

⁷³ UN Working Group on Business and Human Rights. “Investors, Environmental, Social and Governance Approaches and Human Rights.” UN Doc A/HRC/56/55, 2024, [48].

⁷⁴ UN Working Group on Business and Human Rights. “Extractive Sector, Just Transition and Human Rights.” UN Doc A/78/155, 2023, [68].

⁷⁵ *ibid* at [66].

⁷⁶ *see* UN Special Rapporteur on Human Rights and the Environment. “Expert Seminar on the Responsibility of Business Enterprises to Respect the Human Right to a Clean, Healthy and Sustainable Environment.” UN Doc A/HRC/55/41, 2024.

⁷⁷ UN Special Rapporteur on Human Rights and the Environment. “Paying Polluters: The Catastrophic Consequences of Investor-State Dispute Settlement for Climate and Environment Action and Human Rights.” UN Doc A/78/168, 2023.

⁷⁸ A full critique of ISDS is beyond the scope of this article. For further information, *see* Alvaraez, Jose. “ISDS Reform: The Long View.” *ICSID Review*, vol. 36, 2021, pp. 253-277; Wegmann, Vera. “The Unsustainable Political Economy of Investor-State Dispute Settlement Mechanisms.” *Review of Administrative Sciences*, vol. 7, 2021, pp. 480-496.

healthy environment, that the denial of public participation in ISDS proceedings was a violation of the right to a healthy environment, and that oftentimes ISDS tribunals unfairly dismissed rights-based arguments during ISDS proceedings.⁷⁹ The Rapporteur defined the right to a clean, healthy and sustainable environment as including “clean air, safe and sufficient water, healthy and sustainably produced food, non-toxic environments, healthy biodiversity and ecosystems and a safe climate.”⁸⁰ An expansive interpretation of the right like the one offered by the Rapporteur has the potential to tie in with wider Global South conceptions of the right. For example, the reference to “sustainably produced food” could be used to incorporate Indigenous conceptions and practices in food production into wider considerations of how businesses may play a role in the Northern-led exploitative global food system.⁸¹ More generally, the labelling of the current existing structure of ISDS as being on-the-whole a violation of human rights shows that the right to a healthy environment can be used to target structural economic practices which have disproportionately benefited Northern transnational corporations.⁸² A structural approach of this kind to applying the right to a healthy environment could open up further opportunities for corporations to face scrutiny for their role in the Northern-dominated economic system which has caused a multitude of environmental crises.

In another report, the Rapporteur considered the nexus between state and business obligations with regard to the right to a healthy environment.⁸³ Of particular interest is the broad interpretation of what the Rapporteur deems the “procedural elements”

of the right to a healthy environment,⁸⁴ with the Rapporteur noting that “greenwashing, deceit, denial, fraud, sabotaging science, aggressive lobbying, massive political donations, corruption, manipulating public opinion, revolving-door hiring practices, regulatory capture”⁸⁵ had all undermined these procedural elements. This expansive approach to what could be considered as harmful to the right to a healthy environment opens further opportunities for the right to healthy environment to be applied to an extensive number of current business practices. It is broadly similar to the approach taken by the Philippines Human Rights Commission in the Carbon Majors Inquiry, in that the Commission also identified damaging business practices like climate science obfuscation and denial as having contributed to human rights violations.⁸⁶ Questions remain however as to whether this broad interpretation of what may undermine the right to a healthy environment can be translated into effective strategies for corporate accountability. In particular, the fact that the overall recommendations of the report depend largely on the state creating and enforcing heightened obligations, rather than the onus being on businesses themselves to advance protection of the right, is a reiteration of the status quo set out by the UNGPs.

Additionally, the Rapporteur tied the right to a healthy environment to the emerging scientific concept of planetary boundaries—planetary limits identified by scientists, of which at least six-of-nine have currently been breached⁸⁷—stating that “human rights obligations of States and businesses must be re-evaluated” in light of the breaches of these

⁷⁹ UN Special Rapporteur on Human Rights and the Environment (n 77) *supra*.

⁸⁰ *ibid* at [54].

⁸¹ Keenan, Liam, et al. “Hungry for Power: Financialization and the Concentration of Corporate Control in the Global Food System.” *Geoforum*, vol. 147, 2023, pp. 1-11.

⁸² *see* Cima, Elena. “The Right to a Healthy Environment: Reconceptualizing Human Rights in the Face of Climate Change.” *Review of European, Comparative and*

International Environmental Law, vol. 31, 2022, pp. 38-49.

⁸³ UN Special Rapporteur on Human Rights and the Environment. “Business, Planetary Boundaries, and the Right to a Clean, Healthy and Sustainable Environment.” UN Doc A/HRC/55/43, 2024.

⁸⁴ *ibid* at [27].

⁸⁵ *ibid*.

⁸⁶ Savaresi (n 33) *supra*.

⁸⁷ Rockstrom, Johan, et al. “A Safe Operating Space for Humanity.” *Nature*, vol. 461, 2009, pp. 472-475.

boundaries.⁸⁸ The Rapporteur further considered the opportunities available to pursue new models of economics, including a human rights based economy.⁸⁹ This referred to an economy which would “guarantee the material, social and environmental conditions necessary for all people to live with dignity on a flourishing planet” by prioritising investment in economic, social, cultural and environmental rights.⁹⁰ This framing and consideration of human rights is important for two reasons. Firstly, the reference to planetary boundaries could encourage consideration of the wider scholarship planetary boundary scientists have conducted outlining the need for equity and distributive justice.⁹¹ This could in turn involve a larger role for businesses in restricting their activities likely to compromise on these boundaries, and a reconsideration of relevant operational targets to ensure business aligns with the equitable approach needed to protect planetary boundaries. The right to a healthy environment would, under this approach, be protected through emphasis on a planetary boundary framework within new economic paradigms, and businesses would in turn face consequences where they do not embrace these paradigms. At the same time, however, the planetary boundary framework has not enjoyed much support from the Global South, many of whom see it as a means of restricting economic development the Global North has historically benefited from without similar constraints.⁹² Tying the right too closely to planetary boundaries may risk perceptions of the right becoming associated with the Global North, even if more progressive framings of boundaries could eventually be embraced by the Global South.⁹³ Nonetheless, the efforts of the Rapporteur to move beyond traditional Northern conceptions of business and human rights toward a more holistic

conceptualisation of the framework shows an openness to new perspectives, which could be useful in allowing the Global South to play a greater role in laying out the contours of the right to a healthy environment and business obligations.

Therefore, the UNGA resolution recognising the right and associated UN interpretations and reports have yet to fully embrace the potential of the right to be a Global South-led tool to enhance efforts at corporate environmental and climate accountability. At the same time, the ill-defined nature of the right in the resolution, and the subsequent efforts of the UN bodies, shows some signs of progress toward interpretations of the right to a healthy environment. These expansive interpretations can be built upon by leaders in the Global South to potentially encourage (i) higher degrees of scrutiny and obligations on states to supervise corporate activity, with particular attention to paid to the greater capacity of Northern states to engage in this supervisions, and (ii) obligations imposed on large transnational corporations, which could significantly impact on exploitative practices, or at the very least the identification of these practices as being human rights obligations, which could in turn pressure Northern states to act to rein in some of the worst elements of these businesses. Opportunities to chart a path forward for the right to a healthy environment which could build upon the more progressive elements of UN bodies have now arisen in the near-term with the arrival of major climate litigation cases before leading international courts, and the attempts by major Northern powers to enact human rights due diligence legislation.

IV. Future Applications of the Right to a Healthy Environment to Business

⁸⁸ UN Special Rapporteur on Human Rights and the Environment (n 83) *supra*.

⁸⁹ *ibid*.

⁹⁰ *ibid*.

⁹¹ Rockstrom, Johan. “Safe and Just Earth System Boundaries.” *Nature*, vol. 619, 2023, pp. 102-111.

⁹² Biermann, Frank, and Rakhyn Kim. “The Boundaries of the Planetary Boundary Framework: A Critical Appraisal of Approaches to Define a ‘Safe Operating

Space’ for Humanity.” *Annual Review of Environment and Resources*, vol. 45, 2020, pp. 497-521; Sultana, Farhana. “Whose Growth in Whose Planetary Boundaries? Decolonising Planetary Justice in the Anthropocene.” *Environmental Governance and Policy*, vol. 33, 2023, pp. 615-630.

⁹³ *ibid*.

Thus far, with the exception of the cases outlined in Section II, the right to a healthy environment has not played a major role in the wider developments of international efforts to hold non-state actors accountable for environmental damage. However, important opportunities to integrate the right into wider business and human rights obligations have been presented by the swathe of international climate law cases currently before the International Court of Justice and regional human rights courts. At the same time, the EU has finalised its Corporate Sustainability Due Diligence Directive, which is likely to be one of the most significant pieces of human rights due diligence legislation promulgated by the Global North for quite some time.

A. The Right to a Healthy Environment and International Climate Litigation

There are a number of pending major international climate litigation cases which have the potential to clarify the linkages between the right to a healthy environment and non-state actors. The most relevant of these cases are the Inter-American Court of Human Rights Advisory Opinion on Human Rights and the Climate Emergency, and the International Court of Justice Advisory Opinion on States Responsibilities in Respect of Climate Change.

As was noted in Section II, the Inter-American Court has taken significant steps toward interpreting the right to a healthy environment in a manner conducive to both heightened obligations on states to supervise corporate activity, and increased pressure being placed on businesses to at a minimum align with the UNGPs even where domestic laws may not bet at this standard. In its current Advisory Opinion on Human Rights and the Climate Emergency, the Inter-American Court has an opportunity to enhance these obligations and issue an Advisory Opinion explicitly focused on corporate

accountability.⁹⁴ Many submissions to the Court used examples of business activities which were damaging the environment, and thus the right to a healthy environment as evidence of the scale of the human rights violations caused by the climate emergency.⁹⁵ This bolstered the broader human rights narrative at play during the proceedings by allowing for this right to be both viewed independently as having been violated, and tied to wider economic, social and cultural rights, all of which could be interpreted as having been violated by state and non-state actors through climate-related activities.

Several NGOs including the Center for International Environmental Law, Greenpeace International, the Union of Concerned Scientists (UCS), the Open Society Justice Initiative (OSJI), and the New York University School of Law's Climate Law Accelerator (CLX, have called on the Court to prioritise corporate accountability in their final Opinion. As noted in their joint Amicus Brief to the Court, "rights violations resulting from business enterprises' conduct (i.e. acts and omissions) contributing to climate change cannot be sufficiently addressed or prevented through an exclusively state-centered application of international law."⁹⁶ They recommend that businesses be obliged to reduce greenhouse gas emissions, introduce just transition plans and "remediate and compensate for past and ongoing climate change-related harm (loss and damage) and adaptation costs."⁹⁷ These recommended obligations would move beyond the due diligence paradigm, and use human rights law as a means of imposing direct obligations on corporations to engage in proactive climate mitigation efforts, as well as retrospectively provide reparations for the existing harm done to Latin America and the Caribbean by their harmful climate actions. What is interesting, however, is that these extensive obligations are still grounded in the UNGP

⁹⁴ *Request for an Advisory Opinion on the Climate Emergency and Human Rights*, I-ACtHR, 2023; CIEL et al. "Inter-American Court of Human Rights Advisory Opinion on the Climate Emergency and Human Rights Corporate Accountability in the Climate Crisis Amicus Brief." *Center for International Environmental Law*, 2023.

⁹⁵ Tigre, Maria Antonia. "Advisory Opinion on Climate Change: Summary of Written Observations Submitted to the Inter-American Court of Human Rights (Part 1)." *Sabin Center for Climate Change Law*, 2024.

⁹⁶ CIEL et al. (n 94) *supra*.

⁹⁷ *ibid*.

concept that businesses have an independent obligation to respect human rights.⁹⁸ This shows that as interpretation of rights evolves to address the climate emergency, there is an opportunity to construct a Global North concept of “respect” for human rights in a manner more aligned with the sweeping measures imposed on businesses seen in the human rights jurisprudence of the Global South. The right to a healthy environment can therefore help to justify such an interpretation due to its assistance in demonstrating the linkages between human rights violations and the activities of businesses. The argument presented in the submission further ties human rights to concepts of remediation and accountability in a manner that would be of great help to climate justice activists and to businesses trying to understand their human rights obligations. While the Amicus Brief may not be taken into account by the Court in its final Opinion, it is helpful in showing that members of civil society can also interpret the right to a healthy environment and associated rights like the right to life to have implications for corporations that move beyond a limited perception of the right.

The ICJ Advisory Opinion is the first time the world’s leading international court will consider the responsibilities of states with respect to addressing climate change.⁹⁹ Given the inherently state-centric nature of the question, and the broader state-centric nature of the ICJ, it is unlikely this forum will do much to address the potential interactions between the right to a healthy environment and non-state actors. More broadly, the ICJ will need to consider itself with the vast and often fragmented nature of international law when considering the existence of responsibilities,¹⁰⁰ and so it is unlikely to devote significant attention to the right to a

healthy environment in particular, as opposed to a more generalised interpretation and / or recognition of the linkages between international human rights law and climate change.

Nonetheless, there are particular measures the ICJ could consider in the context of the right to a healthy environment and non-state actors. Firstly, it can confirm and outline the extent to which states are responsible for the actions of their corporations with regard to transboundary harm caused by corporate emissions. This does not necessarily entail any particular recognition of the impact on the right to a healthy environment, but it may help clarify state’s climate due diligence obligations—states are considering their climate impacts and adopting relevant laws and policies accordingly—which in turn could involve a higher degree of supervision over corporate activity.¹⁰¹ Secondly, the ICJ could help to clarify the legal status of the right to a healthy environment. This could be achieved through embracing its role as a norm-setter with regard to international law.¹⁰² Thus, it could advise or suggest that recognition of the right by the UNGA reflects an international understanding that the right is part of the intentional human rights law fabric even if it has not been outlined in a specific treaty. This clarification could form part of a broader effort to weave together various aspects of international law that may have implications for climate change in order to ensure states have a clear understanding of how their obligations derive from or intersect with these aspects of international law.¹⁰³ It is unlikely that the ICJ can fully explain the nature and scope of a right to a healthy environment given its absence from international treaties, but clarification of this kind would elevate the position of the right and consolidate existing

⁹⁸ *ibid.*

⁹⁹ *Obligations of States in Respect of Climate Change*, Advisory Opinion, ICJ Rep 2022-2023 (August 1) p. 78.

¹⁰⁰ Tigre, Maria Antonia. “It Is (Finally) Time for an Advisory Opinion on Climate Change: Challenges and Opportunities on a Trio of Initiatives.” *Charleston Law Review*, vol. 17, 2024, pp. 623-723.

¹⁰¹ Voigt, Christina. “The Power of the Paris Agreement in International Climate Litigation.” *Review of European*,

Comparative and International Environmental Law, vol. 32, 2023, pp. 246-48.

¹⁰² Tigre (n 100) *supra*; Simma, Bruno. “Human Rights Before the International Court of Justice: Community Interest Coming to Life?” *The Development of International Law by the International Court of Justice*, edited by Christian Tams and James Sloan, Oxford University Press, 2013.

¹⁰³ *ibid.*

efforts at international recognition. Finally, the ICJ can emphasise the importance of current and emerging legal concepts of critical interest to the Global South, including the principle of common but differentiated responsibilities with regard to climate mitigation, recognition that reductions in greenhouse gas emissions should be equitable and reflect historical and current injustices, and the need for a just transition when pursuing necessary global energy shifts.¹⁰⁴ This would help to frame climate change as an equity issue, where the burden of reducing emissions and providing financing for mitigation and adaptation measures should fall primarily on the Global North. Framing of this kind opens the door for further Global South perspectives on climate change, which in turn could lead down a pathway toward the application of the right to a healthy environment to particular instances of corporate misbehaviour.

More generally, strategic litigation like the pursuit of these advisory opinions can use the right to a healthy environment to bolster and draw attention to particular examples of corporate conduct. This does not necessarily entail a full application of international human rights law, but could involve drawing the right to a healthy environment into wider efforts to use mechanisms like tort law and private litigation to hold corporations accountable. For example, *Milieudefensie v Royal Dutch Shell* was a tort-law based challenge to Shell's climate-harming activities, but involved consideration of human rights law to ground its conception of the duty of care.¹⁰⁵ The plaintiffs used human rights obligations under the European Convention on Human Rights to shape what it argued should be the duty of care owed by Shell with regard to its impact on the climate and subsequent obligations to reduce its greenhouse gas emissions. International recognition of the right to a healthy environment may open up further

opportunities to take similar approaches.¹⁰⁶ We have already seen such an approach with cases like *La Oroya* and the Carbon Majors Inquiry. International recognition of the right could offer environmental, climate, and human rights activists a valid platform through which to engage in further litigation efforts. What will be important for future applications of the right within strategic litigation will be (i) whether activists adopt and expand upon existing Global South jurisprudence, (ii) whether such jurisprudence could ever be utilised or influence a Global North court with greater enforcement capacity, and (iii) whether use of the right, in whatever manner in which it is conceptualised ensures corporations face relevant and substantive consequences based upon the use of this right. International recognition of the right cannot answer these questions but it also helps bring this framing into the wider discussion around the linkages between strategic human rights litigation and corporate environmental and climate impacts.

B. The Right to a Healthy Environment and Human Rights Due Diligence

Finally, there is the question of how the right to a healthy environment could interact with the efforts of the EU, and other major Northern powers such as France and Germany to introduce human rights due diligence legislation. While this article is critical of a strict emphasis on due diligence as the only means through which corporate accountability should be conceptualised, it nonetheless remains the primary mechanism through which business and human rights obligations are being concretised into hard law. Therefore, it is worth briefly exploring this potential intersection to provide a holistic overview of the scope of the right.

Human rights due diligence is, for the moment, largely narrowly defined with regard to the extent and scope of human rights obligations that may derive from any relevant

¹⁰⁴ Tigre (n 100) *supra*.

¹⁰⁵ *Milieudefensie v Royal Dutch Shell plc* ECLI:NL:RBDHA:2021:5339.

¹⁰⁶ Spijkers, Otto. "Friends of the Earth Netherlands (*Milieudefensie*) v Royal Dutch Shell." *Chinese Journal of Environmental Law*, vol. 5, 2021, pp. 237-256.

due diligence legislation. For example, the EU Corporate Sustainability Due Diligence Directive, the most prominent piece of human rights due diligence legislation, notes that “the prohibition of causing any measurable environmental degradation, such as harmful soil change, water or air pollution, harmful emissions, excessive water consumption, degradation of land, or other impact on natural resources, such as deforestation” are all considered within the scope of human rights due diligence insofar as the above activities conflict with the existing interpretation of the Article 6(1) of the International Covenant on Civil and Political Rights, the right to life, as well as Articles 11 (right of adequate standard of living) and 12 (enjoyment of the highest attainable standard of physical and mental health) of the International Covenant on Economic, Social and Cultural Rights.¹⁰⁷ This approach relies on a ‘greening’ of pre-recognised human rights rather than consideration of an independent right to a healthy environment. As Bueno et al. have noted “while the Annex [outlining the scope of human rights and environmental obligations encompassed by the Directive] at first glance appears relatively comprehensive, the decision to list only certain human rights and international human rights instruments (without the Universal Declaration of Human Rights) departs from the UNGPs.”¹⁰⁸ A departure of this kind from the UNGPs, which is already a narrow base for corporate human rights obligations is disappointing. However, it does not preclude the role that the right to a healthy environment statements and jurisprudence may play in determining whether businesses have conducted appropriate due diligence with regard to their environmental impacts. This is because recognition of the right by UNGA is likely to play a role in how other rights and rights bodies understand the linkages between

existing rights and the right to a healthy environment. As such, while it may not directly play a role in due diligence obligations as presently envisioned, jurisprudence and interpretations of the right may shape how businesses understand these obligations in practice. The Global South can also use the introduction of due diligence laws with a flexible scope to pressure the Global North to reign in the excesses of their companies,¹⁰⁹ on the basis that due diligence has not been adequately conducted unless the right to a healthy environment and associated obligations have not been taken into account. This may not be of direct relevance to how Global North regulatory bodies police due diligence, but it could help to shape their overall regulatory perceptions and understandings of how human rights due diligence intersects with the right to a healthy environment.

Recognition of the right to a healthy environment also leaves open the possibility of exploring approaches like the ‘climate due diligence’ approach advocated by Maachi and others.¹¹⁰ Maachi has posited that “precisely because climate, environmental and human rights challenges are fundamentally interrelated, a holistic approach to human rights due diligence is needed, one in which the standard of conduct is interpreted in the light of environmental law, climate law, as well as international human rights law.”¹¹¹ As a result she argued that “it should be made explicit that climate due diligence constitutes an inherent dimension of the standard of conduct required under the new legislation, and that its constitutive components reflect the structure of human rights due diligence articulated in the UNGPs.”¹¹² The right to a healthy environment would bolster the case for such an approach because it explicitly ties harm to the environment to the international

¹⁰⁷ Directive 2024/1760 of the European Parliament and Council, Annex.

¹⁰⁸ Bueno, Nicholas, et al. “The EU Directive on Corporate Sustainability Due Diligence (CSDDD): The Final Political Compromise.” *Business and Human Rights Journal*, 2024.

¹⁰⁹ “Engagement, Remedy & Justice: Priorities for the Corporate Sustainability Due Diligence Directive from

Workers in the Global South.” *Business and Human Rights Resource Centre*, 2024.

¹¹⁰ Maachi, Chiara. “The Climate Change Dimension of Business and Human Rights: The Gradual Consolidation of a Concept of ‘Climate Due Diligence’.” *Business and Human Rights Journal*, vol. 6, 2021, pp. 93-119.

¹¹¹ *ibid.*

¹¹² *ibid.*

human rights law framework, while also having clear linkages to climate change. Interpreting human rights due diligence in this manner would ensure that corporations do not just adopt a ‘tick box’ approach to rights outlined in international instruments,¹¹³ but must consider their environmental and climate impacts as a core aspect of these wider human rights obligations. From a Global South perspective, a holistic approach of this kind would allow further advocacy grounded in the right to a healthy environment, and create better linkages between Global South efforts at corporate accountability and the Global North’s efforts to enforce human rights due diligence.¹¹⁴ This could in turn influence the eventual consolidation of human rights due diligence into a broader and interconnected concept with clear accountability implications for harm that either breaches the right to a healthy environment or harms the environment such that it impugns on the rights conceptualised under current due diligence mechanisms.

The right to a healthy environment could therefore be useful in shaping the emerging concept of climate due diligence. While this does not mean the Global South can influence how the Global North may interpret the right in a due diligence context, it could at the very least help to bridge gaps between human rights due diligence, environmental due diligence and the emergence of climate due diligence. How this will operate in practice will best be illustrated through the efforts of EU based regulators to adopt and enforce the Corporate Sustainability Due Diligence Directive.

V. Conclusion

In conclusion, the UNGA recognition of the right to a healthy environment is a valuable opportunity to take the fight for environmental and climate justice to Global North transnational corporations. The Global South has shown that it is willing to use and

interpret the right to impose sweeping obligations on corporations, or at the very least increase the obligations on states to supervise and regulate activity. However, that does not mean that these obligations or this holistic approach to the right to a healthy environment will be translated and embraced by the Global North. The business and human rights movement has largely shied away from shifting to a more holistic approach to corporate human rights obligations, favouring a largely neoliberal ‘respect and due diligence’ approach. There is, as such, a gap between how the right to a healthy environment is understood and applied to corporations in Global South jurisdictions, and how corporate accountability is considered in the context of the UNGPs.

The UNGA resolution recognising the right to a healthy environment, while still underdeveloped, offers a critical opportunity for the Global South to lead in advancing corporate environmental accountability. Expansive interpretations by UN bodies and Rapporteurs since the UNGA resolution have advocated for greater scrutiny on corporate activity, though it is unclear as of yet whether this advocacy can be translated into more concrete and expansive business obligations. Nonetheless, the resolution can influence global law and policy, and with appropriate understanding of Global South linkages of the right with corporate activity, could become an effective means of pushing the business and human rights movement toward greater efforts at environmental and climate accountability.

The emergence of international climate litigation, and the efforts to introduce human rights due diligence legislation open up further paths to expand upon and clarify the scope and application of the right to a healthy environment to businesses. International recognition of the right to a healthy environment is important for shifting the

¹¹³ McCorquodale, Robert, and Justine Nola. “The Effectiveness of Human Rights Due Diligence for Preventing Business Human Rights Abuses.” *Netherlands International Law Review*, vol. 68, 2021, pp. 455–478.

¹¹⁴ Martínez, Julián Gutiérrez. “On the Path to Corporate Accountability: The Global South and the New European Due Diligence Law” *Dejusticia*, 13 Aug. 2024.

norms within these movements, and for allowing the Global South a rights-based platform through which they can pressure Global North courts and regulators to take greater action against their companies.

Moving the right forward in the manner advocated for in this article will meet a number of hurdles. Business and human rights paradigms will need to shift, and a broad conception of corporate climate and environmental harm will be required to effect any sort of change in Northern human rights jurisprudence. The Global South has been a leader on the development of the right to a healthy environment, and deserves to have its interpretations of the right taken forward when taking the next steps following the UNGA resolution. The next 'wave' of climate and human rights law and policy provides an opportunity to take these steps, but the Global North must move beyond its present aversion to an ambitious interpretation of the right to a healthy environment should it ever be

considered an effective actor in the context of corporate human rights obligations.

Understanding the Adoption of Bike-Sharing Systems in the Baltic States: A Multilevel Perspective Analysis of Online Consumer Reviews

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KEYWORDS

bike-sharing systems, MLP, sustainable urban mobility, Baltic States, online consumer reviews

ABSTRACT

As climate change and urban congestion continue to pose global challenges, promoting cycling as an alternative transport mode is becoming increasingly critical. Bike-sharing systems offer a sustainable solution to reduce greenhouse gas emissions, alleviate traffic congestion, and promote healthier lifestyles. In the Baltic States—Estonia, Latvia, and Lithuania—cycling has been promoted as a potential mode of urban transport, influenced by European Union policies targeting sustainable mobility. This study investigates the adoption of biking in these countries through the Multilevel Perspective (MLP) framework, analysing 1465 online customer reviews from platforms like Google Maps, TripAdvisor, and Google Play. The results reveal key niche-level challenges, such as technical failures and poor maintenance, as well as regime-level issues like insufficient infrastructure and unprofessional customer service. However, users also reported positive aspects, including the quality of bikes, accessibility, and staff helpfulness. This study contributes to the existing literature by integrating user feedback into the MLP framework, offering both theoretical insights and practical recommendations for policymakers.



I. Introduction

Climate change is one of the most pressing challenges facing the world today, and the transportation sector contributes significantly to this issue. Road transport, which includes private car use, is a major emitter of greenhouse gases (GHGs) like carbon dioxide (CO₂), accounting for a substantial portion of urban emissions.¹ Urban areas, particularly

those with high car dependency, face numerous environmental and social challenges. The widespread use of private cars contributes to traffic congestion, air and noise pollution, and negative health outcomes, including respiratory and cardiovascular issues.² Current projections indicate that if the existing trends continue, transport-related emissions could double by 2050, making it

¹ Igliński, Hubert, and Maciej Babiak. "Analysis of the Potential of Autonomous Vehicles in Reducing the Emissions of Greenhouse Gases in Road Transport." *Procedia Engineering*, vol. 192, 2017, pp. 353–58.

² Miner, Patrick, et al. "Car Harm: A Global Review of Automobility's Harm to People and the Environment." *Journal of Transport Geography*, vol. 115, 2024, p. 103817.

imperative to explore alternative, sustainable mobility solutions. Among these, cycling has emerged as a promising mode of urban transport, offering a way to reduce CO₂ emissions, mitigate air pollution, and promote public health.³ Public bike-sharing (PBS) systems, in particular, are seen as crucial tools for promoting sustainable urban mobility by providing a practical alternative to motorised transport and reducing emissions. Incorporating cycling into urban transportation not only enhances flexibility and reduces motor vehicle reliance but also promotes healthier lifestyles. The rise of PBS is seen as a catalyst for increasing bicycle usage by providing easy access to bicycles and reducing entry barriers.⁴ However, its success is contingent on overcoming challenges related to user convenience, system reliability, and infrastructure availability.

Globally, the adoption of PBS is shaped by a variety of policy and infrastructure factors. Adequate cycling infrastructure, like bike lanes and docking stations, plays a significant role in increasing adoption rates, although its importance differs across regions.⁵ For example, infrastructure investments are crucial in China, where government policies have enhanced the cycling infrastructure and reduced costs, encouraging PBS adoption.⁶ In contrast, Southeast Asian countries face technical challenges and lower adoption rates,

highlighting the need for policies that address local mobility needs.⁷

Environmental and cultural factors also heavily influence PBS adoption worldwide. In Asia, environmental awareness is a key motivator; countries like India have shown that promoting PBS's environmental benefits aligns with individual values and environmental knowledge, encouraging adoption.⁸ Cultural factors, including social norms and values like collectivism, are similarly impactful; regions with high environmental consciousness, for instance, may more readily embrace PBS due to its alignment with sustainable practices.⁹ Economically, PBS serves as an affordable alternative to other transportation modes,¹⁰ but barriers such as adverse weather, safety concerns, and operational issues like bike theft and redistribution continue to limit adoption in some areas.¹¹ Understanding these factors is crucial for crafting strategies that promote PBS adoption across diverse regions.

In the Baltic states—Estonia, Latvia, and Lithuania—cycling is increasingly seen as a viable urban mobility option, largely influenced by European Union policies aimed at reducing CO₂ emissions and promoting sustainable transport.¹² However, despite these efforts, significant challenges persist, such as cultural acceptance, political resistance, and historically underdeveloped cycling infrastructure. While these countries are making strides toward sustainability,¹³

³ Winkler, Lisa, et al. "The Effect of Sustainable Mobility Transition Policies on Cumulative Urban Transport Emissions and Energy Demand." *Nature Communications*, vol. 14, no. 1, 2023, p. 2357.

⁴ Serna, Ainhoa, et al. "Identification of Enablers and Barriers for Public Bike Share System Adoption Using Social Media and Statistical Models." *Sustainability*, vol. 11, no. 22, 2019, p. 6259.

⁵ Ye, Xiaozhou. "Bike-Sharing Adoption in Cross-National Contexts: An Empirical Research on the Factors Affecting Users' Intentions." *Sustainability*, vol. 14, no. 6, 2022.

⁶ *ibid.*

⁷ Mateo-Babiano, Iderlina, et al. "Bicycle Sharing in Asia: A Stakeholder Perception and Possible Futures." *Transportation Research Procedia*, vol. 25, 2017, pp. 4966–78.

⁸ Sajid, Muhammed, et al. "Pedaling towards Sustainability: A Mixed-Method Study of the Drivers and Barriers to Bike-Sharing Adoption." *Management of*

Environmental Quality, vol. 34, no. 6, Jan. 2023, pp. 1580–606.

⁹ Yin, Juelin, et al. "Sharing Sustainability: How Values and Ethics Matter in Consumers' Adoption of Public Bicycle-Sharing Scheme." *Journal of Business Ethics*, vol. 149, no. 2, 2018, pp. 313–32.

¹⁰ Ye (n 5) *supra*.

¹¹ Shaheen, Susan A., et al. "Bikesharing in Europe, the Americas, and Asia: Past, Present, and Future." *Transportation Research Record*, vol. 2143, no. 1, Jan. 2010, pp. 159–67.

¹² Liobikienė, Genovaitė, and Jānis Brizga. "Sustainable Consumption in the Baltic States: The Carbon Footprint in the Household Sector." *Sustainability*, vol. 14, no. 3, 2022.

¹³ Ahmadov, Tarlan, et al. "Fiscal Incentives for Circular Economy: Insights from the Baltic States." *Business Models for the Circular Economy: A European Perspective*,

there is still limited academic knowledge on the adoption of sustainable mobility in the region. Bridging these gaps will require targeted policies and infrastructure improvements to create a safe and efficient cycling network.

Addressing the multifaceted challenges of transitioning to sustainable urban mobility requires a collaborative approach that involves multiple stakeholders. Huang et al.¹⁴ discuss the importance of collaborative decision-making in promoting sustainable mobility, emphasising that reaching consensus on practices is essential. This aligns with the Multi-Level Perspective (MLP) framework, which provides a lens to examine the interaction between societal norms, user practices, technological innovations, and policy measures. In the context of cycling, the MLP framework underscores the significance of niche-level innovations, regime changes, and landscape pressures in shaping sustainable transport transitions.¹⁵

While not extensively documented in the Baltic context, public bike-sharing programs can make bicycles more accessible, serving as a catalyst for increased cycling adoption.¹⁶ Additionally, provisional infrastructure changes, such as those introduced during the pandemic, have demonstrated the potential to increase cycling traffic and improve safety, suggesting a need for more permanent and cohesive infrastructure solutions.¹⁷

Designing effective policies requires an understanding of individual mobility needs, social perceptions, and the factors that influence sustainable mobility choices. Studies indicate that public sentiment significantly affects the adoption of biking, with positive perceptions of infrastructure

and the benefits of cycling driving higher adoption rates.¹⁸ The integration of cycling into broader urban planning, focusing on improving street connectivity and the bikeability index, can further promote biking as a flexible and efficient mode of urban transport.¹⁹ Identifying the influencing factors through social media analysis and user reviews can provide actionable insights for tailoring PBS to meet local needs.

This study aims to analyse online customer reviews (OCRs) for biking in Estonia, Latvia, and Lithuania through the MLP framework, offering a novel approach to understanding user experiences and adoption factors in the Baltic context. By examining both enablers and barriers to biking adoption, the study addresses the need for tailored bike-sharing systems that respond to local preferences and infrastructure needs.²⁰ The findings aim to provide actionable insights for targeted infrastructure improvements and policy interventions, contributing to broader efforts to integrate cycling into urban transportation, reduce motor vehicle reliance, and foster healthier, more sustainable cities in the Baltic states.

The following sections outline the structure of the study. Section II provides a literature review, covering the existing research on bike-sharing systems and the use of MLP. Section III introduces the research methodology, detailing the data collection and analysis processes. In Section IV, the results of the study are presented and discussed. Finally, Section V concludes the paper, presents implications for policy and practice and address the limitations and propose areas for future research.

edited by Viktor Prokop et al., Springer International Publishing, 2022, pp. 219–39; Ye (n 5) *supra*.

¹⁴ Huang, He, et al. “Collaborative Decision-Making in Sustainable Mobility: Identifying Possible Consensuses in the Multi-Actor Multi-Criteria Analysis Based on Inverse Mixed-Integer Linear Optimization.” *International Journal of Sustainable Development & World Ecology*, vol. 28, no. 1, Jan. 2021, pp. 64–74.

¹⁵ Magdolen, Miriam, et al. “Mobility Styles and Car Ownership—Potentials for a Sustainable Urban Transport.” *Sustainability*, vol. 13, no. 5, 2021.

¹⁶ Serna et al. (n 4) *supra*.

¹⁷ Kraus, Sebastian, and Nicolas Koch. “Provisional COVID-19 Infrastructure Induces Large, Rapid Increases in Cycling.” *Proceedings of the National Academy of Sciences*, vol. 118, no. 15.

¹⁸ Serna et al. (n 4) *supra*.

¹⁹ Hardinghaus, Michael, et al. “More than Bike Lanes—A Multifactorial Index of Urban Bikeability.” *Sustainability*, vol. 13, no. 21, 2021.

²⁰ Serna et al. (n 4) *supra*.

II. Literature Background

A. Evolution and Challenges of Bike-Sharing Systems

Bike-sharing systems have rapidly become an integral component of urban mobility solutions, with widespread adoption worldwide over the past decade.²¹ These systems provide flexible, environmentally friendly, and cost-effective alternatives to traditional urban transportation. The rise in the use of shared bikes has sparked widespread academic interest, leading to numerous studies exploring the factors that contribute to the development, sustainability, and impact of such systems.²² A key factor influencing the success of these systems is the public's attention and attitude towards them, which affects both service providers and policymakers.²³

Bike-sharing systems are designed to reduce urban congestion, decrease pollution, and promote sustainable transport alternatives. Typically, these services allow short-term bike rentals at docking stations located throughout cities, giving users the flexibility to pick up and drop off bikes at their convenience. The academic discourse around bike-sharing has expanded over time, covering a broad spectrum of factors including environmental impact, public health benefits, and the alleviation of traffic issues.²⁴ Some studies²⁵ highlight how bike-sharing systems contribute to reductions in greenhouse gas emissions by

replacing car trips, while others²⁶ examine the economic implications and necessary infrastructural adjustments for integrating these systems into urban environments.

However, bike-sharing systems are not without their challenges. Operational issues, including bike theft, vandalism, and the difficulty of redistributing bikes between high-demand and low-demand locations, have been well-documented.²⁷ These challenges reflect the growing pains that bike-sharing networks experience, especially as they scale up in size and scope.²⁸ In addition to logistical challenges, users' individual motivations, such as environmental awareness and personal values, play a critical role. For instance, environmental knowledge and values in countries like India strongly correlate with intentions to use PBS schemes, emphasising the impact of promoting environmental benefits on adoption rates.²⁹

Technological and economic factors also shape system success. Performance expectations, perceived effort, and ease of use significantly impact adoption, particularly in cost-sensitive regions like Asia.³⁰ In Asian cities, economic benefits are notable, as bike-sharing provides a lower-cost alternative to other transport modes. However, technical constraints, such as limited infrastructure, present major barriers to system adoption in these regions.³¹ Additionally, dockless systems in China have

²¹ Pekdemir, Mehmet Ihsan, et al. "Assessing the Impact of Public Transportation, Bicycle Infrastructure, and Land Use Parameters on a Small-Scale Bike-Sharing System: A Case Study of Izmir, Türkiye." *Sustainable Cities and Society*, vol. 101, 2024, p. 105085.

²² Fishman, Elliot, et al. "Bike Share's Impact on Car Use: Evidence from the United States, Great Britain, and Australia." *Transportation Research Part D: Transport and Environment*, vol. 31, 2014, pp. 13–20.

²³ Cheng, Peng, et al. "Understanding Bike Sharing Use over Time by Employing Extended Technology Continuance Theory." *Transportation Research Part A: Policy and Practice*, vol. 124, 2019, pp. 433–43.

²⁴ Zhang, Yongping, and Zhifu Mi. "Environmental Benefits of Bike Sharing: A Big Data-Based Analysis." *Applied Energy*, vol. 220, 2018, pp. 296–301.

²⁵ Campbell, Kayleigh, and Candace Brakewood. "Sharing Riders: How Bikesharing Impacts Bus Ridership in New York City." *Transportation Research Part A: Policy and Practice*, vol. 100, 2017, pp. 264–82.

²⁶ Hamilton, Timothy, and Casey Wichman. "Bicycle Infrastructure and Traffic Congestion: Evidence from DC's Capital Bikeshare." *Journal of Environmental Economics and Management*, vol. 87, 2018, pp. 72–93.

²⁷ Eren, Ezgi, and Volkan Emre Uz. "A Review on Bike-Sharing: The Factors Affecting Bike-Sharing Demand." *Sustainable Cities and Society*, vol. 54, 2020, p. 101882.

²⁸ Sun, Feiyang, et al. "Promoting Public Bike-Sharing: A Lesson from the Unsuccessful Pronto System." *Transportation Research Part D: Transport and Environment*, vol. 63, 2018, pp. 533–47.

²⁹ Sajid et al. (n 8) *supra*.

³⁰ Chopdar, Prasanta Kr, et al. "Exploring Factors Influencing Bicycle-Sharing Adoption in India: A UTAUT 2 Based Mixed-Method Approach." *International Journal of Emerging Markets*, vol. 18, no. 11, Jan. 2023, pp. 5109–34.

³¹ Mateo-Babiano et al. (n 7) *supra*.

introduced sustainability challenges in urban management despite their flexibility.³²

The social and cultural context further influences system adoption. Social norms and cultural fit often determine how well bike-sharing models, particularly those inspired by Western designs, integrate into local settings. In some Asian cities, localised approaches have proven necessary to enhance user acceptance and ensure that systems align with regional preferences.³³ For example, subjective norms and social values influence system adoption in India, where social factors, when combined with other motivators, support usage.³⁴ Moreover, users' pro-environmental values, such as reducing carbon emissions, are key motivators, particularly for those driven by social attitudes towards sustainable behaviours.³⁵

Social media platforms, including Twitter and Facebook, have become valuable sources of data for understanding public attitudes towards PBS. They provide a vast and accessible repository of user-generated content that can be mined for insights into user satisfaction, operational problems, and suggestions for improvement.³⁶ For instance, Collins et al.³⁷ used Twitter data to evaluate the satisfaction of riders with the Chicago transit system, while Méndez et al.³⁸ applied similar text mining techniques to assess public transportation in Santiago. These approaches

are increasingly being adopted in bike-sharing research, as social media allows researchers to capture real-time, geographically diverse opinions at a relatively low cost.³⁹

In bike-sharing, Kim and Hong⁴⁰ applied text mining techniques to analyse reviews of South Korea's public bike-sharing service. Their study identified both positive aspects, such as the ease of use, and negative aspects, including technical failures in mobile apps. This type of research is critical because it highlights the role of digital infrastructure—specifically, the technological tools that users rely on to access bikes—in shaping overall user satisfaction. Wu and Lei⁴¹ similarly explored the role of digital tools in China, analysing social media and news reports to investigate how security deposit policies and other operational issues influenced user complaints about bike-sharing systems.

Digital integration is a key factor influencing the success of bike-sharing systems. Most modern PBS relies on smartphone apps for tasks such as locating available bikes, making payments, and navigating between docking stations. Alam et al.⁴² emphasize that these technological advancements are reshaping transportation demand and supply, urging system providers to keep pace with evolving user expectations and technological capabilities. Kim and Hong⁴³ further stress that analysing factors affecting service

³² Yang, Yang, et al. "Tourists on Shared Bikes: Can Bike-Sharing Boost Attraction Demand?" *Tourism Management*, vol. 86, 2021, p. 104328.

³³ Mateo-Babiano et al. (n 7) *supra*.

³⁴ Machavarapu, Pavan Kumar, et al. "Factors Influencing Bike Share Intentions of Users in Indian Cities: A Structural Equation Modelling Approach." *Urban, Planning and Transport Research*, vol. 11, no. 1, Dec. 2023, p. 2276405.

³⁵ Wang, Kailai, et al. "Bike Sharing Differences among Millennials, Gen Xers, and Baby Boomers: Lessons Learnt from New York City's Bike Share." *Transportation Research Part A: Policy and Practice*, vol. 116, 2018, pp. 1–14.

³⁶ Qi, Bing, et al. "A Framework with Efficient Extraction and Analysis of Twitter Data for Evaluating Public Opinions on Transportation Services." *Travel Behaviour and Society*, vol. 21, 2020, pp. 10–23.

³⁷ Collins, Craig, et al. "A Novel Transit Rider Satisfaction Metric: Rider Sentiments Measured from Online Social

Media Data." *Journal of Public Transportation*, vol. 16, no. 2, 2013, pp. 21–45.

³⁸ Méndez, J T, et al. "Using Twitter to Infer User Satisfaction With Public Transport: The Case of Santiago, Chile." *IEEE Access*, vol. 7, 2019, pp. 60255–63.

³⁹ Dwivedi, Yogesh, et al. "Setting the Future of Digital and Social Media Marketing Research: Perspectives and Research Propositions." *International Journal of Information Management*, vol. 59, 2021, p. 102168.

⁴⁰ Kim, Na Rang, and Soon Goo Hong. "Text Mining for the Evaluation of Public Services: The Case of a Public Bike-Sharing System." *Service Business*, vol. 14, no. 3, 2020, pp. 315–31.

⁴¹ Wu, S, and X Lei. "The Analysis of the Influencing Factors on the Problems of Bike-Sharing System in China." *IEEE Access*, vol. 7, 2019, pp. 104000–10.

⁴² Alam, Md, et al. "Identifying Public Perceptions toward Emerging Transportation Trends through Social Media-Based Interactions." *Future Transportation*, vol. 1, no. 3, 2021, pp. 794–813.

⁴³ Kim and Hong (n 40) *supra*.

quality, such as app functionality and user-friendliness, can lead to concrete improvements in bike-sharing systems.

In addition to the technological challenges, businesses managing PBS schemes increasingly turn to user-generated data from websites and social media platforms to refine and enhance their services.⁴⁴ Online reviews, in particular, offer rich, multifaceted feedback that helps service providers address real-time issues, optimise their operations, and meet consumer needs more effectively. This real-time feedback loop is crucial for responding dynamically to evolving urban transportation needs, which are often fast-changing and context-specific.

Despite the growing body of research, several critical challenges remain. These include persistent operational inefficiencies, such as the difficulty of maintaining bikes across large networks, redistributing bikes effectively, and preventing theft and vandalism.⁴⁵ The limited attention paid to user perspectives on these issues also presents a gap in the literature. Future studies could greatly benefit from adopting more user-centred approaches, particularly in evaluating how these operational challenges impact service quality from the user's point of view.

As Sun et al.⁴⁶ point out, bike-sharing systems continue to experience 'growing pains', often reported in the media. However, the increasing use of social media data in transportation research offers a promising avenue for overcoming these challenges. Social media can capture not only the technical and logistical problems associated with PBS but also more nuanced user-specific

experiences that might be missed in traditional data collection methods.⁴⁷ For example, during the COVID-19 pandemic, Habib and Anik⁴⁸ used text mining to analyse tweets, uncovering shifts in public transportation use, including bike-sharing, as a result of changing mobility behaviours during the crisis.

B. Applying the Multilevel Perspective to Bike-Sharing Systems

The Multilevel Perspective (MLP) is a valuable framework for analysing the evolution and adoption of innovations, including PBS. Originally developed within the field of sustainability transitions theory (STT), the MLP offers a systematic way to examine how innovations emerge, stabilise, and scale within complex socio-technical systems. In the context of bike-sharing services, the MLP helps explain the dynamics between technological development, consumer behaviour, infrastructure, and regulatory frameworks. By integrating consumer reviews with the MLP framework, it is possible to explore how different levels—niche innovations, socio-technical regimes, and broader landscape forces—interact to shape consumer experiences and the overall adoption of bike-sharing systems.

At the core of the MLP is the understanding that technological transitions, such as the shift towards bike-sharing, are co-evolutionary processes that involve the interaction of various elements within and across multiple levels of society. These include not only technological innovations but also behavioural changes, infrastructure development, and regulatory adaptations.⁴⁹ According to Geels,⁵⁰ the MLP framework views transitions as

⁴⁴ Akehurst, Gary. "User Generated Content: The Use of Blogs for Tourism Organisations and Tourism Consumers." *Service Business*, vol. 3, no. 1, 2009, pp. 51–61.

⁴⁵ Eren and Uz (n 27) *supra*.

⁴⁶ Sun et al. (n 28) *supra*.

⁴⁷ Cottrill, Caitlin, et al. "Tweeting Transit: An Examination of Social Media Strategies for Transport Information Management during a Large Event." *Transportation Research Part C: Emerging Technologies*, vol. 77, 2017, pp. 421–32.

⁴⁸ Habib, Muhammad Ahsanul, and Md Asif Hasan Anik. "Impacts of COVID-19 on Transport Modes and Mobility Behavior: Analysis of Public Discourse in Twitter." *Transportation Research Record*, vol. 2677, no. 4, Aug. 2021, pp. 65–78.

⁴⁹ Gruber, Mario. "An Evolutionary Perspective on Adoption-Diffusion Theory." *Journal of Business Research*, vol. 116, 2020, pp. 535–41.

⁵⁰ Geels, Frank. "Disruption and Low-Carbon System Transformation: Progress and New Challenges in Socio-Technical Transitions Research and the Multi-Level

multi-dimensional processes that unfold across three analytical levels: the niche level (where innovations emerge), the regime level (where established systems and practices dominate), and the landscape level (the broader societal and environmental forces that exert pressure on the regime).

In the case of bike-sharing, the niche level represents the space where new technologies, business models, and behaviours are tested and refined. This includes the development of mobile apps for bike rentals, integration with public transportation networks, and the introduction of electric bikes. Consumer reviews at this level often highlight both the potential and the limitations of these innovations. For instance, users may praise the convenience of bike-sharing apps, while simultaneously pointing out technical issues such as app crashes or malfunctioning payment systems. These reviews reflect the early-stage challenges that niche innovations face, as they seek to stabilise and gain wider acceptance.⁵¹ Milfont and Markowitz⁵² emphasise that consumer behaviour, especially in sustainable mobility, is shaped by both individual preferences and broader contextual factors, such as the availability of infrastructure or societal attitudes toward eco-friendly transportation.

As niche innovations begin to stabilise and attract more users, they interact with the socio-technical regime, which consists of established infrastructures, regulatory frameworks, and dominant cultural practices. At this regime level, the bike-sharing system competes with entrenched modes of urban transportation, such as private cars and public buses. Consumer reviews offer insights into how users perceive this interaction, often

highlighting the gaps between what bike-sharing services offer and what established systems provide. For example, issues related to the availability of safe cycling infrastructure, insufficient docking stations, or the lack of integration with other transportation modes are frequently mentioned in reviews. These concerns underscore the importance of aligning new mobility solutions with the existing regime, as the success of bike-sharing systems depends not only on technological innovations but also on the broader system's ability to accommodate and support these changes.⁵³

Finally, the landscape level refers to the exogenous forces that influence both niche and regime dynamics. These forces include broader societal trends, such as increasing urbanisation, climate change awareness, and shifts in consumer preferences toward sustainable mobility options. The rise of bike-sharing systems can be seen as part of a larger trend toward more sustainable urban transport solutions, driven by growing concerns about environmental sustainability and the need to reduce carbon emissions. However, landscape-level pressures can also introduce challenges, such as economic downturns or political instability, which may limit public investment in cycling infrastructure or deter consumer adoption of new mobility services. Canitez⁵⁴ and Geels⁵⁵ note that the landscape level is crucial for understanding the long-term viability of innovations, as broader social, environmental, and economic forces can either accelerate or hinder the transition toward sustainable transportation systems.

The interaction between niche, regime, and landscape levels creates a dynamic

Perspective." *Energy Research & Social Science*, vol. 37, 2018, pp. 224–31.

⁵¹ Kranzbühler, Anne-Madeleine, et al. "The Multilevel Nature of Customer Experience Research: An Integrative Review and Research Agenda." *International Journal of Management Reviews*, vol. 20, no. 2, Apr. 2018, pp. 433–56.

⁵² Milfont, Taciano, and Ezra Markowitz. "Sustainable Consumer Behavior: A Multilevel Perspective." *Current Opinion in Psychology*, vol. 10, 2016, pp. 112–17.

⁵³ Tiberius, Victor, et al. "Radical Innovations: Between Established Knowledge and Future Research Opportunities." *Journal of Innovation & Knowledge*, vol. 6, no. 3, 2021, pp. 145–53.

⁵⁴ Canitez, Fatih. "A Socio-Technical Transition Framework for Introducing Cycling in Developing Megacities: The Case of Istanbul." *Cities*, vol. 94, 2019, pp. 172–85.

⁵⁵ Geels (n 50) *supra*.

environment in which innovations like bike-sharing systems evolve. For instance, the integration of bike-sharing systems with digital platforms and mobile apps reflects the co-evolution of technology and user behaviour, as more consumers become reliant on smartphones for managing transportation. However, consumer reviews often reveal the tension between technological advancements and the existing infrastructure or regulatory frameworks. One common complaint in reviews involves the digital divide, where users with limited access to smartphones or internet connectivity struggle to use bike-sharing services. This highlights the need for greater inclusivity in the design and implementation of mobility innovations.⁵⁶

Furthermore, the MLP framework is particularly useful for understanding how consumer feedback can influence the trajectory of innovation. Reviews from early adopters provide critical insights into the usability and functionality of bike-sharing services, offering valuable feedback for service providers seeking to improve their offerings. As Tiberius et al.⁵⁷ argue, the success of radical innovations like PBS depends not only on technological advancements but also on the ability of organisations to respond to user needs and market demands. By systematically analysing consumer reviews, researchers can identify key areas for improvement, such as app functionality, bike availability, and customer service quality. This iterative process of refinement and adaptation is essential for ensuring that bike-sharing systems remain competitive and responsive to changing consumer preferences.

III. Methodology

This study utilised online consumer reviews (OCRs) as the primary data source, collected from platforms where users regularly provide feedback on bike-sharing services, specifically Google Maps, TripAdvisor, and the Google Play Store. These platforms were selected due to their high usage and accessibility in the Baltic

region, making them well-suited for capturing a representative sample of local user experiences and opinions. While other platforms such as Yelp or Twitter could offer additional insights, these are less popular in the Baltic context and therefore less likely to yield substantial data relevant to this study's focus.

A qualitative content analysis (QCA) was employed to analyse the OCRs. This method is well-suited for systematically interpreting qualitative data, while also allowing for the inclusion of quantitative elements. According to Schreier,⁵⁸ QCA is a mixed-method approach that enables researchers to integrate qualitative and quantitative data analysis processes. For this study, the qualitative component focused on identifying and interpreting the meanings within user reviews, uncovering key themes and patterns in the consumer feedback. The quantitative component involved categorising the reviews, tracking the frequency of themes, and conducting sentiment analysis based on the star ratings provided by the users. This allowed for a comprehensive understanding of user experiences and perceptions regarding bike-sharing services.

The QCA approach was chosen because of its flexibility in dealing with complex data and its capacity to combine in-depth qualitative insights with measurable trends. By employing both qualitative and quantitative strategies, the analysis was able to offer a more robust interpretation of user feedback. This combination of methods facilitated a deeper exploration of how users engage with bike-sharing services and revealed broader patterns of satisfaction, complaints, and system performance.

A. Data Collection

The OCRs were gathered by searching for bike-sharing services in various cities within the Baltic States on Google Maps, TripAdvisor, and the Google Play Store. The data for this study were extracted from the mentioned platforms

⁵⁶ Gruber (n 49) *supra*.

⁵⁷ Tiberius et al. (n 53) *supra*.

⁵⁸ Schreier, Margrit. *Qualitative Content Analysis in Practice*. 1st ed., Sage, 2012.

in September 2024 using Outscraper, a cloud-based service designed to scrape public data from websites. The extraction process resulted in a total of 1,671 reviews, with 745 reviews from Estonia, 500 from Latvia, and 426 from Lithuania. Only reviews that provided substantial feedback, excluding those with only star ratings, were included in the qualitative analysis, resulting in a total of 1,465 reviews.

Once collected, the reviews were organised into different categories based on the platform they were sourced from. The sentiment of each review (positive, neutral, or negative) was then identified, providing an initial layer of analysis that helped guide the subsequent qualitative interpretation. This process also involved categorising the reviews according to their star ratings (1-5 stars), which provided additional quantitative insight into overall user satisfaction levels.

B. Data Analysis

In the qualitative phase of the QCA, the collected reviews were carefully examined to identify recurring themes and patterns in user feedback. This inductive process involved coding the data, where particular attention was given to recurring concepts, such as ease of use, app functionality, bike availability, and customer service experiences. These themes were then analysed to understand how users perceive different aspects of the bike-sharing services.

For the quantitative component, the star ratings provided with each review were used to assess overall user satisfaction. By categorising reviews according to the number of stars given (e.g., 1-2 stars indicating dissatisfaction, 4-5 stars indicating satisfaction), a basic sentiment analysis was conducted to evaluate the general mood of the feedback.

IV. Results and Discussion

A. Quantitative Results: Overview of Consumer Reviews on Bike-Sharing Services

The quantitative results provide insights into user perceptions of bike-sharing services in

the Baltic States, drawn from 1,671 OCRs. As displayed in Table 1, below, Estonia contributed the largest share of reviews (745), followed by Latvia (500) and Lithuania (426). This distribution highlights the varying levels of user engagement across different countries. Estonia's higher number of reviews suggests that bike-sharing systems may be more popular or accessible there compared to Latvia and Lithuania, or that there is simply more digital feedback infrastructure in place.

In Figure 1, below, the trend in average review ratings across Estonia, Latvia, and Lithuania between 2011 and 2024 reflects user satisfaction over time. Both Estonia and Lithuania experienced dips in ratings during certain years, suggesting moments of user dissatisfaction, while Latvia's reviews have remained relatively stable and slightly higher overall. This indicates that bike-sharing systems in Latvia may have achieved more consistent user satisfaction, while Estonia and Lithuania may have faced challenges that led to fluctuating user experiences.

In terms of sentiment, Figure 2, below, shows that the majority of reviews (81%) were positive, reflecting an overall favourable reception of bike-sharing services. However, 16% of reviews were negative, signalling room for improvement. Only 3% of reviews were neutral, indicating that users tend to have strong opinions—either positive or negative—about their experiences.

These quantitative insights provide a clearer picture of user engagement with bike-sharing services in the region, highlighting key trends in satisfaction.

B. Qualitative Results: Niche, Regime, and Landscape Level Insights

1. Niche-Level Challenges

At the niche level, bike-sharing services and related technologies (for instance, cycling apps) are intended to serve as sustainable and flexible alternatives to traditional urban transport. However, the analysis of negative reviews reveals significant challenges that these emerging innovations face in achieving

widespread public acceptance and operational stability. These challenges are highlighted by the recurring themes of technical failures, booking and registration issues, and poor maintenance, which are central barriers to the success of bike-sharing systems.

Figure 3, below, illustrates the emergence of niche-level and regime-level challenges in bike-sharing services. The figure highlights the first-order concepts (for example, technical failures or poor maintenance), which lead to broader second-order themes, such as technical instability and service quality issues.

A key issue is technical failure, where users frequently report problems with the apps that are critical for accessing bikes. Issues such as app crashes, malfunctioning interfaces, and login difficulties are prominent. One user describes that the app “crashes while opening. So I cannot even try to use it.” These failures significantly hinder the accessibility and convenience of bike-sharing services, a core component for gaining user trust and regular usage. This echoes findings in the literature on PBS adoption globally, where technological setbacks remain a critical barrier.⁵⁹ These recurring technical failures underscore that without reliable digital infrastructure, bike-sharing cannot fully capitalise on its potential as a convenient mode of urban transportation.⁶⁰

Another major issue is poor maintenance, particularly concerning the physical condition of the bikes themselves. Multiple users highlight service quality issues related to poorly maintained bikes. For instance, one review stated: “The chain fell off my bike because of the poor condition of the bike I rode.” This not only frustrates users but also raises safety concerns, further weakening the perception of bike-sharing as a reliable transport option. The feedback points to broader service quality and reliability issues, where operational deficiencies in maintaining

equipment undermine the user experience and contribute to a lack of confidence in the service, aligning with findings that underscore the need for regular upkeep to maintain user trust.⁶¹ This highlights a gap between intended service quality and the operational realities, where poor maintenance diminishes the credibility of bike-sharing systems as reliable transport options.⁶²

The theme of booking and registration issues also emerges strongly in the negative reviews, as users report significant difficulties in accessing the service. Feedback such as “[c]annot pass registration screen” illustrates how even the initial steps of using the service are fraught with obstacles. These struggles with the digital infrastructure reflect broader technical and digital instability and highlight the fact that, at the niche level, bike-sharing innovations are not yet providing the seamless, user-friendly experience that is essential for scaling up and reaching a wider audience.

2. Regime-Level Rigidities and Misalignments

The negative feedback highlights several regime-level challenges that hinder the broader adoption and integration of bike-sharing services into mainstream urban mobility. Prominent themes emerging from the reviews include poor customer service, safety concerns, and unreliable information systems, which collectively contribute to larger systemic issues within the regime.

One of the most notable concerns is unprofessional customer service, which is repeatedly referenced in negative reviews. Users describe interactions with staff as dismissive and unhelpful, with comments such as “[t]he staff is rude. When asked for the price, they told me to look it up on the internet.” This reveals regime-level rigidities in customer service practices, suggesting that bike-sharing services are yet to fully integrate a user-centred approach, a key requirement for service-driven innovations.⁶³

⁵⁹ Kim and Hong (n 40) *supra*.

⁶⁰ Shaheen et al. (n 11) *supra*.

⁶¹ Mateo-Babiano et al. (n 7) *supra*.

⁶² Sun et al. (n 28) *supra*.

⁶³ Tiberius et al. (n 53) *supra*.

Safety concerns are another prevalent theme, with users citing unsafe biking routes and inadequate maintenance of bikes. One review states that “[r]outes were downright dangerous”, pointing to a lack of alignment between bike-sharing systems and existing city infrastructure. Literature on sustainable mobility emphasises the need for supportive infrastructure—such as safe cycling paths—for the successful adoption of PBS.⁶⁴ However, findings from this study reflect a misalignment in regime support in the Baltic states, where limited cycling infrastructure remains a significant deterrent to adoption.⁶⁵ This misalignment suggests that without regime-level improvements in safety and infrastructure, the niche-level innovations of bike-sharing services will struggle to achieve long-term viability.⁶⁶

In addition, unreliable information from the apps and bike-sharing systems further complicates the user experience. Many users express frustration with inaccurate data on bike availability, with one stating that “[t]he app does not show the actual amount of bikes parked at the station.” This is indicative of a larger technological misalignment at the regime level, where operational practices do not meet user needs for reliable and accessible data, thus reducing the likelihood of regular adoption.⁶⁷ Rigidity in policies, such as restrictive rules on bike usage based on battery levels, further highlights a disconnect between internal policies and the practical needs of users, a theme that has been observed in PBS systems globally.⁶⁸

3. Niche-Level Successes

Despite the challenges, niche-level successes provide insight into factors that enhance the user experience and contribute to the popularity of bike-sharing services. Figure 4, below, demonstrates the emergence of niche-level and regime-level success factors in bike-sharing services based on positive user reviews.

The most frequently mentioned aspect is the high-quality bikes provided by the service, which users praise for their reliability and performance. One user commented that “[t]he bikes were great for riding around the city,” while another mentioned “[e]xcellent bikes that coped well with the ice,” underscoring the importance of robust equipment in positioning bike-sharing as a dependable mobility option. These findings align with global perspectives on PBS success, where quality and durability are considered essential for user satisfaction and continued engagement.⁶⁹

Another recurring theme is professional and friendly staff, with users frequently noting how helpful and approachable the staff are. Reviews often mention interactions: “The staff was very friendly and helpful, and they have a lot of different bikes”; “Affordable, great service, fast and friendly assistance.” This reflects an effective, customer-centred approach at the niche level, aligning with studies that link user engagement and repeat usage to positive customer service.⁷⁰

The ease of booking and rental process also emerges as a significant factor contributing to user satisfaction. Positive reviews frequently describe the rental system as “straightforward” and “easy to use,” with one user explaining, “[w]e booked online with our credit card, and the whole process was very straightforward.” The simplicity and efficiency of the booking process make the service more accessible, especially for tourists and first-time users, reinforcing its convenience as a mode of transport.

The positive reviews also highlight the convenience and accessibility of bike-sharing services, as users note the benefits of easily accessing bikes across the city. For example, one user remarked, “[a]bsolutely the best way to explore the city,” emphasising how bike-sharing provides an efficient and flexible mode of urban transportation. This theme

⁶⁴ Winkler et al. (n 3) *supra*.

⁶⁵ Zhang and Mi (n 24) *supra*.

⁶⁶ Geels (n 50) *supra*.

⁶⁷ Wu and Lei (n 41) *supra*.

⁶⁸ Mateo-Babiano et al. (n 7) *supra*.

⁶⁹ Yang et al. (n 32) *supra*.

⁷⁰ Hardinghaus et al. (n 19) *supra*.

reflects the growing role of bike-sharing in promoting urban mobility and exploration, positioning it as an appealing alternative to traditional modes of transport.

4. Regime-Level Alignment and Support

Positive user feedback also indicates areas where bike-sharing services successfully align with regime-level urban mobility systems, particularly through customer-oriented practices and urban mobility integration. The theme of customer-oriented practices is frequently praised in the reviews, with users commending the staff for their helpfulness and the variety of bikes available. For instance, one review mentioned that “[s]taff was very friendly and helpful, and they have a lot of different bikes.” This highlights the importance of meeting diverse user needs, pointing to emerging alignment between the bike-sharing niche and regime-level goals for flexible and inclusive urban mobility.⁷¹

Another important theme is urban mobility integration, wherein bike-sharing services are seamlessly incorporated into the city’s transport ecosystem. Reviewers frequently describe biking as a convenient way to explore urban areas, with remarks like “[a]bsolutely the best way to explore the city,” and “[b]iking is a great way to explore [the area].” These statements reflect the growing integration of bike-sharing into mainstream urban transportation, supporting the vision of cycling as a viable and attractive alternative for city travel.

Lastly, service flexibility and accessibility is a recurring theme in positive reviews, with users appreciating the variety of bikes available and the ease of accessing the service. One user noted that “[t]hey have a lot of different bikes,” which highlights the importance of catering to diverse user needs. This flexibility enhances the overall attractiveness of bike-sharing, aligning with broader regime-level shifts towards more inclusive and adaptable transport systems that accommodate different preferences and requirements.

5. Landscape-Level Trends and Societal Drivers

While the reviews primarily focus on niche and regime-level experiences, some comments hint at broader landscape-level forces shaping bike-sharing services. For instance, the frequent praise for convenience and accessibility suggests alignment with larger societal trends towards urbanisation and the growing need for alternative, sustainable transport options. Remarks like “[b]iking is a great way to explore [the area]” indicate how bike-sharing responds to the increasing demand for eco-friendly and flexible mobility solutions in urban environments. This observation aligns with the macro-level emphasis on reducing car dependency and increasing urban liveability through sustainable mobility solutions.⁷²

In addition, some reviews reflect economic trends, where users value bike-sharing for its affordability and cost-effectiveness: “Affordable, great service, fast and friendly assistance.” These sentiments align with the macro-level push towards more economical urban mobility options, where rising transportation costs drive users toward cheaper and more sustainable alternatives like biking.

Though explicit references to environmental issues or broader policy trends are limited, the positive user experiences with technological advancements and affordability suggest that landscape-level factors, such as urbanisation, economic pressures, and sustainability, indirectly influence the growing appeal of bike-sharing services in the region.

6. Integration of Results with the Multilevel Perspective

Using the MLP framework, this study reveals interactions across niche, regime, and landscape levels that influence bike-sharing adoption. At the niche level, technical instabilities and operational challenges limit the scaling potential of bike-sharing services, as seen in recurring themes of app malfunctions, maintenance issues, and

⁷¹ Gruber (n 49) *supra*.

⁷² Canitez (n 54) *supra*.

accessibility challenges. These findings reflect the ongoing ‘growing pains’ of bike-sharing as a niche innovation that has yet to achieve consistent service quality.⁷³

At the regime level, rigidities in customer service practices and safety misalignments underscore the importance of integrating bike-sharing into broader urban mobility frameworks. Feedback on unprofessional staff interactions and dangerous routes highlights how existing regime structures—such as transportation policies and customer service standards—can inhibit user satisfaction and reduce PBS’s attractiveness as a viable transport alternative.⁷⁴ This misalignment is particularly evident in the Baltic context, where a lack of supportive cycling infrastructure and limited policy integration hinder the full adoption of bike-sharing, echoing findings from other urban areas where regime rigidity impacts the success of niche-level innovations.⁷⁵

Finally, at the landscape level, societal drivers such as sustainability, affordability, and urbanisation pressures reinforce the potential of bike-sharing to contribute to eco-friendly urban mobility. While these landscape pressures are favourable, the Baltic states’ PBS efforts remain constrained by infrastructure gaps and operational deficiencies. Addressing these regime-level issues and aligning them with niche innovations are essential steps toward building a cohesive, multi-level strategy for sustainable mobility.⁷⁶

V. Conclusion

This study analysed OCRs on bike-sharing in the Baltic States using the MLP framework, uncovering critical challenges and opportunities at niche, regime, and landscape levels. By leveraging user-generated feedback, I identified key operational barriers, including technical failures, inadequate maintenance, and infrastructure gaps, as well as successes such as user satisfaction with bike quality and service convenience. These insights

underscore the need for more integrated transport systems and targeted infrastructure investments to enhance bike-sharing adoption in urban areas.

A. Theoretical Contribution

This study extends the MLP framework by integrating the often-overlooked dimension of user feedback, particularly at the niche level. While MLP has been used to analyse the interactions between niche innovations, socio-technical regimes, and broader landscape forces,⁷⁷ this study introduces user experiences as a vital lens through which to assess the effectiveness of these transitions. By systematically analysing user reviews, I highlight how consumer dissatisfaction with niche innovations (for instance, technical failures and poor bike maintenance) can impede the transition to more sustainable transport solutions, even when landscape pressures (for instance, environmental concerns) support their adoption. Niche-level innovations—such as bike-sharing apps and electric bikes—struggle with stabilisation due to persistent technical failures and maintenance issues, echoing Kranzbühler et al.’s⁷⁸ emphasis on the importance of user experience in service innovation.

Furthermore, the study reveals that regime-level misalignments—such as a lack of cohesive infrastructure and suboptimal customer service—pose significant barriers to the adoption of sustainable mobility. The findings emphasise that even with strong landscape-level support for sustainability, unresolved niche-regime gaps, especially those related to user experience, can impede broader transitions. This study thus advances MLP by suggesting that incorporating user-centric insights is essential for understanding and modelling socio-technical transitions effectively.

B. Practical Contributions

The practical contributions of this study are equally important, especially for policymakers

⁷³ Serna et al. (n 4) *supra*.

⁷⁴ Geels (n 50) *supra*.

⁷⁵ Magdolen et al. (n 15) *supra*.

⁷⁶ Huang et al. (n 14) *supra*.

⁷⁷ Geels (n 50) *supra*.

⁷⁸ Kranzbühler et al. (n 51) *supra*.

and urban planners aiming to foster sustainable mobility in the Baltic states and similar regions aiming to advance sustainable urban mobility. The user feedback gathered in this study offers concrete insights into the operational challenges that hinder the widespread adoption of biking as sustainable mobility. Policymakers should prioritise the development of integrated infrastructure that supports bike-sharing services, including safe and well-maintained bike lanes, reliable docking stations, and efficient bike redistribution mechanisms. The findings echo previous studies that emphasise the need for cohesive infrastructure planning to ensure the success of sustainable transport systems.⁷⁹

Moreover, addressing technical failures in bike-sharing apps and improving customer service should be a top priority for bike sharing operators. As user convenience is critical to the success of these systems, improving the technological reliability of apps and ensuring user-friendly interfaces will help increase user satisfaction and drive adoption. The role of digital infrastructure, as highlighted by Alam et al.,⁸⁰ is crucial for enhancing the functionality and reliability of bike sharing. Furthermore, by leveraging social media and OCRs as a tool for real-time user feedback, policymakers and operators can gain immediate insights into areas that need improvement. This dynamic and responsive approach aligns with the call by

Huang et al.'s⁸¹ for collaborative decision-making in sustainable mobility. By actively involving users in the refinement of PBS, policymakers and operators can ensure that these systems are better tailored to the needs of local populations, improving the chances of widespread adoption.

C. Limitations and Future Research

This study's reliance on OCRs may limit the breadth of user experiences represented, as reviews often reflect the views of users who actively choose to share feedback, potentially introducing bias. Additionally, the focus on the Baltic States constrains the generalisability of findings to other regions with different socio-political and infrastructural contexts. Future research should consider incorporating more diverse data sources, such as interviews or surveys, to capture a wider range of perspectives and experiences. Expanding the geographic scope and conducting more qualitative studies (such as group interview) could provide deeper insights into the adoption of sustainable mobility.

Channels	Estonia	Latvia	Lithuania
Map	224	304	411
TripAdvisor	134	151	0
Google Play	387	45	15
Total	745	500	426

Table 1: Distribution of Online Consumer Reviews by Country and Platform

⁷⁹ Magdolen et al. (n 15) *supra*; Serna et al. (n 4) *supra*.

⁸⁰ Alam et al. (n 42) *supra*.

⁸¹ Huang et al. (n 14) *supra*.

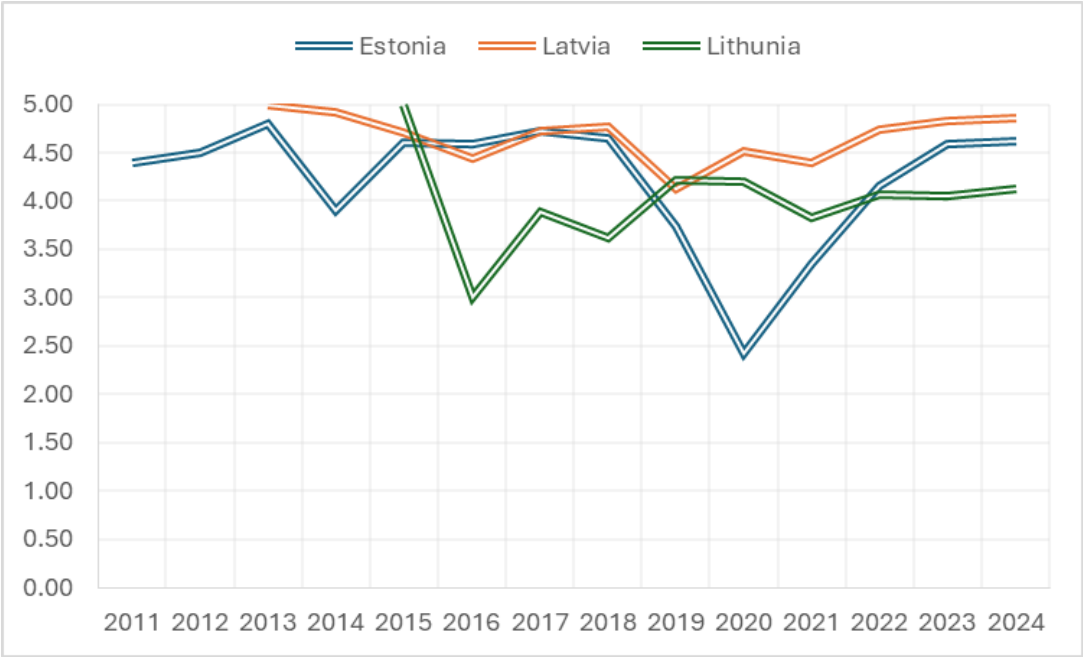


Figure 1: Trends in Average Review Ratings for Bike-Sharing Services (2011-2024)

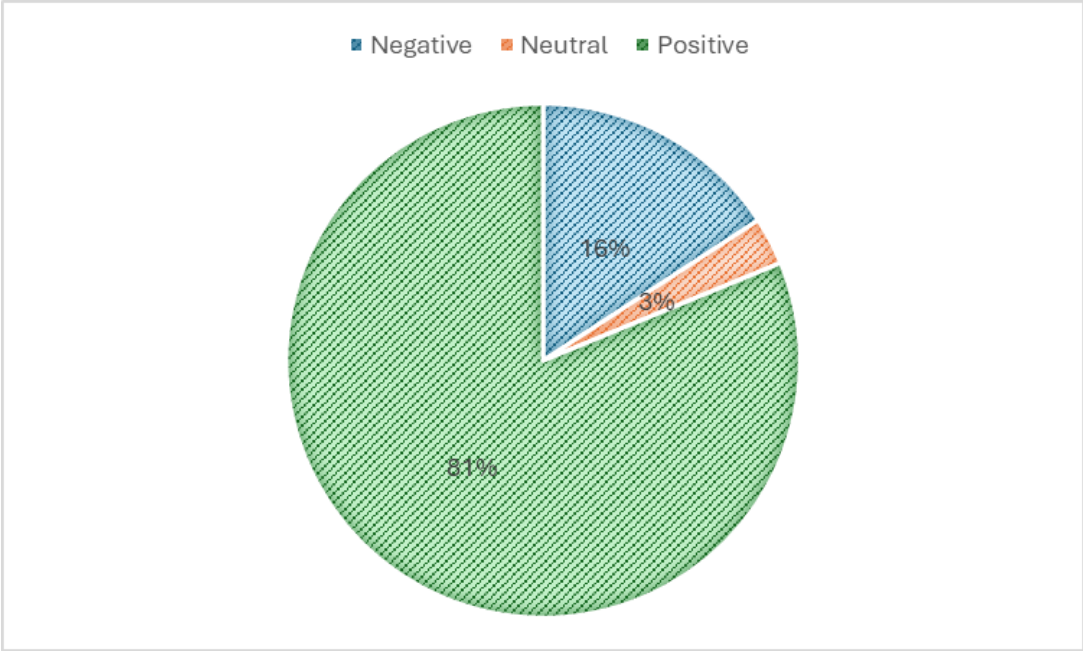


Figure 2: Sentiment Analysis of Consumer Reviews (Positive, Neutral, Negative)

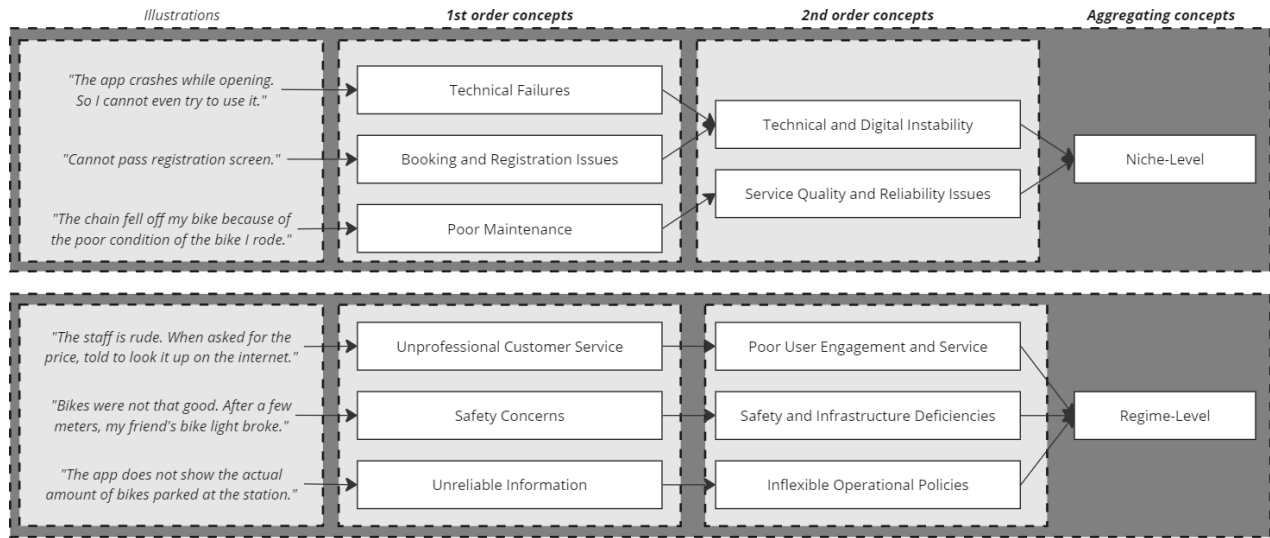


Figure 3: Emergence of Niche and Regime-Level Challenges in Bike-Sharing Services Based on Online User Reviews

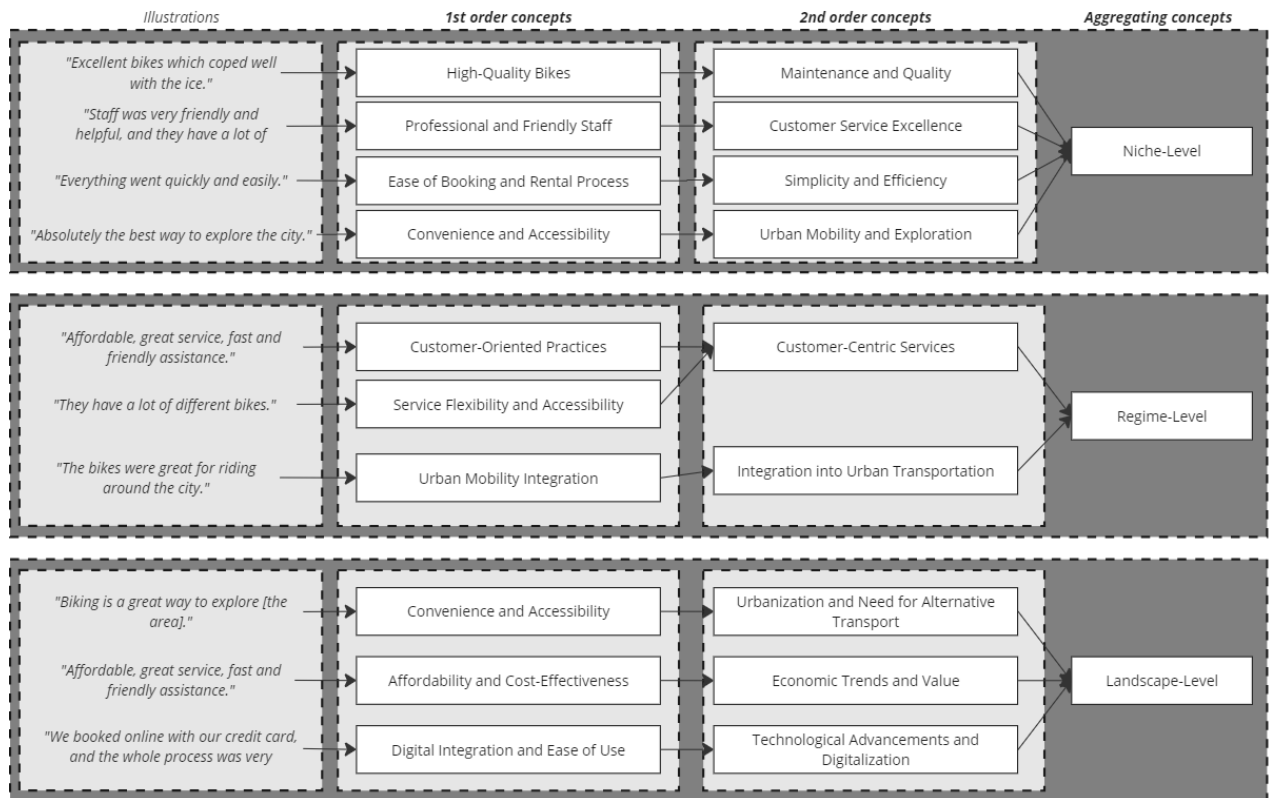


Figure 4: Emergence of Niche, Regime and Landscape-Level Success Factors in Bike-Sharing Services Based on Positive Online User Reviews

Sustainability and Purpose-Driven Companies: New Legal Trends from a Comparative Law Perspective

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KEYWORDS

*sustainable
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comparative
analysis*

ABSTRACT

As sustainability takes centre stage in the political agenda and corporate governance discussions, the law becomes crucial in facilitating the transition from shareholder primacy to responsible capitalism. The law has the potential to influence the behaviour of private companies by establishing rules that ensure businesses profit from creating benefits rather than generating detriments to society, effectively incentivising positive practices while disincentivising harmful ones. Nevertheless, the existence of a grey area for activities that do not materialise in tort, or the violation of other mandatory rules, cannot be denied, and is probably where the reconceptualisation of fiduciary duties and corporate purpose can mediate. New legal trends in these areas are analysed with a special focus on the European context and some comparative law considerations with respect to the UK and the US. An examination of the law in the books and the law in action suggests that the boundaries of directors' duties are expanding, and the dual-purpose companies' directors' management and accountability model appears an appropriate general management paradigm for the new era of responsible capitalism.



I. From Shareholder Primacy to Sustainable Corporate Governance?

¹ Shareholder primacy is a shareholder-centric model of corporate governance according to which companies should be run for the benefit of shareholders who provide risk capital to companies and the shareholders' interest must be primarily considered in decision-making. The focus of shareholder primacy thus, is on maximising the value of shareholders before considering the interests of other stakeholders of the corporation. On the contrary, in the stakeholder model companies should be run for the benefit of all the stakeholders, those who can affect the company and can be affected by the company activity; all the interested of stakeholders need

The shareholder primacy model,¹ which originated primarily within the US corporate

to be considered in the decision-making process. On the birth of the two models of shareholder and stakeholder primacy see the seminal debate between Berle and Dodd: Berle, A. "Corporate Powers as Powers in Trust." *Harvard Law Review*, vol. 44, no. 7, 1931, pp. 1049-1074 (in which the author states that managers are only bound to pursue the interests of shareholders); Dodd, E. "For Whom Are Corporate Managers Trustees?" *Harvard Law Review*, vol. 45, no. 7, 1932, pp. 1145-1163 (which states the need for the corporation, as an institution, to

framework, only recently emerged as the dominant approach in corporate practice and company law² (particularly in the second half of the nineteenth century),³ even though the pursuit of some form of public interest was one of the core elements of business corporations since their birth as chartered companies.⁴ Despite the existence of different ‘varieties of capitalism’,⁵ the Anglo-Saxon liberal market approach and the principle of shareholder primacy have influenced not only the UK and other common law systems, but also Continental Europe’s legal systems. The latter, traditionally characterised by a more significant interaction of firms with other stakeholders,⁶ such as trade unions and

financial institutions, have also been encouraged to move towards the Anglo-American model⁷ due to the growing role of the capital market and financialization.⁸ By the end of the 20th century, a notable convergence among major Western legal systems⁹ was observed, although the degree of emphasis on shareholder primacy continues to vary across jurisdictions.

In recent decades, driven by global economic and financial crises, rising inequality, ethics-related corporate scandals, and growing awareness of climate change and planetary boundary¹⁰ risks, there has been a profound rethinking of current economic and capitalist

also pursue public interests); Berle, A. “For Whom Corporate Managers Are Trustees: A Note.” *Harvard Law Review*, vol. 45, no. 8, 1932, pp. 1365-1372 (in which, responding to Dodd’s criticism, the impossibility for managers to be accountable to parties other than shareholders is reaffirmed). Numerous influential scholars and economists have supported the shareholder primacy doctrine over the years, framing it as essential for ensuring corporate accountability and efficiency, among them, Berle, A, and G Means. *The Modern Corporation and Private Property*. New York, 1932; Friedman, M. “The Social Responsibility of Business Is to Increase Its Profits.” *The New York Times Magazine*, 13 Sep., 1970; Jensen, M, and W Meckling. “Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure.” *Journal of Financial Economics*, vol. 3, no. 4, 1976, pp. 305-360; Easterbrook, F, and D Fischel. *The Economic Structure of Corporate Law*. Harvard University Press, 1991; Hansmann, H, and R Kraakman. “The End of History for Corporate Law.” *Georgetown Law Journal*, vol. 89, no. 2, 2001, pp. 439-468; Bainbridge, S. “Director Primacy: The Means and Ends of Corporate Governance.” *Northwestern University Law Review*, vol. 97, no. 2, 2003, p. 547-606; Bebchuk, L. “The Case for Increasing Shareholder Power.” *Harvard Law Review*, vol. 118, no. 3, 2005, pp. 833-914.

² see, e.g., Bainbridge, S. “Participatory Management Within a Theory of the Firm.” *Journal of Corporate Law*, vol. 21, no. 4, 1996, p. 717; Davis, K. “Discretion of Corporate Management to Do Good at the Expense of Shareholder Gain—A Survey of and Commentary on, the US. Corporate Law.” *Canada-United States Law Journal*, vol. 13, 1988, pp. 7-74; and Lund, D, and E Pollman. “The Corporate Governance Machine.” *Columbia Law Review*, vol. 121, no. 8, 2021, pp. 2563-2634, describing the United States “corporate governance machine” as a complex governance system composed of law, markets, and culture that orients corporate decision-making towards shareholders primacy.

³ Sneider, J. “The History of Shareholder Primacy, from Adam Smith through the Rise of Financialism.” *The Cambridge Handbook of Corporate Law, Corporate*

Governance and Sustainability, edited by B Sjøfjell and C Bruner, Cambridge University Press, 2019, pp. 73-85.

⁴ Williston, S. “History of the Law of Business Corporations Before 1800.” *Harvard Law Review*, vol. 2, no. 3, 1888, pp. 109-112.

⁵ The ‘varieties of capitalism’ framework, developed by political economists Peter Hall and David Soskice, refers to the fact that capitalism is not a one-size-fits-all model but varies significantly across countries. Capitalist economies, indeed, take distinct forms based on specific institutional arrangements, which influence how companies, workers, governments, and other economic actors interact: see Hall, Peter, and David Soskice. *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford University Press, 2001.

⁶ Hopt, K. “Comparative Corporate Governance: The State of the Art and International Regulation.” *American Journal of Comparative Law*, vol. 59, no. 1, 2011, pp. 28-29.

⁷ Collison, D, et al. *Shareholder Primacy in UK Corporate Law: An Exploration of the Rationale and Evidence*. Association of Chartered Certified Accountants Report 125—Certified Accountants Educational Trust (London), 2011, pp. 9-11.

⁸ Arrighi, G. *The Long Twentieth Century: Money, Power, and the Origins of Our Times*. Verso, 1994; Aglietta, M, and A Reberlioux. *Corporate Governance Adrift. A Critique of Shareholder Value*. Edward Elgar Publishing, 2005; Sneider (n 3) *supra*.

⁹ see Hansmann and Kraakman (n 2) *supra*, noting a “large degree of uniformity [on shareholder primacy] across developed market jurisdictions,” and that “[t]here is no longer any serious competitor to the view that corporate law should principally strive to increase long-term shareholder value.”

¹⁰ On the concept of planetary boundaries in business and corporate law, see, among others, Whiteman, G, et al. “Planetary Boundaries: Ecological Foundations for Corporate Sustainability.” *Journal of Management Studies*, vol. 50, no. 2, 2013, pp. 307-336; Sjøfjell, B. “Sustainable Value Creation Within Planetary Boundaries—Reforming Corporate Purpose and Duties of

systems. This has sparked calls for a new model of stakeholder or “responsible” capitalism,¹¹ where businesses generate profit not as an end in itself, but as a by-product of creating value for society as a whole. The issue of sustainability has thus taken centre stage, and debates on corporate governance and the managerial and legal concept of “corporate purpose” have gained significant traction among business and legal scholars,¹² particularly in countries rooted in Western legal traditions.¹³

Beyond a social and economic reconsideration of the capitalist system, this debate has been both driven by and has further fuelled various legal developments. On the one hand, recent legislative and regulatory initiatives at both

international and national levels have aimed to address environmental and social challenges. On the other hand, a growing pressure to reinterpret directors’ fiduciary duties in terms of sustainability has emerged, fuelled by the rise of sustainability-related lawsuits¹⁴ (supported by ESG, climate, and human rights litigation funds that increase access to justice),¹⁵ and ESG-driven shareholder activism.¹⁶ However, it must be stressed that, in both cases, the outcomes in terms of sustainability have been mixed, for and against sustainability.¹⁷ This reinterpretation of directors’ duties expands the board’s legal exposure beyond traditional fiduciary and tort liability, opening the door to actions against directors for breaching their duty of care, diligence, and oversight in

the Corporate Board.” *Sustainability*, vol. 12, no. 15, 2020, p. 6245; Veldman, J, and A Jansson. “Planetary Boundaries and Corporate Reporting: The Role of the Conceptual Basis of the Corporation”. *Accounting, Economics, and Law*, vol. 10, no. 2, 2020, p. 20180037; Heikkurinen, P, et al. “Managing the Anthropocene: Relational Agency and Power to Respect Planetary Boundaries.” *Organization & Environment*, vol. 34, no. 2, 2021, pp. 267-286.

¹¹ see the many contributions on this issue published in the ECGI Blog, available online.

¹² On the corporate purpose debate see Mayer, C. *Firm Commitment*. Oxford University Press, 2013; Mayer, C. “Who’s Responsible for Irresponsible Business? An Assessment.” *Oxford Review of Economic Policy*, vol. 33, no. 2, 2017, pp. 157-175; Mayer, C. *Prosperity: Better Business Makes the Greater Good*. Oxford University Press, 2018; *The Future of the Corporation: Principles for Purposeful Business*. The British Academy, 2019; Bebchuk, L, and R Tallarita. “The Illusory Promise of Stakeholder Governance.” *Cornell Law Review*, vol. 106, no. 1, 2020, pp. 91-177; Mayer, C. “Shareholderism Versus Stakeholderism – A Misconceived Contradiction: A Comment on ‘The Illusory Promise of Stakeholder Governance’ by Lucian Bebchuk and Roberto Tallarita.” *Cornell Law Review*, vol. 106, no. 7, 2020, pp. 1859-1879; Rock, E. “For Whom Is The Corporation Managed in 2020?: The Debate Over Corporate Purpose.” European Corporate Governance Institute, Law Working Paper No. 515/2020; Fisch, J, and S Davidoff Solomon. “Should Corporations Have a Purpose?” *Texas Law Review*, vol. 99, no. 7, 2020, pp. 1309-1346; Edmans, A. *Grow the Pie: How Great Companies Deliver Both Purpose and Profit*, Cambridge University Press, 2020; Fleischer, H. “Corporate Purpose: A Management Concept and Its Implications for Company Law.” *European Company and Financial Law Review*, vol. 18, no. 2, 2021, pp. 161-189; Lund, D, and E Pollman. “The Corporate Governance Machine.” *Columbia Law Review*, vol. 121, no. 8, 2021, pp. 2563-2634; Strine, L. “Restoration: The Role

Stakeholder Governance Must Play in Recreating a Fair and Sustainable American Economy – A Reply to Professor Rock.” *Business Law*, vol. 76, no. 2, 2021, pp. 397-436; Mayer, C. *Capitalism and Crises: How to Fix Them*. Oxford University Press, 2024.

¹³ Puchniak, D. “No Need for Asia to be Woke: Contextualizing Anglo-America’s ‘Discovery’ of Corporate Purpose.” *RED*, vol. 4, no. 1, 2022, pp. 14-21.

¹⁴ see, for example, *Milieudefensie v Royal Dutch Shell plc* ECLI:NL:RBDHA:2021:5339, The Hague District Court, 26 May 2021; *ClientEarth v Shell Plc & Ors* [2023] EWHC 1137 (Ch); *John Trotter, Trustee of the PG&E Fire Victim Trust v Lewis Chew & Ors*, San Francisco Superior Court Case No CGC-18-572326, 2021.

¹⁵ Among the major litigation funds pursuing ESG investments are Therium, Deminor, Woodsford, North Wall Capital, and Litigation Lending Services.

¹⁶ Katelouzou, D. “Worldwide Hedge Fund Activism: Dimensions and Legal Determinants.” *University of Pennsylvania Journal of Business Law*, vol. 17, no. 3, 2015, pp. 789-860; Castañón Moats, M, et al. “The Director’s Guide to Shareholder Activism.” *Harvard Law School Forum on Corporate Governance*, 11 June 2021; Mocanu, D, and L Ventura. “Future of Boards – Legal and Regulatory Frameworks for Sustainability (Phase 1, Part 2).” University of Cambridge Institute for Sustainability Leadership Technical Report, 2023, [6]-[7].

¹⁷ In the UK, in the specific field of directors’ duties, see e.g., the negative outcomes for sustainability issues of *ClientEarth* (n 14) *supra*, where the England and Wales High Court dismissed ClientEarth’s application for permission to bring a derivative action against Shell’s directors in respect of their alleged failures to properly address the risks of climate change; and *McGaughey & Anor v Universities Superannuation Scheme Ltd & Ors* [2023] EWCA Civ 873, where the England and Wales Court of Appeal rejected an appeal brought by academics requesting permission to bring a derivative claim against the directors of a university pension scheme for its alleged failure to divest from fossil fuels.

relation to violations of existing sustainability obligations and commitments arising from various sources. In this transition from maximising shareholder value to responsible capitalism, the concept of purpose-driven organisations (that is, business organisations aligning their reason to exist with improving the long-term wellbeing of people and planet)¹⁸ becomes crucial. Businesses must adapt to promote wider prosperity producing “profitable solutions to the problems of people and planet and not to profit from producing problems for people or planet.”¹⁹

When considering the role of law in shaping strategies to ensure that businesses profit from generating benefits for the society rather than causing harm, it is important to distinguish between legal interventions aimed at incentivising positive outcomes and those designed to disincentivise negative ones. The creation of harms is typically regulated by law through tort and specialised statutes, particularly in areas like labour, human rights, and environmental protection. More recently, new legislation on supply chain due diligence has been enacted to specifically address companies’ negative social and environmental impacts throughout their value chain. Nevertheless, it is undeniable that a grey area exists for activities that do not rise to the level of tort or violate other mandatory regulations. Some lawful activities can generate profits for the company while simultaneously creating negative externalities for the community and the environment, without falling under any legal liability scenario. This grey area is where the role of purpose and the legal reconceptualisation of directors’ duties can serve as a crucial mediating force. When it comes to promoting the production of societal benefits, legislative intervention is more complex due to the widely accepted constitutional principle of freedom of economic initiative, which limits excessive state intrusion into entrepreneurs’ and shareholders’ private ordering. As a

result, efforts to steer companies toward generating societal benefits were initially pursued through self-regulation and soft law mechanisms, such as codes of ethics, principles and guidelines from international organisations, and corporate governance and stewardship codes based on the ‘comply or explain’ approach.

More recently, mandatory disclosure requirements and capital markets regulations have been introduced to nudge companies in this direction. While these rules do not directly influence the decision-making process, they demand greater transparency regarding sustainability impacts and help channel investments toward sustainable products and firms. In recent years, these hard law measures have been complemented by direct interventions in company law, particularly through the introduction of dual-purpose companies in several jurisdictions as optional legal forms. These companies are characterised by a ‘dual’ or ‘blended’ purpose: they aim not only to generate profit (the profit-making purpose) but also to deliver public or common benefits (the public benefit purpose) by reducing negative externalities and creating a positive impact on the environment and society through their business activities. Due to the limitations of voluntary and soft law instruments, legislators have thus increasingly intervened to impose sanctions on harmful practices and to encourage companies to create benefits for society.

In the following paragraphs, the aforementioned legal trends will be explored, with a particular focus on the European context, along with comparative law considerations regarding the UK and the US. From this investigation will become clear that sustainability is increasingly central to the governance of commercial companies, and that directors’ duties are evolving to encompass a growing array of sustainability

¹⁸ This is the definition elaborated in 2022 by the British Standards Institution (BSI), PAS Standard 808, *Purpose-Driven Organisations: Worldviews, Principles and Behaviours*, 2022.

¹⁹ see The British Academy’s Future of the Corporation initiative, in particular *Reforming Business for the 21st Century – A Framework for the Future of the Corporation*. The British Academy, 2018.

obligations. In this context, it seems that the management and accountability model advanced by dual-purpose companies offers an appropriate management paradigm for the new era of responsible capitalism.

II. Directors' Duties Developments

According to company law, directors' duties are generally owed to the "company as a whole"²⁰ but in practice this has been often interpreted in such a way as to give priority to the interests of shareholders. Currently, we see an increasing pressure to reinterpret the content of directors' fiduciary duties in terms of sustainability and thus requiring directors to take into account the interests of stakeholders and, more generally, of the society as a whole.

In the UK, the issue of shareholder primacy was addressed during the preparatory work for the 2006 Companies Act reform,²¹ which codified directors' fiduciary duties that had previously been governed primarily by case law (according with a shareholder-oriented common law duty). In particular, the new section 172 of the Companies Act 2006 imposes on directors the duty to "promote the success of the company for the benefit of its members as a whole"²² and introduced the so-

called "enlightened shareholder value" providing that directors have regard to a broad range of interests, balancing the interests of shareholders with other stakeholder interests, including the promotion of environmental, social and governance (ESG) objectives.²³ The provision, which captured some aspects of corporate governance pluralist approaches and the long-term perspective, does not represent a substantive change because it does not compel directors to act based on stakeholders' interests (they are only required to "have regard" to them). Since its enactment, section 172 occupied a relevant space in policy and academic discussions in the UK and abroad,²⁴ but the mainstream interpretation of the new provision sees the preservation of shareholder primacy as a key principle of UK company law.²⁵ To better align the interests of shareholders with those of the society and the environment, the Better Business Act campaign was launched in 2021 to further amend section 172, providing that the duty of a director is to "advance the purpose of the company" to benefit its members as a whole and the wider society and the environment, having regard to the interests of the stakeholders and reducing or eliminating the harms the company creates, or costs it imposes on them.²⁶

²⁰ Mocanu and Ventura (n 16) *supra* at pp. 64-67.

²¹ Great Britain Company Law Review Steering Group, *Modern Company Law, For A Competitive Economy: Developing the Framework*. Department of Trade and Industry, 2000.

²² Companies Act 2006, s. 172: "(1) A director of a company must act in the way he considers, in good faith, would be most likely to promote the success of the company for the benefit of its members as a whole, and in doing so have regard (amongst other matters) to – (a) the likely consequences of any decision in the long term, (b) the interests of the company's employees, (c) the need to foster the company's business relationships with suppliers, customers and others, (d) the impact of the company's operations on the community and the environment, (e) the desirability of the company maintaining a reputation for high standards of business conduct, and (f) the need to act fairly as between members of the company."

²³ Environmental, Social, and Governance—ESG—are the key criteria used to evaluate the sustainability and ethical impact of companies or organisations. ESG criteria are increasingly used by investors, regulators, and companies to assess investment decisions, risks, and

opportunities in alignment with sustainable and responsible business practices.

²⁴ Among others, Harper Ho, V. "Enlightened Shareholder Value": Corporate Governance Beyond the Shareholder-Stakeholder Divide." *Journal of Corporate Law*, vol. 36, no. 1, 2010, pp. 59-112; Ho, K. "Director's Duty to Promote the Success of the Company: Should Hong Kong Implement a Similar Provision?" *Journal of Corporate Law Studies*, vol. 10, no. 1, 2010, pp. 17-33; Zhao, J. "Promoting More Socially Responsible Corporations Through UK Company Law After the 2008 Financial Crisis: The Turning of the Crisis Compass." *International Criminal Court Law Review*, vol. 22, no. 9, 2011, pp. 275-284.

²⁵ Williams, R. "Enlightened Shareholder Value in UK Company Law." *UNSW Law Journal*, vol. 35, no. 1, 2012, pp. 360-377.

²⁶ see the Better Business Act Campaign, according to which s. 172 of the Companies Act 2006 shall be amended and replaced in its entirety as follows: "(1) A director of a company must act in the way the director considers, in good faith, would be most likely to advance the purpose of the company, and in doing so must have

In the US, the “success of the company” is not mentioned in Delaware corporate law, neither in the Model Business Corporations Act (MBCA),²⁷ nor in the American Law Institute (ALI) Principles of Corporate Governance,²⁸ all referring to the duty of directors to perform their functions in “good faith” and in a manner believed to be “in the best interest of the corporation.” As for corporate purpose, the ALI Principles explicitly state in section 2.01 that “a corporation should have as its objective the conduct of business activities with a view to enhancing corporate profit and shareholders gain.”²⁹ The *ALI Restatement of the Law of Corporate Governance* project, aimed at capturing the evolution of corporate law, including the recent emphasis on ESG issues, attempted to revise the content of section 2.01 on the objective of a corporation. However, the tentative draft, which includes a reference to the possibility of considering interests of different stakeholders (employees, suppliers, customers, the community, the environment, and ethical considerations) has encountered several critics.³⁰ From a general perspective, although

from the 1980s most US states (but not Delaware) have adopted constituency statutes³¹ allowing or requiring boards to have regard to the interests of stakeholders other than shareholders,³² shareholder primacy is still considered the underpinning principle of corporate law, especially in Delaware, where, according to case law, directors, as agent of the corporation’s shareholders,³³ owe their duties primarily to the corporation’s shareholders.³⁴

In the European Union, company law harmonisation directives do not reference the “success of the company” and have not yet addressed the definition of “corporate purpose” or the content of directors’ duties, leaving these matters largely within the jurisdiction of individual Member States. An effort to move in this direction was made with the European Commission’s proposal for a Corporate Sustainability Due Diligence

regard (amongst other matters) to the following considerations – (a) the likely consequences of any decision in the long term, (b) the interests of the company’s employees, (c) the need to foster the company’s business relationships with suppliers, customers and others, (d) the impact of the company’s operations on the community and the environment, (e) the desirability of the company maintaining a well-deserved reputation for trustworthiness and high standards of business conduct, and (f) the need to act fairly as between members of the company. (2) The purpose of a company shall be to benefit its members as a whole, whilst operating in a manner that also – (a) benefits wider society and the environment in a manner commensurate with the size of the company and the nature of its operations; and (b) reduces harms the company creates or costs it imposes on wider society or the environment, with the goal of eliminating any such harm or costs. (3) A company may specify in its Articles a purpose that is more beneficial to wider society and the environment than the purpose set out in subsection (2).”

²⁷ Revised Model Business Corporations Act § 8.30: Standards of Conduct for Directors: “(a) Each member of the board of directors, when discharging the duties of a director, shall act: (i) in good faith, and (ii) in a manner the director reasonably believes to be in the best interests of the corporation.”

²⁸ American Law Institute Principles of Corporate Governance: Analysis and Recommendations § 4.01(a).

²⁹ *ibid* at § 2.01.

³⁰ *see, e.g.*, Orts, E. “The ALI’s Restatement of the Corporate Objective Is Flawed.” *The CLS Blue Sky Blog: Columbia Law School’s Blog on Corporations and the Capital Markets*, 6 Jun. 2022.

³¹ On this issue, *see* Bainbridge, S. “Interpreting Nonshareholder Constituency Statutes.” *Pepperdine Law Review*, vol. 19, no. 3, 1992, pp. 971-1025; von Stange, G, “Note. Corporate Social Responsibility Through Constituency Statutes: Legend or Lie?” *Hofstra Labour & Employment Law Journal*, vol. 11, no. 2, 1994, pp. 461-497; Bisconti, A. “Note. The Double Bottom Line: Can Constituency Statutes Protect Socially Responsible Corporations Stuck in Revlon Land?” *Loyola of Los Angeles Law Review*, vol. 42, no. 3, 2009, pp. 765-805.

³² Sjøfjell, B, et al. “Shareholder Primacy: The Main Barrier to Sustainable Companies.” *Company Law and Sustainability: Legal Barriers and Opportunities*, edited by B Sjøfjell and B Richardson, Cambridge University Press, 2015, p. 98.

³³ 8 Delaware Code § 141 *et seq.*

³⁴ In case law, *see, for example*, *Guth v Loft, Inc*, 5 A.2d 503, 510 (Del. 1939); *Revlon, Inc v MacAndrews & Forbes Holdings, Inc*, 506 A.2d 173, 182 (Del. 1958); *Unocal Corp v Mesa Petroleum Co*, 493 A.2d 946, 955 (Del. 1985); *Polk v Good*, 507 A.2d 531, 536 (Del. 1986); *N Am Catholic Education Programming Foundation, Inc v Gheewalla*, 930 A.2d 92, 101 (Del. 2007); *In Re Trados Incorporated Shareholder Litigation*, Civil Action No. 1512-CC (Del. Ch. Jul. 24, 2009); *eBay Domestic Holdings, Inc v Newmark*, 16 A.3d 1, 34 (Del. Ch. 2010).

Directive (CSDDD),³⁵ published in February 2022.³⁶ One of its initial aims was also to harmonise certain aspects of directors' duties in European companies. The original text of the proposal prepared by the European Commission, indeed, provided for a broader duty of care. According to the original article 25, directors, in fulfilling their duty to act in the best interests of the company, should have considered the consequences of their decisions for sustainability matters (including human rights, climate change and environmental consequences) across the short, medium and long terms. The provisions on directors' duties, though, were removed from the final text approved by the EU Institutions in June 2024. At Member State level, the "success of the company" or the "company purpose", intended as the ultimate goal of the business to contribute to the common good, other than the legal purpose,³⁷ is traditionally not mentioned by legislators. Reference is made to the concept of "company interest" with its slightly different interpretations in the

various legal systems (generally open to the possible consideration of other stakeholders' interests).³⁸

A jurisdiction in Europe that recently attempted to revise the traditional domestic concept of "company interest" is France with the *Loi Pacte* of 2019.³⁹ The reform that was drawn up based on the Notat-Senard Report⁴⁰ and previous academic studies⁴¹ addresses both managerial duties and new optional legal forms (analysed in the next paragraph). As for the first issue, amending article 1833 of the Civil Code,⁴² the reform introduced a new paragraph applicable to all company types, which enshrines the jurisprudential notion of "company interest"⁴³ and expands it in view of sustainability considerations, providing a general obligation for boards to manage the company in the "company interest" (*intérêt social*), "taking into consideration the social and environmental challenges of its activity."⁴⁴ Even though interpretations vary as to the actual relevance of the legislative

³⁵ Proposal for a Directive of the European Parliament and of the Council on Corporate Sustainability Due Diligence and Amending Directive (EU) 2019/1937, of 23 February 2022, COM(2022) 71, 2022/0051 (COD).

³⁶ On the European Commission Proposal, see Ventura, L. "Corporate Sustainability Due Diligence and The New Boundaries of the Firms in the European Union." *European Business Law Review*, vol. 34, n. 2, 2023, p. 239-268.

³⁷ see Joly, H. "Creating a Meaningful Corporate Purpose." *Harvard Business Review*, 28 Oct. 2021.

³⁸ see, e.g., the examples of Italy, Portugal, Germany, Austria, Spain, and France, as described by Tombari, U. "Potere" e "Interessi" Nella Grande Impresa Azionaria. Giuffrè, 2019, pp. 38-47.

³⁹ Law No 2019-486 of May 22, 2019, art. 169, art. 176.

⁴⁰ Senard, J, and N Notat. *L'Entreprise, Objet D'Intérêt Collectif*. French Ministry of Economy, Finance, and Industry, 9 Mar. 2018.

⁴¹ Segrestin, B, and A Hatchuel. *Refonder L'Entreprise*. Seuil, 2012; Segrestin, B, et al. *L'Entreprise: Point Aveugle du Savoir*. Éditions Sciences Humaines, 2014; Segrestin, B, et al. *La "Société à Objet Social Étendu": Un Nouveau Statut pour L'Entreprise*. Presses des Mines via OpenEdition, 2016; Levillain, K. *Les Entreprises à Mission: Un Modèle de Gouvernance pour L'Innovation*. Vuibert, 2017.

⁴² Code Civil art. 1833[2]: "La société est gérée dans son intérêt social, en prenant en considération les enjeux sociaux et environnementaux de son activité."

⁴³ The reference is to the concept of "enterprise" as opposed to that of "company", and to the institutional conception of the company, as opposed to the

proprietary and contractual one. A consolidated case law in France states the superiority of the "company interest" (or "enterprise's interest") as the independent common interest of the company, other than the interest of shareholders, which is not a juxtaposition of stakeholder interests, nor those of its associates. According to this conception of "company interest", a company must take into consideration the interest of its stakeholders. On this issue, see Hiez, D. "The Suitability of French Law to B Corp." *The International Handbook of Social Enterprise Law: Benefit Corporations and Other Purpose-Driven Companies*, edited by H Peter et al., Springer Nature, 2023, pp. 572-573; Cohen, E. *La Société à Mission*. Hermann, 2019, pp. 50-54. On the concept of "enterprise" see Levillain, K, et al. "Profit-with-Purpose Corporations: An Innovation in Corporate Law to Meet Contemporary CSR Challenges." *The Oxford Handbook of Corporate Social Responsibility: Psychological and Organizational Perspectives*, edited by A McWilliams et al., Oxford University Press, 2019, p. 490; Segrestin, B, et al. "When the Law Distinguishes Between the Enterprise and the Corporation: The Case of the New French Law on Corporate Purpose." *Journal of Business Ethics*, vol. 171, no. 1, 2021, pp. 1-13.

⁴⁴ It seems that the law, therefore, recognises the existence of a superior social interest of the company itself, distinct from that of the members, employees, customers or creditors, extended to other considerations than the financial ones. On this issue, see the report of the working group Association Française Des Entreprises Privées (AFEP) and Conseil National Du Patronat Français (CNPF), *Le Conseil d'Administration des Sociétés*

amendment,⁴⁵ it can nevertheless be regarded as a step forward in legally providing a new management paradigm where social and environmental dimensions enter the decision-making process, and directors are at least explicitly required to consider them in their activity.⁴⁶ Moreover, amending article 1835 of the Civil Code, the reform allowed any company to specify in its articles of association, on a voluntary basis, a “*raison d’être*”⁴⁷ (literally the “reason for being”), the principles the company is endowed with, that wants to pursue in its business⁴⁸ and for the pursuit of which it intends to allocate means (for instance, through investment or innovation strategies).⁴⁹ The consequence of the reform is that directors should consider the social and environmental dimensions as well as the existing *raison d’être* in setting the strategic direction of the company’s activities.⁵⁰

The topic of corporate purpose and fiduciary duties has historically been at the centre of scholarly debate, but it is worth noting that in the legal sphere no substantial radical reforms can be observed, with the partial exception of the 2019 French reform.

III. The Birth of Dual-Purpose Companies

Another significant legal trend, alongside the evolutions in the area of directors’ duties, is an advancement in organisational forms. Due to the widespread cultural and legal dominance of shareholder primacy, recent decades have witnessed the emergence of new hybrid legal entities designed to help businesses address social and environmental objectives. In the UK, the “community interest company” (CIC) was introduced in 2004.⁵¹ CICs are blended legal structures⁵² for businesses that primarily have social and environmental objectives and whose surpluses are principally reinvested in the business or in the community, rather than being driven by the need to maximise profit for shareholders. CICs can raise equity capital as well as for-profit companies but company’s assets shall be dedicated to public benefit. Thus, the distribution of dividends is capped at 35% of the aggregate total company profits⁵³ and in the event of dissolution a CIC’s assets must go to similar entities pursuing community benefits. CICs are overseen by the CIC Regulator, which ensures compliance with the “community interest test” (verifying that the CIC’s activity is carried on for the benefit of

Cotées, Jul. 1995, p. 8; Heinich, J. “Intérêt Propre, Intérêt Supérieur, Intérêt Social.” *Revue des Sociétés*, vol. 10, 2018, p. 568; Schmidt, D. “La Loi PACTE et L’Intérêt Social.” *Recueil Dalloz*, 2019, p. 633.

⁴⁵ Some scholars question the concrete consequences of such amendment, considering that the social and environmental dimensions are not part of the “company interest”, but they represent additional considerations. Thus, the directors’ decision must follow the company interest while social and environmental consequences need only to be taken into account. For this analysis see Hiez (n 43) *supra*.

⁴⁶ Commercial Code, art. L. 225-35 and L. 225-64, as amended by the *Loi Pacte*.

⁴⁷ The *raison d’être* shapes the identity and vocation of a company, and it must be consistent with the general principle of creating a positive impact on society and the environment provided by art. 1833[2] of the Civil Code. It entails those guiding principles that determine the long-term strategic orientation of a company and integrates the economic dimension of the corporate purpose: see the description provided by the Conseil d’État in its *Avis sur un Projet de Loi Relatif à la Croissance et la Transformation des Entreprises*, No. 384.599 and 395.021, 14 Jun. 2018, p. 39, which describes it as “... un dessein, une ambition, on toute

autre considération générale tenant à l’affirmation de ses valeurs ou de ses préoccupations de long terme.”

⁴⁸ As suggested by scholars, the *raison d’être* must be sufficiently precise to support decision-making and cannot be merely anecdotal because it can impact the activity and corporate decisions. It must be used to clarify the corporate purpose and its extension.

⁴⁹ Civil Code art. 1835: “Les statuts peuvent préciser une raison d’être, constituée des principes dont la société se dote et pour le respect desquels elle entend affecter des moyens dans la réalisation de son activité.”

⁵⁰ Commercial Code, art. L. 225-35 and L. 225-64.

⁵¹ Companies (Audit, Investigations and Community Enterprise) Act, 2004, c. 27, s. 26. In legal literature, see, e.g., Lloyd, S. “Transcript: Creating the CIC.” *Vermont Law Review*, vol. 35, no. 1, 2010, pp. 31-43; Esposito, R. “The Social Enterprise Revolution in Corporate Law.” *William & Mary Business Law Review*, vol. 4, no. 2, 2013, pp. 674-678.

⁵² Both companies limited by guarantee and companies limited by shares can acquire CIC status.

⁵³ see Office of the Regulator of Community Interest Companies. *Community Interest Companies: Guidance Chapters, Chapter 6: The Asset Look*, p. 6.

the community)⁵⁴ and receives the CIC's annual report. It is worth noting that CICs do not have tax advantages and are subject to the corporation tax regime. CICs represent a first step towards a new blended-value entity, but they have non-distribution constraint limits that characterise the non-profit sector.⁵⁵

In the US, several more innovative hybrid entities combining for-profit and non-profit objectives were developed. Among them, the low-profit limited liability company,⁵⁶ the social purpose corporation,⁵⁷ and the benefit corporation. The latter is the most widespread among US states and represents the archetype of dual-purpose company legal forms. Benefit corporations are for-profit corporations whose purpose, in addition to producing profits, is to reduce negative externalities and generate a positive impact on the environment, society, the workers, and the community in which they operate. They differ from traditional business corporations in entity purpose, directors' accountability, and

transparency, but not in taxation. The first benefit corporation statute passed in Maryland in 2010. Currently, about forty US jurisdictions have passed statutes,⁵⁸ the majority of which are inspired by the Model Benefit Corporation Legislation,⁵⁹ while Delaware introduced its own slightly different statute in 2013 with the Public Benefit Corporation Act.⁶⁰

The benefit corporation legal model circulated in other jurisdictions in Europe, Latin America and Canada.⁶¹ In Europe, it was transplanted at first in Italy in 2015 with the introduction of "*società benefit*",⁶² which allows the internalisation in the articles of association of social and environmental objectives ("*beneficio commune*"), making them legally binding for the directors that must manage the company in a responsible, sustainable and transparent manner, balancing the financial interests of the shareholders, the interests of other stakeholders, and the specific public benefits identified in the company agreement.

⁵⁴ Companies (Audit, Investigations and Community Enterprise) Act, 2004, c. 27, s. 35(2), according to which "A company satisfies the community interest test if a reasonable person might consider that its activities are being carried on for the benefit of the community."

⁵⁵ On this issue, see Hansmann, H. "The Role of Nonprofit Enterprise." *Yale Law Journal*, vol. 89, no. 5, 1980, pp. 835-901; Hansmann, H. "Reforming NonProfit Corporations Law." *University of Pennsylvania Law Review*, vol. 129, no. 3, 1981, p. 500.

⁵⁶ The first statute for Low-Profit Limited Liability Companies (L3C) was introduced in Vermont in 2008: Vt. Stat. Ann. Tit. 11, §3001(27). Other states such as Illinois, Louisiana, Maine, Michigan, Rhode Island, Utah, and Wyoming introduced L3C statutes. L3Cs are companies aimed primarily at performing a socially beneficial (charitable or educational) purpose, and not at maximising income. In particular, the L3C legal form is designed to make it easier for socially oriented businesses to attract investments from foundations, simplifying compliance with the Internal Revenue Service's 'Program Related Investments' (PRI) regulations: I.R.C. §§4944(c); 170(c)(2)(B); 26 CFR 53.4944-3(b) Ex. (3). The purpose of the L3C statute is to attract PRIs from foundations, investments considered by the IRS as "qualifying distributions", meaning that they count toward the IRS's requirement that private foundations spend 5% of their net worth in any given year. Indeed, thorough PRIs private foundations can satisfy their obligation under the Tax Reform Act of 1969 to distribute annually at least 5% of their assets for charitable purposes. Investments in L3Cs that qualify as PRIs can fulfil this requirement while allowing the

foundations to receive a return from the investment. L3Cs have been widely criticised for their unclear regulation under tax law. On L3Cs see Kelley, T. "Law and Choice of Entity on the Social Enterprise Frontier." *Tulane Law Review*, vol. 84, no. 2, 2009, p. 356; Lang, R, and E Carrott Minnigh. "The L3C, History, Basic Construct, and Legal Framework." *Vermont Law Review*, vol. 35, no. 1, 2010, p. 15; Esposito (n 51) *supra*; Murray, J. "The Social Enterprise Law Market." *Maryland Law Review*, vol. 75, no. 2, 2016, pp. 545-546.

⁵⁷ It was introduced for the first time in California in 2011 (formerly known as the flexible purpose corporation), then in a few other states, like Washington in 2012 and in Florida in 2014. The SPC is a new corporate entity enabling directors to consider and give weight to one or more social and environmental purposes in decision-making. Unlike the L3C, where the charitable purpose overrides profit maximisation, the SPC gives directors the discretion to choose social and environmental purposes over profits: see Esposito (n 51) *supra*.

⁵⁸ For further information, see the Social Enterprise Law Tracker, available online.

⁵⁹ The Model Benefit Corporation Legislation has been drafted by Bill Clark and B Lab with the support of the American Sustainable Business Council.

⁶⁰ Delaware Code Ann. Tit. 8, §§361-368.

⁶¹ Similar hybrid models have been introduced in Colombia, Ecuador, Peru and Uruguay ("*Sociedades de Beneficio e Interés Colectivo*"), and in British Columbia in Canada ("benefit company").

⁶² Law No. 208, 28 December 2015, art. 1, [376]-[384].

A similar dual-purpose company structure has been introduced in Spain in 2022, the “*sociedades de beneficio e interés común*”,⁶³ and in France with the *Loi Pacte* of 2019. The latter regulated an optional dual-purpose legal form, the “*société à mission*”, close to the US benefit corporation but characterised by different governance features to control the purpose. It allows a for-profit company to incorporate into the articles of association, together with the *raison d’être*, one or more social and / or environmental objectives that wants to pursue in the framework of its activity,⁶⁴ which must be considered in the management of the company and monitored by a new dedicated internal body, the “*comité de mission*” (or “*réfèrent de mission*” for companies with less than 50 employees).⁶⁵ The most innovative aspect of these new corporate forms is that they not only allow but require directors to take into account social and environmental objectives, which enter the articles of association and the “company interest”, and provide for clear accountability and disclosure mechanisms.

At the European level, although some Member States have introduced dual-purpose companies, there is not a harmonised dual-purpose company legal structure for purpose-driven organisations, a structure aimed at greater integration of sustainability into business operations in terms of purpose, director duties, and impact reporting. The Union instead, has taken action in other areas, such as disclosure requirements and supply chain due diligence, as discussed below.

However, the introduction of a uniform or harmonised dual-purpose company legal structure could be useful to include in the European framework by specific rules to incentivise business to profit from creating benefit for the society. It could be modelled on the dual-purpose company examples developed in Italy and France and introduced through the enactment of an EU regulation establishing a European hybrid model (for instance, a “European benefit company”), or a harmonisation directive requiring Member States to regulate a dual-purpose company at the domestic level.

IV. Sustainability Reporting and Disclosure Requirements

In recent years, significant further legal developments around sustainability have taken place in the area of disclosure of non-financial information. Sustainability reporting and disclosure requirements, indeed, moved from voluntary corporate actions to mandatory legal obligations. The main aim of this shift is to promote transparency on companies’ impacts and improve comparability between companies’ sustainability information. To that end, several harmonisation initiatives of sustainability-related reporting standards have been developed at the international and regional levels.⁶⁶ Examples are the increasing number of countries mandating the alignment of climate risk disclosures with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD),⁶⁷ like the UK;⁶⁸ the adoption of the

⁶³ Law No. 18/2022, 28 Sep. 2022.

⁶⁴ Commercial Code, art. L. 210-10.

⁶⁵ See Segrestin, B, and K Levillain. “Profit-with-Purpose Corporations: Why Purpose Needs Law and Why it Matters for Management.” *European Management Review*, vol. 20, no. 4, 2023, pp. 733-740.

⁶⁶ On the necessity to define common metrics for sustainable value creation, see, e.g., *Measuring Stakeholder Capitalism: Towards Common Metrics and Consistent Reporting of Sustainable Value Creation*. World Economic Forum, 2020.

⁶⁷ In 2015, the Financial Stability Board (FSB) created the TCFD to develop recommendations on the types of information that companies should disclose to support investors, lenders, and insurance underwriters in assessing and pricing risks related to climate change. The TCFD’s recommendations report was published in

2017. It contains recommended disclosures around four thematic areas (governance, strategy, risk management, and metrics and targets) that should help investors and others to understand how report and assess climate-related risks and opportunities. In 2023, the TCFD has been disbanded, and the International Financial Reporting Standards (IFRS) Foundation is now in charge of the monitoring of the progress of companies’ climate-related disclosures.

⁶⁸ The UK since 2022 mandated TCFD-aligned disclosure for large entities in the private sector, like large companies and LLPs, publicly traded companies, banking and insurance companies, companies with an annual turnover of more than 500 million pounds and more than 500 employees, issuers, asset managers with more

International Sustainability Disclosure Standards (IFRS SDS) elaborated by the International Sustainability Standards Board's (ISSB) in June 2023;⁶⁹ and the birth of the European Union Sustainability Reporting Standards (ESRS) developed by the European Financial Reporting Advisory Group (EFRAG).⁷⁰

In particular, with regard to the European Union, which is the leading actor in setting the rules for the transition to a sustainable economy, sustainable development has long been at the heart of the European project,⁷¹ but especially after the adoption of the UN 2030 Agenda for Sustainable Development⁷² and the Paris Agreement on climate change,⁷³ the EU has been working extensively on strategies aimed at achieving their goals and targets. Among other initiatives,⁷⁴ the EU Commission published in 2018 the *Action Plan on Financing*

*Sustainable Growth*⁷⁵ (launching an ambitious and comprehensive strategy on sustainable finance), in 2019 the *European Green Deal*⁷⁶ (aimed at making all sectors of the EU's economy fit to meet climate targets, such as the reduction of emissions by at least 55% compared to 1990 levels by 2030, and climate neutrality by 2050), and in 2020 the plan for *A Strong Social Europe for Just Transitions*⁷⁷ (to set the road towards a just and fair transition that leaves nobody behind in the achievement of a climate-neutral and environmentally sustainable economy).

To support these policies, an intense period of revising and updating European rules applicable to the business sector and financial markets is ongoing. As for the legislative tools used by the European institutions, it is worth noting that from an initial promotion of voluntary instruments through soft law, as in

than 5 billion pounds of assets under management, and occupational pension schemes with more than 1 billion pounds of assets under management.

⁶⁹ To meet the demand of high quality, transparent, reliable and comparable reporting on environmental, social and governance matters, in November 2021, the International Financial Reporting Standards Foundation announced the creation of the new International Sustainability Standards Board (ISSB), which has been established at COP26 to develop a comprehensive global baseline of sustainability disclosures. In June 2023 (effective from Jan. 2024), using the starting basis of Integrated Reporting, CDSB, SASB and TCFD, the ISSB issued its first two IFRS Sustainability Disclosure Standards, IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information, and IFRS S2 Climate-related Disclosures.

⁷⁰ In July 2023 the EU Commission adopted the European Sustainability Reporting Standards (ESRS) covering the full range of environmental, social, and governance issues (including climate change, biodiversity and human rights) that must be used by all companies subject to the Corporate Sustainability Reporting Directive (CSRD). The ESRS, which take account of discussions with the International Sustainability Standards Board (ISSB) and the Global Reporting Initiative (GRI) to ensure interoperability, provide information for investors to understand the sustainability impact of the companies.

⁷¹ The issue of sustainable development was included in the Maastricht Treaty of 7 Feb. 1992 (see Article B), and in the Amsterdam Treaty of 2 Oct. 1997 (see, e.g., amendment of Article B and Article 2, as well as the "principle of integration" of environmental policies into all other Union policies of Article 6). Nowadays, the consolidated version of the Treaty on European Union (TEU), art. 3, paragraph 3, refers to a balanced and sustainable development of economic activities; while

Article 11 of the consolidated version of the Treaty on the Functioning of the European Union (TFEU) recalls the protection of the environment and the promotion of sustainable development. With regards to the business sector, from the early 2000s onwards, the EU recognised the UN Guiding Principles for Business and Human Rights and developed its Strategy on Corporate Social Responsibility.

⁷² UNGA Resolution A/RES/70/1. The commitment to the SDGs is expressed in the EU Commission Communication of 22 Nov. 2016, *Next Steps for a Sustainable European Future. European Action for Sustainability* (COM(2016) 739), and Council conclusions on *A Sustainable European Future: The EU Response to the 2030 Agenda for Sustainable Development*, adopted by the Council at its 3552nd meeting held on 20 June 2017.

⁷³ Paris Agreement to the United Nations Framework Convention on Climate Change (Paris Agreement), Dec. 12, 2015, TIAS No 16-1104. The agreement has been adopted by the European Union through Council Decision (EU) 2016/1841 of 5 Oct. 2016 on the conclusion, on behalf of the European Union, of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change (OJ L 282, 19.10.2016, p. 1).

⁷⁴ see, e.g., EU Commission Communication of 2 Dec. 2015, *Closing the Loop: An EU Action Plan for the Circular Economy*, COM/2015/0614, then renewed with the EU Commission Communication of 11 Mar. 2020, *A New Circular Economy Action Plan. For a Cleaner and More Competitive Europe*, COM/2020/98.

⁷⁵ EU Commission Communication of 8 Mar. 2018, *Action Plan: Financing Sustainable Growth*, COM/2018/097.

⁷⁶ EU Commission Communication of 11 Dec. 2019, *The European Green Deal*, COM/2019/640.

⁷⁷ EU Commission Communication of 14 Jan. 2020, *A Strong Social Europe for Just Transitions*, COM(2020) 14.

the case of corporate social responsibility programs⁷⁸ and good governance standards for directors' remuneration,⁷⁹ the focus has shifted towards the production of hard law to demand the adoption of sustainable business practices. Examples are the 2014 Directive on Non-Financial reporting,⁸⁰ imposing on certain large public-interest companies⁸¹ reporting requirements on sustainability-related matters on a "comply or explain" basis, and the 2017 Shareholder Rights Directive II,⁸² promoting more long-termism in share ownership and shareholder engagement.⁸³ A closer look at the most recent EU legislative policies also reveals how, so far, EU institutions have tried to achieve the shift toward a sustainable economy mainly indirectly,⁸⁴ through the regulation of financial markets and reporting requirements. In particular, the Sustainable Finance package, a comprehensive strategy aimed at

redirecting investments towards sustainable activities to reach climate neutrality by 2050, comprises a regulation on sustainability-related disclosure in the financial services sector⁸⁵ and the taxonomy regulation on the establishment of a framework to facilitate sustainable investment decisions and tackle greenwashing.⁸⁶

Moreover, at the end of 2022 the Corporate Sustainability Reporting Directive (CSRD)⁸⁷ was approved, replacing the 2014 Non-Financial Reporting Directive, to ensure the reporting of reliable and comparable sustainability information to investors and other stakeholders. The main objectives of CSRD are (i) to extend the scope of reporting requirements of non-financial information to all large undertakings (whether listed or not)⁸⁸ and all undertakings with securities listed on EU regulated markets (except listed

⁷⁸ see, e.g., *Promoting A European Framework for Corporate Social Responsibility*, 2001, COM(2001) 366; the Commission Communication of 15 May 2001, *A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development*, COM(2001) 264; the Commission Communication of 13 Dec. 2005 on *The Review of the Sustainable Development Strategy – A Platform for Action*, COM(2005) 658; the Commission Communication of 25 Oct. 2011 on *A Renewed EU Strategy 2011-14 for Corporate Social Responsibility*, COM(2011) 681.

⁷⁹ see EU Commission Recommendation 2004/913/EC of 14 Dec. 2004, the EU Commission Recommendation 2005/162/EC of 15 Feb. 2005, and the EU Commission Recommendation 2009/385/EC of 30 Apr. 2009, which promoted the inclusion of good governance standards regarding directors' remuneration in corporate governance codes on a "comply or explain" base. The ineffectiveness of this approach was demonstrated by the *Report on the Application of the Commission Recommendation on Directors' Remuneration* (SEC 2007, 1022), and the *Report on the Application of the Commission 2009/385/EC Recommendation* (SEC 2010, 285).

⁸⁰ Directive 2014/95/EU of the European Parliament and of the Council of 22 Oct. 2014 Amending Directive 2013/34/EU.

⁸¹ Directive 2014/95/EU was applicable to large EU public-interest entities, and to public-interest entities which are parent companies of a large group that have more than 500 employees and, alternatively, a total balance sheet exceeding EUR 20 million or a net turnover exceeding EUR 40 million.

⁸² Directive (EU) 2017/828 of the European Parliament and of the Council of 17 May 2017 Amending Directive 2007/36/EC; Commission Implementing Regulation (EU) 2018/1212.

⁸³ According to Directive (EU) 2017/828, the remuneration policy should contribute to the business strategy, long-term interests and sustainability of the company and should not be linked entirely or mainly to short-term objectives. Moreover, the Directive and the Regulation (EU) 2018/1212 improved the transparency of institutional investors and asset managers regarding how they engage with the companies they invest in, and how they consider and monitor the long-term and non-financial performance of these companies and their environmental and social impact, requiring investors to disclose their engagement policy and their strategy. However, these governance rules strengthened shareholder rights and directors' accountability towards shareholders, but do not cover directly the interests of other stakeholders and the environment.

⁸⁴ With some partial exceptions of directives that have affected the organisation and management of companies, such as the above-mentioned Shareholder Rights Directive II (Directive (EU) 2017/828), and the Directive (EU) 2019/2121 of the European Parliament and of the Council of 27 Nov. 2019 Amending Directive (EU) 2017/1132.

⁸⁵ Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 Nov. 2019.

⁸⁶ Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 Jun. 2020 Amending Regulation (EU) 2019/2088.

⁸⁷ Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 Amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU.

⁸⁸ The reference is made to undertakings meeting at least two out of the three following criteria: (i) a net turnover of more than EUR 40 million; (ii) balance sheet assets greater than EUR 20 million; (iii) more than 250

micro-enterprises),⁸⁹ and (ii) to assure the comparability of non-financial information. Indeed, it ends flexibility⁹⁰ in reporting methods, introducing detailed and standardised mandatory reporting standards based on the “double materiality” principle, as per the EU Sustainability Reporting Standards drafted by the European Financial Reporting Advisory Group (EFRAG). Although the CSRD and other mandatory sustainability disclosure requirements provided in other jurisdictions are expected to significantly improve sustainability-related disclosure, they are usually not underpinned by any substantial obligation to consider sustainability issues in the decision-making process. They push companies to do it from the ex-post perspective of disclosure requirements, such that they only indirectly regulate companies’ behaviour. Given that limit, other initiatives in company law were needed to tackle the

employees. Insurance undertakings and credit institutions will be required to comply regardless of their legal form, provided they meet the relevant size criteria. Non-European companies with substantial activity in the EU (that is, a net turnover over EUR 150 million euro in the EU) will also have to report according to the directive.

⁸⁹ Micro-enterprises are defined by art. 3 of the Accounting Directive (2013/34/EU) as undertakings that do not exceed the limits of at least two of the three following criteria: (a) balance sheet total: EUR 350 000; (b) net turnover: EUR 700 000; (c) average number of employees during the financial year: 10. Nonetheless, listed micro companies and non-listed small-medium enterprises (SMEs) can apply the provisions on a voluntary basis.

⁹⁰ The 2014 Non-Financial Reporting Directive allowed significant flexibility with respect to the reporting method to be used. Undertakings were allowed to use international, European, or national frameworks to produce their non-financial statements. The Directive Recital 9 referred, for instance, to national frameworks, Union-based frameworks such as the Eco-Management and Audit Scheme (EMAS), or international frameworks such as the United Nations (UN) Global Compact, the Guiding Principles on Business and Human Rights implementing the UN “Protect, Respect and Remedy” Framework, the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises, the International Organisation for Standardisation’s ISO 26000, the International Labour Organisation’s Tripartite Declaration of principles concerning multinational enterprises and social policy, and the Global Reporting Initiative. Aware of the problem, and trying to minimise this flexibility, the European Commission published voluntary Guidelines to help companies disclose environmental and social

problem from an ex-ante perspective, mandating or at least legitimising directors to consider sustainability outcomes in decision-making. An example is the regulation of supply chain due diligence.

V. Supply Chain Due Diligence Legislation

A shift from voluntary initiatives to mandatory requirements has also taken place in the context of supply chain due diligence in recent years.⁹¹ After a first generation of issues specific statutes protecting specific industry sectors or areas of human rights through disclosure requirements, such as the 2019 Dutch Child Labor Due Diligence Law⁹² and the UK 2015 Modern Slavery Act,⁹³ a new generation of more comprehensive statutes have been enacted providing general protection against violations of human rights and environmental damages through

information in 2017 and Guidelines on reporting climate-related information in 2019.

⁹¹ see McGaughey, F, et al. “Corporate Responses to Tackling Modern Slavery: A Comparative Analysis of Australia, France and the United Kingdom.” *Business and Human Rights Journal*, vol. 7, no. 2, 2022, pp. 249-270; Palombo, D. “The Duty of Care of the Parent Company: A Comparison Between French Law, UK Precedents and the Swiss Proposals.” *Business and Human Rights Journal*, vol. 4, no. 2, 2019, pp. 265-286.

⁹² Netherlands Kamerstukken I, 2016/17, 34 506, A. According to the Dutch Child Labor Due Diligence Law, all companies (whether domiciled in the Netherlands or not) operating in the country are required to issue a statement declaring that they have exercised due diligence to prevent their goods and services being made using child labor.

⁹³ Modern Slavery Act 2015. It establishes an independent Anti-Slavery Commissioner and contains provisions to prevent modern slavery and protect the victims: see Jason, H. “The Modern Slavery Act (2015): A Legislative Commentary.” *Statute Law Review*, vol. 37, no. 1, 2016, pp. 33-56; Rae, L, et al. “Hardly Soft Law: The Modern Slavery Act 2015 and the Trend Towards Mandatory Reporting on Human Rights.” *Business Law International*, vol. 18, no. 1, 2017, pp. 29-50; Mantouvalou, V. “The UK Modern Slavery Act 2015 Three Years On.” *Modern Law Review*, vol. 81, no. 6, 2018, pp. 1017-1045; Voss, H, et al. “International Supply Chains: Compliance and Engagement with the Modern Slavery Act.” *Journal of the British Academy*, vol. 7, no. 1, 2019, pp. 61-76; Islam, M, and C van Staden. “Modern Slavery Disclosure Regulation and Global Supply Chains: Insights from Stakeholder Narratives on the UK Modern Slavery Act.” *Journal of Business Ethics*, vol. 180, 2022, pp. 455-479.

disclosure and substantive oversight obligations. The primary examples of these second generation of statutes are the 2017 French Duty of Vigilance Law,⁹⁴ the 2021 German Act on Corporate Due Diligence Obligations in Supply Chains,⁹⁵ and the European Union Directive on Corporate Sustainability Due Diligence (CSDDD).⁹⁶ With this latest directive, a second shift occurred within the context EU legal framework, from disclosure regulations, the focus moved to the production of rules directly affecting companies' activities, decision-making, risk management, and liability regimes. Moreover, the goal of the Directive is to harmonise the rules in this field aligning them with international standards on due diligence,⁹⁷ ensuring a level playing field within the EU internal market and avoiding distortions of competition.

The main areas regulated by the CSDDD are supply chain due diligence obligations and climate change obligations. As for supply chain due diligence, the directive requires to European and foreign large companies under the scope (now restricted to companies with more than 1,000 employees—not applicable to foreign companies—and a net worldwide turnover of more than EUR 450 million, for two consecutive financial years; and to the ultimate parent company⁹⁸ of a group that reaches the thresholds)⁹⁹ to implement and integrate in company's policies and risk management systems plans and strategies (developed through effective engagement with stakeholders) to identify and assess, monitor, prevent, mitigate, end, or minimise¹⁰⁰ actual or potential human rights and environmental adverse impacts¹⁰¹ arising from the companies' own operations, those of their subsidiaries¹⁰² and business partners in

⁹⁴ Law No. 2017-399, 27 Mar. 2017. The law introduced Articles L. 225-102-4 and L. 225-102-5 into the French Commercial Code.

⁹⁵ *Gesetz über die unternehmerischen Sorgfaltspflichten zur Vermeidung von Menschenrechtsverletzungen in Lieferketten (Lieferkettensorgfaltspflichtengesetz: "LkSG")*, 16 Jun. 2021, Bundesgesetzblatt (BGBl) I 2021, 2959.

⁹⁶ Directive 2024/1760 of the European Parliament and of the Council of 13 June 2024 Amending Directive (EU) 2019/1937 and Regulation (EU) 2023/2859.

⁹⁷ see UN Office of the High Commissioner for Human Rights, *Guiding Principles on Business and Human Rights: Implementing the "Protect, Respect and Remedy" Framework* (UNGPs), HR/PUB/11/04, 2011, and the 2011 amendment to the OECD Guidelines for Multinational Enterprises.

⁹⁸ According to articles 22(1) to (5) of Directive 2013/34/EU of the European Parliament and of the Council.

⁹⁹ SMEs are not included but can be indirectly affected as a result of large companies' actions across their value chains. The directive also provides specific thresholds for companies / parent companies that entered into franchising or licensing agreements in the Union in return for royalties, if they had a net worldwide turnover of more than EUR 80 million in the last financial year and royalties amount to more than EUR 22,5 million in the last financial year: see Directive 2024/1760 on Corporate Sustainability Due Diligence, art. 2. With a few exceptions, financial institutions including banks will be required to comply with the directive; see Directive 2024/1760 on Corporate Sustainability Due Diligence, art. 3(a)(iii).

¹⁰⁰ Directive 2024/1760 on Corporate Sustainability Due Diligence, articles 5 to 11.

¹⁰¹ The adverse impacts covered are the ones resulting from the violation of rights, prohibitions and obligations provided by international human rights and environmental conventions listed in the Annex to the directive. The directive, thus, on one side spreads in third countries European accepted legal standards in the field and, on the other, also makes legally binding for companies under the scope of the directive international standards usually directed to states, regardless of whether the jurisdictions in which the alleged violations take place have ratified the international conventions listed: see on this issue Enriques, L, and M Gatti. "The Extraterritorial Impact of the Proposed EU Directive on Corporate Sustainability Due Diligence: Why Corporate America Should Pay Attention." *Oxford Business Law Blog*, 21 Apr. 2022.

¹⁰² A subsidiary is a "controlled undertaking" as defined in Article 2(1)(f) of Directive 2004/109/EC of the European Parliament and of the Council of 15 Dec. 2004 Amending Directive 2001/34/EC. In particular, the reference is to an undertaking (i) in which a natural person or legal entity has a majority of the voting rights; or (ii) of which a natural person or legal entity has the right to appoint or remove a majority of the members of the administrative, management or supervisory body and is at the same time a shareholder in, or member of, the undertaking in question; or (iii) of which a natural person or legal entity is a shareholder or member and alone controls a majority of the shareholders' or members' voting rights, respectively, pursuant to an agreement entered into with other shareholders or members of the undertaking in question; or (iv) over which a natural person or legal entity has the power to exercise, or actually exercises, dominant influence or control.

their chain of activities.¹⁰³ An annual report on due diligence activities shall be provided.¹⁰⁴ Companies are not required to guarantee in all circumstances that adverse impacts will be avoided, they have an “obligations of means” not an “obligation of results”. Their duty is to take all the appropriate measures capable of achieving due diligence’s objectives by effectively addressing adverse impacts, which are proportionate with the degree of severity and the likelihood of the adverse impact.¹⁰⁵ As for climate change obligations, the aim was to incorporate the European Green Deal goals into the daily governance of large companies operating in Europe. The Directive requires to adopt and put into effect a climate change transition plan¹⁰⁶ to ensure (through best efforts) that the business model and strategy are compatible with the transition to a sustainable economy and with limiting global warming to 1.5 degrees Celsius, in line with Paris Agreement¹⁰⁷ and climate neutrality targets of European Climate Law.¹⁰⁸ The plan is updated annually and contains a description of the progress the company has made towards achieving its targets.

¹⁰³ The reference is to direct and indirect business partners, entities performing upstream or downstream (in the latter case excluding distribution, transport, storage being subject to export control specific rules) business operations related to the operations, products or services of the company. See Directive 2024/1760 on Corporate Sustainability Due Diligence, art. 3(f) and 3(g).

¹⁰⁴ Directive 2024/1760 on Corporate Sustainability Due Diligence, art. 16.

¹⁰⁵ Directive 2024/1760 on Corporate Sustainability Due Diligence, Recital 19.

¹⁰⁶ According to art. 22 of Directive 2024/1760 on Corporate Sustainability Due Diligence, the transition plan shall contain: (a) time-bound targets related to climate change for 2030 and in five-year steps up to 2050 based on conclusive scientific evidence and including, where appropriate, absolute emission reduction targets for greenhouse gas for scope 1, scope 2 and scope 3 greenhouse gas emissions for each significant category; (b) a description of decarbonisation levers identified and key actions planned to reach targets referred to under point (a), including where appropriate changes in the undertaking’s product and service portfolio and the adoption of new technologies; (c) an explanation and quantification of the investments and funding supporting the implementation of the transition plan; (d) a description of the role of the administrative, management and supervisory bodies with regard to the plan.

¹⁰⁷ see art. 2.1 (a) of the Paris Agreement (n 73) *supra*.

Both public and private enforcement mechanisms are provided in case of breach of Directive’s rules. The public enforcement system is based on the oversight of national and European network of supervisory authorities, which may impose penalties (up to 5% of the company’s net worldwide turnover) on companies breaching the Directive’s rules.¹⁰⁹ Supervisory authorities will also oversee the adoption and design of the climate change transition plan. The private enforcement system is based on complaints and notification mechanisms¹¹⁰ as well as a specific hypothesis of civil liability for companies violating their due diligence duties. A company, indeed, can be held liable for damages¹¹¹ to a natural or legal person caused by the company’s intentional or negligent noncompliance with key provisions of the Directive to prevent, mitigate, end, or minimise the identified adverse impacts arising from the company’s own operations, those of its subsidiaries and business partners in its chain of activities. However, a company cannot be held liable if the damage was caused only by its business partners in its chain of

¹⁰⁸ Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 Amending Regulations (EC) No 401/2009 and (EU) 2018/1999 (European Climate Law).

¹⁰⁹ Directive 2024/1760 on Corporate Sustainability Due Diligence, articles 24 to 28.

¹¹⁰ Companies shall establish and maintain internal complaints procedure, so that third parties affected (or potentially affected), trade unions or other workers’ representatives, and civil society organisations can raise their concerns regarding actual or potential adverse impacts directly to the company. Additionally, they shall establish an accessible mechanism for the submission of notifications (anonymously or confidentially) by persons and organisations with information or concerns regarding actual or potential adverse impacts. This internal notification and complaint mechanism will allow the companies to be aware of possible risks of adverse impacts and to promptly act and remediate in accordance with the directive: see Directive 2024/1760 on Corporate Sustainability Due Diligence, art. 14.

¹¹¹ According to art. 29 of Directive 2024/1760 on Corporate Sustainability Due Diligence, damage caused to a person’s protected legal interests should be understood in line with the EU Member State’s national law, and derivative damage, caused indirectly to other persons who are not the victims of adverse impacts and who are not protected by the rights, prohibitions or obligations listed in the Directive’s Annex I is not covered; see also Directive 2024/1760 Recitals 79 to 91.

activities. Victims have the right to full compensation for the damage occurred in accordance with applicable national law.

Supply chain due diligence regulations could be considered a further attempt by the legislator to address the creation of negative detriments by companies. Their effect is to make companies internalise their suppliers' externalities, becoming responsible for their behaviour in the event of a breach of vigilance duties. This results in expanding the firm's boundaries (in terms of directors' obligations and civil liability) beyond the legal ones (for instance, those linked to ownership rights¹¹² or the chain of control)¹¹³ and beyond the limits traditionally identified by twentieth-century economic theories (linked to the costs of the two methods of co-ordination, markets and management hierarchies).¹¹⁴ The firm's boundaries and responsibility and oversight function of the directors nowadays seem to move along with sustainability requirements provided by the law, regulations, or the company agreement (like in the case of dual-purpose companies).

VI. Final Remarks

The predominance of shareholder primacy has resulted in a misinterpretation of directors' duties as being exclusively owed to shareholders. This perspective has served as the theoretical foundation for short-termism, excessive risk-taking, and unsustainable corporate practices that negatively impacted the environment and society, all in the pursuit of maximising corporate profits and shareholder value. As sustainability takes centre stage in the political agenda and corporate governance discussions, law becomes crucial in facilitating the transition

from shareholder primacy to responsible capitalism. Law has the potential to influence the behaviour of private companies by establishing rules that ensure businesses profit from creating benefits rather than generating detriments to society, effectively incentivising positive practices while disincentivising harmful ones.

The emerging legal trends analysed here illustrate a well-established transition from soft law to hard law in establishing sustainability requirements and obligations for businesses. Moreover, legislators are shifting from merely imposing sustainability disclosure requirements to enacting substantive sustainability obligations that impact the decision-making processes of companies. This evolution could lead to a reinterpretation of the normative content of directors' duties. Even in the absence of specific reforms to directors' duties, an examination of both the law in the books, with recent developments in legislative and regulatory framework (like sustainability disclosure requirements, supply chain due diligence, dual-purpose companies), and the law in action, with the growth of ESG-led shareholders' activism and sustainability related litigation, suggests that the boundaries of directors' duties are expanding. This expansion either necessitates, or, at a minimum, legitimises, a sustainability-conscious approach in decision-making and the formulation of a company's strategy and policies. In this context, the dual-purpose companies' directors' management and accountability model appears to be an appropriate general management paradigm for the new era of responsible capitalism. Dual-purpose companies, indeed, can serve as

¹¹² see Demsetz, H. "Toward a Theory of Property Rights." *American Economic Review*, vol. 57, no. 2, 1967, pp. 347-359.

¹¹³ Among others, see Penrose, E. *The Theory of the Growth of the Firm*. Oxford University Press, 1959; Weick, K. "Educational Organizations as Loosely Coupled Systems." *Administrative Science Quarterly*, vol. 21, no. 1, 1976, pp. 1-19; Porter, M. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. Free, 1980; Ashkenas, R, et al. *The Boundaryless Organization, Breaking the Chains of Organizational Structure*. John Wiley & Sons, 1995.

¹¹⁴ See, in particular, Coase, R. "The Nature of the Firm." *Economica*, vol. 4, no. 16, 1937, pp. 386-405; Coase, R. "The Nature of the Firm: Influence." *Journal of Law, Economics, & Organization*, vol. 4, no. 1, 1988, pp. 33-47; Alchian, A. and H Demsetz. "Production, Information Costs and Economic Organization." *American Economic Review*, vol. 62, no. 5, 1972, pp. 777-795; Jensen, M, and W Meckling. "Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure." *Journal of Financial Economics*, vol. 3, no. 4, 1976, pp. 305-360.

a stepping stone toward mainstream change in the business community, rather than merely an alternative to it, particularly in the medium-term. The widespread regulation of dual-purpose companies can thus promote the growth of purpose-driven organizations, demonstrating that a shift away from business-as-usual is not only possible but also profitable and desirable.

The Prospect of 'Just Emissions' as an International Norm of Environmental Governance

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ABSTRACT

The international system, as it presently exists, has proven woefully inadequate in its efforts to prevent the global injustices of massive ecosystem loss and environmental degradation. These issues have disproportionately affected individuals living in impoverished countries and in zones characterised by precarious living standards and negligible welfare status both well below the per capita income enjoyed by the Global North since the onset of the industrial revolution. The brunt of the harms to result from climate change will inevitably affect the Global South to a higher degree, because of underdeveloped infrastructure and weaker ability to adapt *ex ante* and respond *ex post*. International agencies, such as UNEP, the UNFCCC, and the IPCC, that are dedicated to instituting international agreements to combat rising surface temperatures, are struggling to create international momentum for realizing the growing necessity for radical action. This essay takes a critical perspective on theories of international culture, society, governance, competition, and great-power rivalry that call for remediations (on the part of industrialised nations) for climate-related loss and damage required by theories of environmental and economic justice. I argue that these theories must consider both the differential capacity for country-specific economic growth potential and the inequality of wealth that exists between developed nations and developing ones when measuring responsibility for climate damages and allocating environmental legal regulations such as financing and cost burdens. Governance and management of the biosphere is desperately needed to ensure equitable transnational standards of environmental justice which, through multilateral adherence to a regime of ecological justice, will create an international coalition of sustainable societies. International justice for the developing world is not only about development. The Global South requires allowances for subsistence emissions, necessary for the purpose of growth; allowances that are due to them through norms of fairness and distributional justice.



I. Introduction

Sustained efforts on the part of diplomats, economists, and philosophers to reach

consensus about the specific duties wealthy nations have to provide developmental aid for poorer nations have largely been

characterised by failure. In addition, even the work of proponents of climate action has yet to reach unanimity or agreement on issues including allowances for poor nations within the framework of international environmental law to emit increased greenhouse gases in the future,¹ as well as firm limits on the emissions of the Global North. In addition, despite the international consensus, there has been little effort on the part of developed nations to finance international environmental policies that aim to level the global distribution of per capita emissions.² I argue Global South countries' per capita emissions should be allowed to rise, and Global North countries' emissions must immediately fall—both conditions must be met on the path to net zero.³ The concept of “just emissions” defines the obligations that the Global North is under to allow proportional and fair growth through the use of fossil fuels within the developing world. Yet *whether* “just emissions” allows free reign to pollute for the Global South, and an immediate cap on emissions for the Global North, remains unclear. What also remains unclear is whether the world can afford *any* additional emissions without respect to what would be just. This argument regarding a zero-emissions scenario is supported by ecological justice and environmental jurisprudence theories which claim strong and egalitarian rights for non-human life, severely restricting humanity's impact on the globe to ensure sustainability in the present. While my primary focus will be on globally oriented human affairs, we cannot ignore arguments

which support climate action that come from ecology.

Our environment, already subject to weather events worsened by climate change, will only continue to deteriorate without immediate action. I do not take the side of hopelessness in this article: while some suspect that what is *just* no longer matters, and what is *necessary* for ecological survival is all that can be reasonably politically accommodated,⁴ I suggest that there is a dire need for justice alongside technical and economic change. Some scenarios of politically extreme carbon austerity might entail a threshold of per capita or gross emissions that constrains the growth of developed nations, where anything above a specified cap would not be permissible.⁵ It is true that the sustainable transition may entail limits to growth for both poor nations and wealthy ones—and arguably this would harm Global South nations more.⁶ Wealthy nations need to view their obligations to abate carbon pollution coming from heavy industries, transportation, and power generation as tied up with the concomitant rights of developing nations to emit (possibly substantially more than) subsistence emissions. Multilateral abatement in the present would reduce poor countries' growth rates, setting them further behind on the difficult path to middle- or high-income status. Can a cap on carbon-intensive development within poorer nations—even in service of combatting climate change—be justified?

¹ Baer, Paul, et al. “Greenhouse Development Rights: A Framework for Climate Protection That Is ‘More Fair’ Than Equal Per Capita Emissions Rights.” *Climate Ethics: Essential Readings*, edited by Stephen Gardiner et al., Oxford University Press, 2010, pp. 215-230.

² Hironaka, Ann. *Greening the Globe: World Society and Environmental Change*. Cambridge University Press, 2014, p. 3.

³ Agarwal, Anil, and Sunita Narain. *Global Warming in an Unequal World: A Case of Environmental Colonialism*. Centre for Science and Environment, 1991. Shue notes that rich, industrialised, nations “would like the poor states to avoid adopting the same form of industrialization by which they themselves became rich”: Shue, Henry. “Global Environment and International Inequality.” *Climate Ethics: Essential Readings* (n 1) *supra* pp. 101-111, at p. 101.

⁴ Bandarage, Asoka. “Ethical Path to Ecological and Social Survival.” *Globalism and Localization: Emergent Solutions to Ecological and Social Crises*, edited by Jeanine Canty, Routledge, 2019, pp. 151-171.

⁵ Baer et al. (n 1) *supra* at 216.

⁶ Gonzalez, Carmen, and Sumudu Atapattu. “International Environmental Law, Environmental Justice, and the Global South.” *Transnational Law and Contemporary Problems*, vol. 26, no. 2, 2017, pp. 229-242; Porter, Libby, et al. “Climate Justice in a Climate Changed World.” *Planning Theory and Practice*, vol. 21, no. 2, 2020, pp. 293-321. Gonzalez, Carmen. “Environmental Justice, Human Rights, and the Global South.” *Santa Clara Journal of International Law*, vol. 13, no. 1, 2015, pp. 151-196.

In this article, I argue that there is a just, equilibrium level of emissions that developing nations must be allowed, if egalitarian politics aimed at reducing poverty and global inequality are to prevail. This international norm would allow an increase in the level at which some developing nations pollute and must be met with ambitious reductions on the part of many wealthy and historically prolific polluters. The following Section argues that climate inaction has led to increasing inequalities in not only wealth, but also environmental impact, and that the world needs to meet its emissions targets swiftly and justly. The Section on the economic background conditions of climate change details the international landscape of environmental politics as defined by social injustice perpetrated by Global North countries most responsible for emissions. Here, I describe the ideological basis for equating growth rates and income levels across heterogeneously endowed nations at different stages of development. This builds to my main thesis where, in the Section on solutions, I propose what I call ‘egalitarian levelling down’, whereby emissions are first equated between rich and poor nations and then reduced in a uniform fashion. The Section on dissent raises some objections to my proposal, and the final Section concludes.

II. The Origins of Climate Inaction

In this Section, I argue that within the international arena, historically modest efforts to fight climate change need to be remade with greater ambition and an emphasis on multilateral consensus. Such consensus can only come when it is led by the developing nations most at risk from climate change itself. In other words, wealthy nations may be largely immune to the shocks that

climate change will bring, and themselves more dependent on fossil fuels, leading to hazardous moral conditions which incentivise the same nations not to act. As Sengupta argues, “the failure of the international system to substantively address these key climate justice concerns poses significant risks to the future maintenance of global order and stability.”⁷ The promise of exacerbated conflict, migration, and crop failures portends that inequalities will also become more pressing—because the adverse effects of climatic warming will be felt most acutely by poorer nations.⁸ Remedying these inequalities is both a difficult moral problem (that is, how much assistance rich nations owe to poorer ones), as well as one of economic justice and feasibility (that is, managing the green transition in as egalitarian a manner as possible).⁹ The freedom that wealthy nations have had to industrialise and develop—without limits on their carbon emissions—has effectively placed limits on the upper bound of emissions that developing countries can produce as they industrialise: that is, if the world is to remain within a targeted atmospheric carbon dioxide concentration budget.¹⁰ Justice requires reaching an equilibrium emissions threshold where nations settle into a balanced distribution defined by equal per capita emissions between all countries. If some individuals are harmed disproportionately by the effects of climate change, they should share equally in the benefits which create those effects. This is partially why consensus has it that the Global South should be exempt from emissions cuts in the near term. Their smaller historical record of emissions and their equally minimal per capita contribution have deprived them of wealth generated by carbon emitting industries owned and operated by the Global

⁷ Sengupta, Sandeep. “Climate Change, International Justice and Global Order.” *International Affairs*, vol. 99, no. 1, 2023, pp. 121–140, at pp. 121–122.

⁸ Harlan, Sharon, et al. “Climate Justice and Inequality.” *Climate Change and Society: Sociological Perspectives*, edited by Riley Dunlap and Robert Brulle, Oxford University Press, 2015, pp. 127–163.

⁹ see Shue, Henry. “Subsistence Emissions and Luxury Emissions.” *Law & Policy*, vol. 15, no. 1, 1993, pp. 39–60 at p. 49 for motivation: “So far, of course, nations and

firms have behaved as if each of them had an unlimited and unshakable entitlement to discharge any amount of green-house gases that it was convenient to release. ... The danger of global warming requires that a ceiling—probably a progressively declining ceiling—be placed upon total net emissions. This total must somehow be shared among the nations and individuals of the world.”
¹⁰ Meadows, Donella, et al. *The Limits to Growth: A Report for the Club of Rome’s Project on the Predicament of Mankind*. Universe Books, 1972.

North. Equal per capita emissions would still allow for disparities in wealth but would only allow that wealth to be generated in a sustainable manner. This could set the scene for additional protections against various types of other social inequalities in international law. As a baseline, Global South countries therefore deserve larger allowances within the remaining global carbon budget.¹¹

Currently, in global environmental politics, individual nations agree to non-binding restrictions on their emissions that are chosen in accordance with what they are reasonably capable, economically, of committing to. Chan notes that in the context of the Paris Agreement, “states *themselves* justify the fairness and ‘ambition’ of their own contributions.”¹² As it currently stands, “flexibility” and “discretion” on the part of individual nations dictates the level of action. In order to attain an egalitarian distribution of emissions, flexibility must be coopted into rigid structural rules and binding obligations—primarily applied to developed countries.¹³ International law, prescribed by the United Nations, as well as environmental governing bodies such as the IPCC, the UNFCCC, and UNEP is, at present, non-binding, making the implementation of proposals to achieve economic and social justice in the context of emissions and climate related reparations difficult to enforce. Multilateralism becomes crucial in these contexts because justice will only work when the project of sustainability is a *shared* end—

an end which requires cooperation, not competition.

Some international affairs realists, and advocates of zero-sum realpolitik, believe that international intervention should only extend insofar as it *prevents* harm—that is, environmental intervention is effective only when it refuses to participate in, and actively works to end environmental degradation.¹⁴ Under a norm calling for equal per capita emissions, rich nations would gain obligations to invest in the sustainable development of poorer countries, bring industry and (monetary and human) capital to impoverished regions, and aid in the transition to net-zero.¹⁵ In what follows, I argue that climate inequality is an issue best solved through the sophisticated economic tools we already have at our disposal to ensure transnational justice in the Anthropocene.¹⁶

III. Capitalism, Modernity, and the Economic Background Conditions of Climate Change

In this Section, I examine the implications of implementing environmental justice for the structure of the global economy, as well as for practical economic policymaking. The theory that Spaargaren and Mol call “ecological modernization” suggests that institutional reform is crucial in efforts to spur ambitious efforts to mitigate emissions.¹⁷ Institutional and structural reform could be a key cornerstone for enabling the Global South to achieve climate justice. Justice for these

¹¹ Falkner, Robert. “The Unavoidability of Justice—and Order—in International Climate Politics: From Kyoto to Paris and Beyond.” *British Journal of Politics and International Relations*, vol. 21, no. 2, 2019, pp. 270-278.

¹² Chan, Nicholas. “Climate Contributions and the Paris Agreement: Fairness and Equity in a Bottom-Up Architecture.” *Ethics & International Affairs*, vol. 30, no. 3, 2016, pp. 291-301, at p. 295, emphasis in original.

¹³ Michaelowa, Axel, and Frank Jotzo. “Transaction Costs, Institutional Rigidities and the Size of the Clean Development Mechanism.” *Energy Policy*, vol. 33, no. 4, 2005, pp. 511-523; Toman, Michael, et al. “The Economics of ‘When’: Flexibility in the Design of Greenhouse Gas Abatement Policies.” Resources for the Future Discussion Paper 99-38-REV.

¹⁴ Vanderheiden, Steve. *Atmospheric Justice: A Political Theory of Climate Change*. Oxford University Press, 2008, at p. 91-96. Vanderheiden argues that realism is crucial

to understanding the position of western powers in the global environmental policy regime.

¹⁵ Torpman, Olle. “Isolationism and the Equal Per Capita View.” *Environmental Politics*, vol. 30, no. 3, 2020, pp. 357-375.

¹⁶ Vanderheiden (n 14) *supra* at pp. 88-91.

¹⁷ Spaargaren, Gert, and Arthur Mol. “Sociology, Environment, and Modernity: Ecological Modernization as a Theory of Social Change.” *Society and Natural Resources*, vol. 5, no. 4, 1992, pp. 323-344; see also Mol, Arthur, and Gert Spaargaren. “Ecological Modernization Theory in Debate: A Review.” *Environmental Politics*, vol. 9, no. 1, 2000, pp. 17-49; Fisher, Dana and William Freudenburg. “Ecological Modernization and its Critics: Assessing the Past and Looking Toward the Future.” *Society and Natural Resources*, vol. 14, no. 8, 2001, pp. 701-709.

developing nations includes the opportunity for development and modernisation—yet, in the context of arguments which contest unlimited possibilities for economic growth, it is not clear what rights—or capabilities—industrialised nations have to continue to grow.¹⁸ In other words, sustainable growth may mean no growth at all—at least for countries that are already rich. Whether environmentalism, as a virtually socialist ideology incubated over decades outside and within the modern academy, allows for growth to continue in some form at least resembling capitalism, remains to be seen. Without growth, which has been historically determined by carbon intensive energy use, it is possible that ideological forces, including contrarian beliefs inclusive of anti-environmental conservatism, but also progressive, liberal democratic socialism,¹⁹ will drive innovation in new ways that do *not* create social, economic, and environmental externalities. This new operating space for the economy, it has been convincingly argued,²⁰ will do away with the consumption and extraction that currently dominates and drives the demand for goods and natural resources. The institution of capitalism degrades the earth's natural resources, and also degrades human agents themselves—relegating them to “revolting, unproductive, meaningless, drudgery, such as work at the treadmill, which deadens both body and mind.”²¹ This Achilles heel of capitalism creates injustice not only within industries and nations, but also across them—dividing humanity at the same time that it corrodes our

ecosystem and limits our ability to use natural resources without constraint.²²

Capitalism is a system is fundamentally extractive,²³ but can also develop market-based solutions to negative environmental externalities. The negative drawbacks that we attribute to the failures of the human endeavour to actively contribute to sustainable world society can be overcome—whether through creative destruction of inefficiencies, or through innovation in service of sustainable utopian metropolises. As Attfield argues, we have no alternative but to work within the system as it presently exists.²⁴ But the system provides opportunities as well as challenges: Falkner claims that “[m]any environmental problems are transboundary in nature, requiring international cooperation by states, but because they tend to have roots in complex social and economic processes they are difficult to address through environmental diplomacy alone.”²⁵ Multilateral diplomacy—the origin of the majority of environmental treaties to date—promises equitable solutions within the regulatory market system, enabling subaltern and Global South voices to be heard. Yet multilateralism also faces challenges and headwinds from entrenched political interests who serve traditionalist values whereby climate change does not warrant deviations from the status quo, and any potential solutions to the crisis are swept away in service of profit and competitive growth. Despite these downsides, any solution which legislates justice and equitable carbon allowances for developing nations will have to

¹⁸ As Meadows et al. (n 10) *supra* at p. 126 note: “under the assumption of no major change in the present system, population and industrial growth will certainly stop within the next century, at the latest.” If this prediction holds true, then by the second half of the 21st century we should see global growth slowing and a new economic paradigm—yet to be determined—rising in its place.

¹⁹ Meadows et al. (n 10) *supra* at p. 128.

²⁰ see Schnaiberg, Allan, and Kenneth Alan Gould. *Environment and Society: The Enduring Conflict*. St. Martin's Press, 1994; Schnaiberg, Allan. *The Environment: From Surplus to Scarcity*. Oxford University Press, 1980.

²¹ Karl Marx, cited in Foster, John Bellamy. “The Treadmill of Accumulation: Schnaiberg's Environment

and Marxian Political Economy.” *Organization and Environment*, vol. 18, no. 1, 2005, pp. 7–18, at p. 9.

²² Yet, as Hironaka (n 2) *supra*, at p. 22, claims, global environmentalism now has the “ability to challenge fundamental aspects of capitalism.” So, environmentalism, if effective, could be a salve to capitalist degradation and overuse.

²³ Attfield, Robin. “Sustainability and Management.” *Philosophy of Management*, vol. 14, 2015, pp. 85–93, at p. 92.

²⁴ *ibid.*

²⁵ Falkner, Robert. *Environmentalism and Global International Society*. Cambridge University Press, 2021, at p. 273.

come from international institutions within the global community—however, such a solution has not yet been raised to the fore.

Of course, while most activists, political theorists of the environment, climate scientists, and climate diplomats and negotiators believe that a sustainable future is possible, climate denialists have interests defined by an entrenchment of continued political inaction. Governments need to inculcate strong national belief in the power of international institutions, combined with ambitious domestic interventions to regulate various forms of externality-generating profit-seeking which come at the expense of the environment.²⁶ These solutions, drawing on concern for all people and maintaining radical ecological solidarity across various forms of life on Earth, can be an asset for nations which seek to assert the importance of ecological solidarity in service of developing an alternative paradigm of ecological economics in the Anthropocene.²⁷ There is a difference between economic and political theories of international climate action and the activist social movement of environmentalism that actually serves to make changes in society. Namely, “[i]n contrast to perspectives that view governments as rational actors pursuing their economic or environmental interests ... external *global forces powerfully shape governments* by providing cultural models, scripts, norms, and even identities.”²⁸ In other words, what Hironaka proposes in this quotation is that cultural ideologies, practices, and understandings of historical justice, in the context of the environment, can be deeply influential in the creation of environmental economic policy, and can make unexpected but valid demands on economic and political

policymakers. Hironaka’s models, scripts, norms, and identities define the nature of the calls for justice, often originating outside the traditional policymaking sphere, and such calls are legitimised and furthered by demands on the part of developing nations for equitable climate action.

To remain within the planetary boundary of atmospheric carbon concentration, radical economic austerity is required from those nations who have historically emitted more. This will represent a divergence from the past regime of unabated emissions, seemingly unlimited wealth accumulation, and massive, government sponsored energy and infrastructure projects with damaging environmental consequences.²⁹ Because developed, industrialised, and wealthy countries have used up a greater proportion of available natural and artificial carbon sinks, their responsibility for already existing warming and damage is greater. In addition to emitting a larger percentage of historical emissions, the Global North continues to emit carbon pollution at orders of magnitude more than the Global South. My claim is that this requires the Global North to radically reduce emissions through ambitious social austerity which will inevitably impose steep costs. As Moellendorf has convincingly argued, “[t]hose who have either had a greater share in creating the problem or enjoyed more benefits from past emissions may not be entitled to emit as much as those who have not.”³⁰ The Global North, including Western, developed nations meet both of those criteria: (i) they have a greater share in creating the problem—they have largely been the cause of the vast majority of historical emissions—and (ii) they have benefited from the emission of vast amounts of carbon and have sequestered and

²⁶ Zywicki, Todd. “Environmental Externalities and Political Externalities: The Political Economy of Environmental Regulation and Reform.” *Tulane Law Review*, vol. 73, no. 3, 1999, pp. 845-922.

²⁷ O’Sullivan, Meghan, et al. “The Geopolitics of Renewable Energy.” Harvard Kennedy School Working Paper, 2017.

²⁸ Hironaka (n 2) *supra* at p. 15, emphasis added.

²⁹ Attfield (n 23) *supra* at p. 88.

³⁰ Moellendorf, Darrel. “Climate Change Justice.” *Philosophy Compass*, vol. 10, no. 3, 2015, pp. 173-186, at

p. 178. Moellendorf on the same page (178) goes on to argue that “[r]econcing increased energy consumption needed for poverty eradicating development and climate change mitigation would require developed states either to make emissions reductions sufficient to offset emissions growth in states that are developing or to subsidize the use of renewable energy in these states so that increased energy costs do not slow economic growth.”

secured those benefits by creating empire and industry, and sovereign, inheritable, wealth for citizens and affiliates. As Moellendorf contends, allowances in the global carbon budget need to be made in order to ensure that still developing nations get a fair chance at securing the benefits of industrialisation that the Global North has experienced for much of the past 200 years.

IV. Solutions and Allowances for ‘Just Emissions’

This Section introduces a long-term proposal for achieving a just and broadly acceptable global net-zero. Olúfẹ̀mi Táíwò argues that if the restrictions on emissions that are being undertaken by developed nations were to be enforced on those states who have had relatively small amounts of historical emissions, this would amount to oppression, discrimination, and the enforcement by the Global North of a deeply unjust “poverty trap.” In this case, continued emissions by the developed world essentially denies to the Global South economic benefits which they have a right to, a right their population has by virtue of the Global North’s historical use of the same methods of industrialisation.³¹ As Táíwò writes, drawing an analogy to colonial oppression:

“It is not that every aspect of today’s global racial empire is rooted in the impacts of climate change. But every aspect of tomorrow’s global racial empire will be. Climate change is set not just to redistribute social advantages, but to do so in a way that compounds and locks in the distributional injustices we’ve inherited from history. If we don’t intervene powerfully, it will reverse the gains toward

justice that our ancestors fought so bitterly for, ushering in an era of what the United Nations Special Rapporteur on extreme poverty and human rights calls ‘climate apartheid’.”³²

Not all commentators are so critical of the Global North’s leadership when it comes to climate.

Andrew Hurrell describes how “the consolidation of what is loosely termed the global environmental movement is seen as one of the most significant and substantial pillars of an emerging transnational civil society.”³³ Falkner echoes Hurrell when he claims that a kind of global solidarity arises when nations of a variety of stripes and levels of development agree on principles that should govern their shared but differentiated responsibilities towards the environment. Falkner argues that “[i]f normative world society is taken as a merely abstract idea ... then environmentalism can count as a major source of moral inspiration for ecological one-worldism and planetary stewardship.”³⁴ How can we reconcile the necessity for a global memorandum and multilateral coalition to tackle environmental degradation with the fact that the demands of the Global South, considered broadly, make claims *against* the economic interests of much of the developed world? Does planetary stewardship, as Falkner conceptualises it, contain clauses which allow for inequalities? Or should we suppose that global solidarity calls for a technocratic solution which takes aim at inequality and climate change simultaneously? Critically, the Global North’s culpability in continued inaction could be prosecuted from the standpoint of legally prescribed “common but differentiated” levels of responsibility for climate change that the

³¹ Agarwal and Narain (n 3) *supra*. One way out of this is compensating developing, resource-rich countries for the costs of mitigating their current and future emissions if mitigation would be costly to them: see Blomfield, Megan. *Global Justice, Natural Resources, and Climate Change*. Oxford University Press, 2019, at p. 112.

³² Táíwò, Olúfẹ̀mi. *Reconsidering Reparations*. Oxford University Press, 2022, at p. 171.

³³ Hurrell, Andrew. “A Crisis of Ecological Viability? Global Environmental Change and the Nation State.” *Political Studies*, vol. 42, no. 1, 1994, pp. 146-165 at p. 147.

³⁴ Falkner (n 25) *supra* at p. 260.

North has neglected to obey or acknowledge. The Global North also retains responsibility for the near future environmental damages that will result from the crisis that some, weaker nations, are far more vulnerable to.

Justice requires that the international community, and particularly the Global North, at least in a legislative capacity, take joint action to repair the Earth's atmospheric composition, and stabilise humanity's massive ecological footprint. Whether global societies can mitigate the increased levels of global poverty, hunger, and conflict that this crisis will cause, should not simply be an afterthought. Instead, it must be addressed concurrently with climate change itself: "[b]y reconciling the normative demands of both developed and developing countries, the global environmental compromise became an integral part of the emergence of a *global* international society in the aftermath of decolonization."³⁵ The world has seen many counterproductive efforts to control, dominate, exploit, and enslave people and resources, primarily by a small subset of the world's territorial powers. The climate crisis is no different in this regard than colonialism—both are unjust and call for multi-pronged efforts to mitigate and repair the damage done. In large part, this damage *continues* to be perpetrated—in Táíwò's examples, through "climate apartheid" and modern neo-colonial hegemony.³⁶ What Táíwò means by these terms is merely that climate change is contributing to increased levels of structural inequality and poverty, and that carbon emissions are unequally harming those who are already marginalised in the Global South because of their race, class, ethnicity, gender, religion, or disability. If we are to

avoid the perils of "climate apartheid" we need to recognise that developing nations in the Global South cannot be held back in their pursuit of growth—but that it is plausible that developed nations should be.³⁷

One prominent solution, put forward by Edward Page, is to continue to allow emissions, yet only in line with a principle of legislation which states the necessity for an even distribution of per capita emissions across both wealthy and poor nations.³⁸ What this would mean in practice is that per capita emissions in developed nations would fall, while per capita emissions in developing nations would rise to meet the per capita emissions of the developed world. Despite the objection that this would lead to a stringent form of carbon austerity in many countries where per capita emissions are high, Page's suggestion is appealing for a few reasons. One reason for equal per capita emissions is that such a hypothetical regime prohibits allowances based on historical emissions; that is, it does *not* allow higher current emissions capacity for developed nations simply because they have historically emitted more. This seems fairer than a requirement which would cap all emissions in proportion to current levels—under this scenario, all countries would have to abate.³⁹ Another reason might be that Page's "emissions egalitarianism" requires a greater level of action from historically large polluters than from nations which have emitted less—in fact it allows developing nations to *continue* to develop, using fossil fuels, at the same time that developed ones would be required to

³⁵ Falkner (n 25) *supra* at p. 283.

³⁶ *see also* Warlenius, Rikard. "Decolonizing the Atmosphere: The Climate Justice Movement on Climate Debt." *Journal of Environment and Development*, vol. 27, no. 2, 2018, pp. 131-155.

³⁷ Note that "just emissions" are far from zero emissions. Net zero needs to be realised urgently for the Global North, while the developing world needs to be allowed time to catch up and only then abate. Development, and so some level of emissions, might benefit us—but perhaps not the environment—if it were to be seen as a "right."

³⁸ Page, Edward. "Climate Change Justice." *The Handbook of Global Climate and Environment Policy*, edited by Robert Falkner, Wiley Blackwell, 2013, pp. 231-247.

³⁹ Further, under the egalitarian scheme, "[t]he poor in the developing world would be guaranteed a certain quantity of protected emissions, which they could produce as they choose. This would allow them some measure of control over their lives rather than leaving their fates at the mercy of distant strangers." Shue (n 6) *supra* at p. 58.

immediately phase out carbon intensive energy production and use.⁴⁰

V. Dissent Within the Theory of Just Emissions

If one were to object to Page's claim, one might criticise the lack of economic research proposing substantive findings about the effects of changes in the relative speeds by which rich countries abate and by which poor countries develop. Different countries would make progress towards their goals at paces unique to their situation, leading to levels of equilibrium which are not uniform across, or even within, countries. Compounded with the legislative headwinds blocking access to egalitarian justice is the Global North's refusal to provide adequate funds to compensate developing nations for loss and damage that is the direct result of industrial emissions. The level of compensation which is required is directly proportional to the benefits that the North has received from emissions and is a small percentage of the total funds needed to close the wealth and development gap that exists between the Global North and South. Some claim that compensation is required over and above the allowances within the carbon budget which must be allocated to developing nations: "the inability of the Global North to transfer USD 100 billion per year to the Global South, which is already insufficient for current needs, is in itself a failure of justice."⁴¹ In other words, despite setting targets for climate reparations and development aid, Countries in the North have yet to meet their own self-imposed obligations, and the needs of the Global South far outweigh what has been pledged.

Whether we agree that compensation is necessary, it is clear that some action beyond allowances for future emissions are called for—particularly in light of recent agreements at the COP27 meetings that have noted "*with*

grave concern ... the growing gravity, scope and frequency in all regions of loss and damage associated with the adverse effects of climate change, resulting in devastating economic and non-economic losses, including forced displacement and impacts on cultural heritage, human mobility and the lives and livelihoods of local communities, and [have] *underline[d]* the importance of an adequate and effective response to loss and damage."⁴² This goes to the crux of matters of the just distribution of the remaining carbon budget—yet I argue that the carbon budget must include the financial possibility that not only do developing nations need to be allowed to emit beyond what they do today, but they also need monetary aid to adapt to changes in the climate which will disproportionately affect their livelihoods. Thus, levelling down must include a condition which determines and justifies the equilibrium where "level" is reached, and where ubiquitous reductions in emissions thereby begin.

Another argument raised in the context of environmental justice goes beyond national legal jurisdiction and international, multilateral, negotiations on abatement and pollution management. Ecological justice for *non*-humans requires also that vulnerable animal and plant species be protected as instantiations of precious and finite life. In many cases this means immediate reparative restoration of ecosystems and habitats.⁴³ However, in realist terms, scholars need to be cognisant of feasibility, the scope of current environmental policies, and the current non-binding nature of international environmental law. All contributions to sustainability on the international stage are voluntary, and most nations have given human constituents and communities priority over flora and fauna, which are primarily viewed as "resources." Future studies would contribute to this space by extending "egalitarian", or even "ecological" levelling-down to incorporate not

⁴⁰ As Shue (n 9) *supra* at p. 43 notes, "the CO₂ emissions of the wealthy nations must be reduced by more than the amount by which the emissions of the poor nations increase."

⁴¹ Gifford, Lauren, and Chris Knudson. "Climate Finance Justice: International Perspectives on Climate Policy,

Social Justice, and Capital." *Climatic Change*, vol. 161, no. 2, 2020, pp. 243-249, at p. 248.

⁴² UNFCCC. *Sharm el-Sheikh Implementation Plan*. 2022, p. 4, emphasis in original.

⁴³ Baxter, Brian. *A Theory of Ecological Justice*. Routledge, 2004.

only disparities between national and international economic capabilities for mitigation, but also agential concerns affecting the most vulnerable forms of life, who often cannot speak for themselves. I do not want to stray from my main conclusion, though. Global North countries need to abate faster than Global South countries industrialise—only via this route will emissions uniformly decrease in a just fashion.

VI. Conclusion

In conclusion, Shue puts it nicely when he writes that “[t]hose living in desperate poverty ought not to be required to restrain their emissions, thereby remaining in poverty, in order that those living in luxury should not have to restrain their [own] emissions.”⁴⁴ If the international community is going to move away from carbon intensive energy, and move away from it in a just manner, all varieties of political and industrial actors—including corporations, governments, and NGOs—need to be involved on a fundamental level. Falkner describes this cacophony of stakeholders and makes a gesture at justice when he writes that global environmental politics “has witnessed the emergence of an increasingly intertwined system of public and private global governance, with states and non-state actors recognizing each other’s contribution to global environmental management and seeking to weave together the fragmented elements of decentralized environmental governance that have come into existence at the global level.”⁴⁵ Yet what is largely missing from Falkner’s work on this issue is the mechanism by which rich countries will pay their due, and by which developing and impoverished ones will share in the benefits of a globalisation which is equitable, egalitarian, and sustainable.

It is my contention that we have not yet seen an image of what this positively just future looks like. Green futures, if politically viable, might entail climate change reparations that,

within a developing nation’s population would likely receive certain assurances from the industrial polluters and may include such things as “welfare, [economic] resources, natural resources, capabilities, and rights.”⁴⁶ If we are to ensure that those left behind by unsustainable globalisation have an equal chance at a liveable future, we must do much more than greenwash our policies to superficially satisfy the grassroots climate movements. Legislation at the local level needs backing by international law and substantive multilateral policy mandates for the green transition. In this article, I have argued, with Shue, Page, and others, that just emissions, for the Global South, fall somewhere above a minimum level of emissions for present subsistence⁴⁷—yet my argument differs from Shue’s, in that I claim that the international landscape of inter-state relations calls for an asymmetry of future allowances, favouring developing nations, vis-à-vis the equitable distribution of the remaining carbon budget. Not only are developing nations owed economic leeway to pollute, they should be all but required to receive assistance to pursue the energy transition for which they are not equipped to engage in alone. This asymmetry should, and probably eventually must, give a right-to-emit priority to countries which are not yet fully developed. Thus, to conclude, I argue that we must recreate our industrial, financial, economic, and political system in a way which limits the power to pollute of the countries that already have far too liberal allowances within the global carbon budget, and places control, agency, and initiative in the hands of peoples who have historically been denied the benefits of both industrialisation, and cosmopolitan political autonomy, in modern society.

⁴⁴ Shue (n 9) *supra* at p. 42.

⁴⁵ Falkner (n 25) *supra* at p. 278.

⁴⁶ Blomfield (n 31) *supra* at p. 12.

⁴⁷ Shue, Henry. *Climate Justice: Vulnerability and Protection*. Oxford University Press, 2014, at p. 116.

Displaced by Rising Tides: Legal Insights and Policy Imperatives for Climate Refugees in the Sundarbans Region of India

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KEYWORDS

*the Sundarbans,
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ABSTRACT

The Sundarbans, among the biggest and most susceptible mangrove ecosystems globally, face escalating threats from rising sea levels, unpredictable monsoons, and increased storms attributable to climate change. These environmental disruptions are displacing thousands of inhabitants, turning them into climate refugees. This article critically examines the legal and policy frameworks addressing climate-induced displacement in India, with a specific focus on the Sundarbans region. The absence of formal legal recognition for climate refugees in India leaves displaced populations in a precarious situation. Through the lens of the doctrine of state obligation, this paper explores the state's legal and moral responsibilities to safeguard citizens from climate-induced harm and displacement. Indian constitutional provisions, particularly Article 21 (Right to Life), oblige the state to take proactive measures to protect the lives and livelihoods of those threatened by environmental crises. This doctrine serves as a basis for demanding stronger state-led interventions in mitigating climate displacement. The article shall also apply transformative constitutionalism to highlight the evolving nature of constitutional rights in addressing modern challenges such as climate change. This theory proposes that the Indian Constitution be interpreted dynamically to expand protections for climate refugees, extending beyond traditional notions of fundamental rights to encompass social and environmental justice. While laws like the Disaster Management Act of 2005 offer a foundation, their real-world applicability to long-term climate displacement still needs to be improved. This study underscores the need for reforms that reflect the lived realities of displaced communities in the Sundarbans. By combining these jurisprudential insights, the study argues for creating robust, inclusive legal frameworks to protect climate refugees, emphasising policy imperatives and the State's duty to provide dignified resettlement for affected populations.



I. Introduction

There is an emphasis on environmentally sensitive topics at the international, national, and local levels in the current discussion of the climate catastrophe. This focus is essential in light of the world's growing problems, such as pollution, coastal erosion, increasing sea levels, and drought. People in environmentally delicate areas, especially in developing nations and those bordering the ocean, make up many of the 'forgotten victims' of climate change. The continuing climate catastrophe is transforming many elements impacting the world's functioning. Climate change is exacerbating serious issues, such as the migration of people and droughts, deaths, starvation, and increasing sea levels.¹ These people are often known as "climate refugees," "environmental refugees," or "migrants induced by climate change."² For many environmentally delicate areas, the phenomenon of climate-induced movement has serious consequences. One such environmentally fragile zone is the India-Bangladesh Sundarbans, also called the Ganges-Brahmaputra and Meghna Delta. It is a World Heritage site, according to UNESCO.³ Its marshy terrain and enclosed deltaic regions are home to over five million people. This article explores the refugee situation in the Indian Sundarbans and tries to uncover the causes of the crisis, as well as potential solutions.

The Sundarbans, the largest mangrove forest globally, encompasses around 10,000 square kilometres, with 62% located in Bangladesh and 38% in India. Mangroves at the land-sea interface protect coastal regions from natural catastrophes by preserving sediments,

replenishing nutrients, and maintaining clean offshore waters, thus enhancing the photosynthetic activity of phytoplankton. Ghosh asserts that mangroves are economically valuable since they provide essential habitats and support live species.⁴ Research by Hamilton and Casey indicates that mangroves face significant worldwide threats from human activities and climate change, with annual loss rates of 0.26% and 0.66%, respectively.⁵ Karmakar further asserts that salt levels serve as "another proof of climate change" since they have diminished freshwater availability, impeded mangrove forest growth, and decreased agricultural productivity on the islands.⁶ Recurring storms and cyclones, in conjunction with other factors, damage the environment and result in loss of life and property. The area is an exceptionally flat, low-lying alluvial plain that is especially susceptible to sea level rise, storm surges, tornadoes, cyclonic activity, riverbank erosion, salinisation, and eventual mangrove loss.⁷ Climatic dangers jeopardise fundamental livelihoods, and the options for livelihood acquisition remain mostly undisclosed. The environmental displacement in the Sundarbans area exemplifies the inadequacy of adaptation strategies to address climate change induced sea level rise, hence increasing vulnerability to coastal floods, storm surges, salinisation, and erosion. This study uses the Doctrine of State Obligation to examine the state's moral and legal duty to protect its population against climate-related suffering and relocation. Article 21 of the Indian Constitution guarantees the right to life and requires the government to intervene when environmental disasters endanger people's lives or means of subsistence. This

¹ Jayawardhan, Shweta. "Vulnerability and Climate Change Induced Human Displacement." *Consilience*, vol. 17 no. 1, 2017, pp. 103–142.

² Warren, Phillip Dane. "Forced Migration After Paris Cop21: Evaluating the 'Climate Change Displacement Coordination Facility'." *Columbia Law Review*, vol. 116, no. 8, 2016, pp. 2103–2144.

³ Hajra, Rituparna, et al. "Sustainability Assessment of Indian Sundarban Delta Islands Using DPSIR Framework in the Context of Natural Hazards." *Natural Hazards Research*, vol. 3, no. 1, Mar. 2023, pp. 76–88.

⁴ Ghosh, Aditya, et al. "The Indian Sundarban Mangrove Forests: History, Utilization, Conservation Strategies and

Local Perception." *Diversity*, vol. 7, no. 2, May 2015, pp. 149–169.

⁵ Hamilton, Stuart, and Daniel Casey. "Creation of a High Spatio-temporal Resolution Global Database of Continuous Mangrove Forest Cover for the 21st Century (CGMFC-21)." *Global Ecology and Biogeography*, vol. 25, no. 6, June 2016, pp. 729–738.

⁶ Karmakar, S. "Climate Change and Everyday-Life: Negotiation of Women in the Sundarbans, India." *Man, Environment and Society*, vol. 3, no. 1, 2022, pp. 49–64.

⁷ Jalais, Annu. *Forest of Tigers: People, Politics and Environment in the Sundarbans*. Routledge, 2011.

philosophy provides the groundwork for calling for more robust state-led initiatives to reduce climate-induced displacement. The article will also use transformative constitutionalism to emphasise further how constitutional rights are dynamic in responding to contemporary issues like climate change. This study investigates potential mitigation strategies to alleviate the impacts of climate change on coastal inhabitants. Further, it evaluates the effectiveness of the Disaster Management Act of 2005 in India in combating this issue. It is essential to implement specific regulations and protections for migrants from environmentally vulnerable deltaic areas, such as the Sundarbans, to safeguard migratory populations.

II. Contextualising Climate-Induced Displacement

Climate-induced displacement denotes a scenario where individuals undergo forced relocation, at least partially due to a weather-related event linked to climate change, including but not limited to recurring droughts, hurricanes, floods, or rising temperatures. While the notion of climate-induced displacement may suggest that climate change is the only catalyst for displacement, we use an empirical migration studies framework that positions climate change as a component that intensifies pre-existing social issues and inequality. According to Baldwin and Fornal, climate-related displacement is a multifaceted process whereby climate change interacts with pre-existing political and socio-economic forces that eventually result in relocation.⁸ Climate change effects do not function alone; they exist within a framework of additional migratory catalysts.

In his study, Hulme claims that although human mobilities may be transitory or permanent, occurring inside or outside state boundaries, whether planned or sudden, migration studies indicate that climate change-induced displacement is often temporary and confined within borders.⁹ He contends that climate change migration is often associated with two categories of occurrences: rapid-onset events and slow-onset events.¹⁰ Rapid-onset events transpire swiftly and directly affect infrastructure and human life, including hurricanes, floods, and tropical storms. Annually, over 21.5 million individuals evacuate their residences due to sudden weather phenomena.¹¹ Conversely, slow-onset events occur over an extended duration. Gradual-onset events, however, lead to severe and sometimes irreversible effects on local ecosystems, including environmental damage, drought, desertification, rising sea levels, ocean acidification, salinisation of arable land, air pollution, and precipitation patterns.¹² Both rapid- and gradual-onset disasters together undermine livelihoods and alter the motivations for local communities to stay in a certain area.¹³

A. Examining International Legal Frameworks Surrounding Climate Refugees

The United Nations Convention Relating to the Status of Refugees, which was established in 1951, and its 1967 Protocol Relating to the Status of Refugees, comprise a significant portion of international refugee law. Refugees are defined and entitled to certain legal protections, assistance, and social rights outlined in the 1951 Convention. They are also obligated to fulfil certain obligations to their host governments. A Refugee is a “person who is outside his or her country of nationality or habitual residence; has a well-founded fear of being persecuted because of his or her race, religion, nationality membership of a

⁸ Baldwin, Andrew, and Elisa Fornalé. “Adaptive Migration: Pluralising the Debate on Climate Change and Migration.” *Geographical Journal*, vol. 183, no. 4, Dec. 2017, pp. 322–328.

⁹ Hulme, Mike. “Climate Refugees: Cause for a New Agreement?” *Environment*, vol. 50, no. 6, 2008, pp. 50–54.

¹⁰ *ibid.*

¹¹ “Frequently Asked Questions on Climate Change and Disaster Displacement.” *UNHCR India*.

¹² Martin, Susan. “Climate Change, Migration, and Governance.” *Global Governance*, vol. 16, no. 3, 2010, pp. 397–414.

¹³ Brown, Oli. *Migration and Climate Change*, 31, International Organization for Migration, 2008.

particular social group or political opinion; and is unable or unwilling to avail him or herself of the protection of that country, or to return there, for fear of persecution.”¹⁴

According to the 1951 Convention, states are not allowed to discriminate against individuals while considering their refugee status, regardless of their gender, age, disability, sexual orientation, race, religion, or place of birth.¹⁵ As soon as a state recognises a person as a refugee, the Convention requires that person be provided asylum. The principle of non-refoulement forbids states from sending refugees back to countries where their lives or freedom are in danger. Any country that takes in a refugee must ensure that its citizens follow its laws.¹⁶ On the other hand, host countries are obligated to ensure that refugees have access to basic services, including the court system, schools, and jobs, and to identity documents like passports.¹⁷

To include the vast majority of people forced to flee their homes due to climate change, this definition must be updated. Even though people displaced by climate change may have lost their entire homeland or even their nation, most will not qualify as refugees under the 1951 Convention, with the exception of those leaving areas where climate change has caused instability (such as food shortages leading to regional conflicts). As the devastating effects of climate change become more apparent, the international community is taking a reactive approach, with the 1951 Convention being the sole legally binding source on the topic of refugee status and its failure to address the plight of those forced to flee their homes due to the storm. The only other legally enforceable international agreement that offers some rights to those displaced by climate change is the 1969 Organization of African Unity Convention (hereinafter, OAU Convention), an African

treaty that strengthens the protections given to refugees by the 1951 Convention. However, the 1969 OAU Convention is unable to offer the protections that climate refugees throughout the world require since it is limited to regional agreements and is unable to recognise ‘climate refugee’ status. Given its broad scope and the comprehensive protections it offers to refugees, the OAU Convention is expected to expand its rights to include climate refugees. The 1951 Convention and the OAU Convention both use the same definition of ‘refugee’ in Article 1, and the latter term is binding on all OAU member states.¹⁸ It states that the term “[r]efugee shall also apply to every person who, owing to external aggression, occupation, foreign domination or events seriously disturbing public order in either part or the whole of his country of origin or nationality, is compelled to leave his place of habitual residence to seek refuge in another place outside his country of origin or nationality.”¹⁹

The OAU Convention, which is only binding on a regional level, does not define ‘climate refugee’ status or the responsibilities of states towards refugees. Despite its promising tone for climate refugees, the definition fails to outline the responsibilities of governments in providing asylum, instead leaving this decision up to the discretion of each national legislature. Furthermore, developing and poor countries bear a disproportionate share of the adverse effects of climate change due to the fact that their governments and populations typically do not possess the resources necessary to adapt to this issue.²⁰

Beyond these two treaties, a number of non-binding accords, such as the 1984 Cartagena Declaration, provide the sole additional international protections for those forced to flee their homes as a result of climate

¹⁴ UN Convention Relating to the Status of Refugees, 189 UNTS 137, 28 Jul. 1951, Art. 1(A)(2).

¹⁵ *ibid* at [3].

¹⁶ Martin (n 12) *supra*.

¹⁷ *ibid*.

¹⁸ OAU Convention Governing the Specific Aspects of Refugee Problems in Africa, 1001 UNTS, 10 Sep. 1969, Art. 1; *see also* Refugee Convention (n 14) *supra*.

¹⁹ OAU Convention (n 18) *supra* at Art. 1(2).

²⁰ Intergovernmental Panel on Climate Change (IPCC). *Climate Change 2014: Mitigation of Climate Change. Fifth Assessment Report*. UN, p. 69

change.²¹ The Cartagena Declaration follows the OAU Convention's lead in dealing with the huge influx of refugees into Central America by broadening the definition of a refugee to the extent that is reasonable and relevant given the current circumstances in the area. The Cartagena Declaration suggests expanding the 1951 Convention's definition of a refugee to include individuals who have fled their home country due to widespread violence, aggression from outside forces, internal strife, severe human rights violations, or any other factor that has significantly disrupted public peace and safety.²² The Cartagena Declaration, similar to the OAU Convention, recognises climate refugees as those whose displacement is caused by natural disasters that "seriously disturb public order." However, the Cartagena Declaration is not legally enforceable. It merely serves as a set of principles that nations can choose to adopt into their own laws, and non-governmental organisations (NGOs) can choose to implement into their work.²³ Currently, millions of individuals potentially classified as refugees are vulnerable due to the protections provided by regional agreements. While legally binding treaties ensure their goals will be met, nonbinding accords provide governments with more leeway to break their promises, as they are seldom followed.

In light of India's non-participation in the 1951 Refugee Convention or the 1967 Protocol, as well as the lack of any specific legislation addressing climate refugees, the plight of the Sundarban residents has garnered minimal attention from governmental authorities. This necessitates establishing a framework similar

to the Cartagena Declaration to address India's climate refugee crisis effectively.

B. Protecting Climate Refugees: The Absence of Legal Recognition in India

India, ranked among the ten most enormous land masses globally, is anticipated to be a prime destination for climate-displaced populations.²⁴ Some researchers have suggested that acquiring land from nations such as India, which possess more land resources, may assist communities on sinking islands in evading extinction.²⁵ It is anticipated that between 50 and 120 million individuals may relocate to India as climate refugees, necessitating preparedness for this impending calamity.²⁶ The initial step towards a resolution is to define the notion of climate refugees²⁷ and contextualise it within the Indian framework.

When it comes to safeguarding refugees, India does not possess a comprehensive national framework. According to Field et al., the protection of climate refugees appears to be an unrealistic aspiration for the Indian regulatory framework, primarily due to its prevailing focus on neo-liberal principles of self-enterprise.²⁸ However, both international and domestic human rights law may provide certain safeguards for individuals seeking acknowledgement as climate refugees in India. They also assert that the scarcity of financial resources, the substantial existing population of India, and the absence of socio-political will to absorb refugees present significant problems for India as a destination for climate refugees.²⁹ India needs comprehensive national law on refugee protection.

²¹ Cartagena Declaration on Refugees, 22 Nov. 1984, Art. 3.

²² *ibid.*

²³ *ibid.*

²⁴ Gautam, Megha. "Climate Refugees: A Global Environmental and Legal Crisis." *Supremo Amicus*, vol. 18, 2020, pp. 507-510.

²⁵ Hsiao, Jerry. "Climate Refugee and Disappearing States: In Need for a New Legal Regime?" *Journal of Cultural and Religious Studies*, vol. 5, no. 5, May 2017, pp. 268-276.

²⁶ Sawant, Nagesh, and Aparna Sanjeev. "Climate Refugees in India: A Wake-Up Call for an Inclusive

Policy." *India Quarterly: A Journal of International Affairs*, vol. 78, no. 2, June 2022, pp. 371-380.

²⁷ McAdam, Jane. "Protecting People Displaced by the Impacts of Climate Change: The UN Human Rights Committee and the Principle of Non-Refoulement." *American Journal of International Law*, vol. 114, no. 4, 2020, pp. 708-725.

²⁸ Field, Jessica, et al. "Self-Reliance as a Concept and a Spatial Practice for Urban Refugees: Reflections from Delhi, India." *Journal of Refugee Studies*, vol. 33, no. 1, Mar. 2020, pp. 167-188.

²⁹ *ibid.*

The Citizenship Amendment Act of 2019 is one of the few codified legislative instruments on refugee protection in India,³⁰ yet this Act has faced criticism for its discriminatory nature. In the absence of a comprehensive domestic legislative framework, the courts in India have intervened to resolve refugee legal concerns.³¹ Due to the absence of laws regulating refugee rights or associated administrative procedures, the refugee system is “characterised by an eclectic interplay of administrative *ad hocism* and judicial assertion of constitutional rights.”³² Consequently, there exists no formal framework for those pursuing refugee status in India, and the administrative determinations are predominantly political.

No UNHCR registration offices for asylum seekers exist at India’s borders, such that applicants must travel to the sole office in New Delhi to enter the process and claim refugee protection.³³ Furthermore, the Ministry of Home Affairs does not provide the procedures applicable to the asylum seeker,³⁴ highlighting the significant degree of discretion involved. The UNHCR conducts registration and refugee status determination in India; however, its mandate is restricted to refugees who are not nationals of Sri Lanka, Tibet, Pakistan, or Bangladesh, and is contingent upon the government’s “political will.”³⁵ The relationship between the UNHCR and the Indian government remains informal.³⁶ Currently, India’s refugee system comprises a combination of judicial rulings and disjointed legislation, lacking standard administrative regulations, and is regulated by the

discretionary administrative procedures of the MHA.³⁷

According to Gauri and Gloppen, the current refugee system in India relies on a variety of inconsistent legislation and a human rights oriented approach implemented by the court under the Indian Constitution.³⁸ The applicable national legislation for all non-citizens, including immigrants, refugees, and asylum seekers in India, includes the Foreigners Act of 1946, which extends authority to the Central Government concerning foreigners.³⁹ The rules for the registration of foreigners in India are outlined in the Registration of Foreigners Act of 1939.⁴⁰ The Citizenship Amendment Act 2019 stipulates that Indian citizenship shall be granted to persecuted minorities, specifically Hindus, Sikhs, Buddhists, Jains, Parsis, and Christians from Afghanistan, Bangladesh, and Pakistan, who entered India on or before December 31, 2014.⁴¹ Furthermore, they will not be classified as illegal immigrants.⁴² This Act establishes a legal classification for those who may be recognized as refugees in India for the first time.⁴³ The existing law permits long-term visas for some minority groups, including women from Pakistan, Bangladesh, and Afghanistan, who enter India with “valid documents.”⁴⁴ These Acts solely encompass substantive protections and lack directions for the implementation of these regulations.

Due to the geographical variety and enormous size of the nation, regional strategies are required. There would be significant policy differences, for instance, between the needs of

³⁰ Abdali, Fazal. “A Comparative Analysis of the Global Compact on Refugees and the Constitution of India.” *The Global Compact on Refugees: Indian Perspectives and Experiences*, edited by Jessica Field and Srinivas Burra, Academicians’ Working Group Coordinator, UNHCR India, 2020, pp. 108–109.

³¹ *ibid.*

³² Bhattacharjee, Saurabh. “India Needs a Refugee Law.” *Economic and Political Weekly*, vol. 43, 2008, pp. 71–73.

³³ Shanker, Roshni, and Hamsa Vijayaraghavan. “Refugee Recognition Challenges in India.” *Forced Migration Review*, vol. 65, 2020, p. 24.

³⁴ *ibid.*

³⁵ Alexander, Atul, and Nakul Singh. “India and Refugee Law: Gauging India’s Position on Afghan Refugees.” *Laws*, vol. 11, no. 2, Apr. 2022, pp. 31–35.

³⁶ *ibid.*

³⁷ Abate, Randall, and Chhaya Bhardwaj. “Enhancing Protection of ‘Climate Refugees’ in Destination Hubs: A Comparative Analysis of Legal Mechanisms and Governance Challenges in the United States and India.” *Harvard Human Rights Journal*, vol. 37, no. 2, 2024, pp. 293–318.

³⁸ Gauri, Varun, and Siri Gloppen. “Human Rights-Based Approaches to Development: Concepts, Evidence, and Policy.” *Polity*, vol. 44, no. 4, 2012, pp. 485–503.

³⁹ Foreigners Act 1946 (India).

⁴⁰ Registration of Foreigners Act 1939 (India).

⁴¹ Citizenship Amendment Act 2019 (India).

⁴² Alexander and Singh (n 35) *supra*.

⁴³ *ibid.*

⁴⁴ *ibid.*

those migrating temporarily from a drought-stricken region of Rajasthan and those of those migrating permanently from Bangladesh as a result of the destruction of their houses brought about by rising sea levels. Agrarian distress is already rampant, and climate change might make it much worse, hastening migration to cities. In addition, certain groups are impacted differently by climate change and environmental calamities. Such calamities typically hit certain areas more powerfully than others. For instance, in the wake of the catastrophic floods in Bihar, members of the ruling upper castes seized control of the relief centres established to aid the refugees. Similarly, unlike some members of the privileged class, those living in poverty cannot afford to temporarily migrate from a city like New Delhi in the event of severe winter air pollution. This shows how certain groups are more susceptible than others because of a lack of social capital or financial means. This indicates that the state is often compelled to respond with tailored policies in order to help those who are less fortunate. As things are, the Indian government lacks a clear refugee policy, and its institutional responses are often reactive, with occasional court interventions. Therefore, expecting a climate refugee policy to be put in place overnight to address cross-border migration would be unrealistic. Attempts to establish appropriate refugee legislation in India have been many and varied, including the Protection of Refugees and Asylum Seekers Bill of 2015, the National Asylum Bill of 2015, and the Asylum Bill of 2015 for Climate Refugees; however, they have not been given the attention they need.⁴⁵ India could use the 2018 United Nations Global Compact as a prompt to address the issue of refugees in its next comprehensive legislation. Since the specific requirements of refugees cannot be effectively met by general refugee laws, it is crucial to act with prudence. Vulnerable and low-income communities need special assistance in this

endeavour because of the disproportionate impact that climate change and other environmental catastrophes have on them.

C. The Sundarbans: A Fragile Ecosystem on the Brink

Scattered low-lying islands in West Bengal make up the Sundarbans forest system, the world's biggest mangrove environment. It protects a number of species from extinction and provides a natural buffer against natural disasters like storm surges and cyclones. Another way that woods naturally sequester carbon is via photosynthesis. Things are evolving rapidly, however. Cyclones have always been a real concern for the locals due to their low-lying, riverine, and coastal location.⁴⁶ The 'transition' zone, which includes both the stable interior regions bordering the mainland, and the 'core' coastal regions of mangrove forests that are legally protected, are particularly at risk from environmental dangers.⁴⁷ In 2011, just a quarter of the 1.5 million people residing in the transition zone had access to potable water. The region's proximity to large tidal rivers meant that even fewer could seek refuge in storm shelters.⁴⁸

All year round, the area encounters a plethora of natural dangers. Approximately nine cyclonic storms, one-third of which are quite violent, occur there per decade. Hudhud (2014), Bulbul (2019), Sidr (2007), Aila (2009), Phailin (2013), and Aila (2009) were all recent devastating storms that hit the Sundarbans. Perpetual cyclonic storms are accompanied by long-term environmental risks that humans have endured for countless generations. The failure of the ring of embankments that were built to protect the area from erosion, increased salinisation of soil and water, loss of ecosystem services, and inadequate WASH (water, sanitation, and hygiene) facilities have all contributed to food insecurity and reduced access to safe drinking

⁴⁵ Shanker and Vijayaraghavan (n 33) *supra*.

⁴⁶ Koh, H, et al. "Mangrove Forests: Protection Against and Resilience to Coastal Disturbances." *Journal of Tropical Forest Science*, vol. 30, no. 5, 2018, pp. 446–460.

⁴⁷ *ibid*.

⁴⁸ The World Bank. "Building Resilience for Sustainable Development of the Sundarbans through Estuary Management, Poverty Reduction, and Biodiversity Conservation Strategy Report." Report No. 88061 – IN, 2014.

water facilities.⁴⁹ Soil salinity has decreased agricultural output in an area where farming is the main economic activity. High rates of diarrhoea-related mortality, particularly in children, and poor health outcomes have been caused by water sources that are too salty and by a lack of piped water delivery. In 2020, the Indian Sundarban residents dealt with three crises at once. With the COVID-19 pandemic and the long-term consequences of slow-onset hazards, the Bay of Bengal was struck by the biggest tropical cyclone in history, Amphan, in the fourth week of May 2020.⁵⁰

In 1987, the Sundarbans in India were recognised as a World Heritage Site by the United Nations Educational, Scientific and Cultural Organization (UNESCO). In 1997, the Sundarbans in Bangladesh were also recognised for their exceptional biodiversity. The 7.2 million people who call this area home face a complicated web of climate stress, both gradual and rapid, as well as socioeconomic instability on a daily basis; as a result, many have fled in search of jobs while they adapt to life here. Environmental concerns have also prompted relocations in the region.⁵¹ Lohachara, Suparibhanga, and Bedford are all underwater, while Ghoramara is reduced to a quarter of its previous size, forcing hundreds to flee to Sagar, a nearby island.⁵² Human activities and climate change exacerbate environmental concerns in the region, such as the overexploitation of natural resources and tidal-based aquaculture. Sea levels in the Sundarbans are rising due to climate change and eustatic processes, while land levels are falling locally due to isostatic processes such as soil compaction and deltaic subsidence. The area experiences a sea level increase of around three to eight millimetres each year due to isostatic processes.⁵³ The physically fit

residents fled the island in quest of employment when Cyclone Aila hit in 2009. Remittances supplied sufficient revenue for their families, who were left behind. Regrettably, the primary method for adapting to environmental hazards at home—seeking economic opportunities beyond the region—appears grim due to the following factors: the catastrophic Amphan disaster, a persistent global pandemic, and an extraordinary surge of return migrants to the Sundarbans in early 2020. Following Amphan, West Bengal received 130 million dollars from the federal government's National Disaster Relief Fund, and the state government pledged 827 thousand dollars in cash to support the restoration of life in the Sundarbans.⁵⁴ However, in the absence of long-term plans to address the region's poverty, COVID-19, and the delayed and rapid advent of environmental risks, short-term aid will not be able to undo the harm that Amphan has inflicted. Economists and climate scientists disagree on whether it is safer to keep people in the transition zone or to relocate them to more stable areas; some say it would be beneficial, while others say it would be dangerous.⁵⁵ Instead of relying on community-based resilience-building initiatives, the state will need to control and support migration as a means to alleviate the public health crisis and acute environmental and economic vulnerability.⁵⁶

D. Socio-Economic Impact of Climate Change on Women in the Sundarbans

Around four million people live on fifty-four Sundarban islands. The residents endure poverty, misery, and hazardous living conditions. Geographical challenges force islanders to deplete natural resources. Rain-fed monoculture agriculture, woods for forest

⁴⁹ *ibid.*

⁵⁰ "Cyclone Amphan Makes Landfall across Sundarbans World Heritage Properties (Bangladesh, India)." *UNESCO World Heritage Centre*.

⁵¹ Das, Shaberi, and Sugata Hazra. "Trapped or Resettled: Coastal Communities in the Sundarbans Delta, India." *Forced Migration Review*, no. 64, 2020.

⁵² *ibid.*

⁵³ *ibid.*

⁵⁴ Sengupta, Nayanika. "Sundarbans Devastated by Cyclone Amphan, as Virus Halts Migration." *India Today*, 2 June 2020.

⁵⁵ Ghosh, Nilanjan, et al. "Away from the Devil and the Deep Blue Sea: Planned Retreat and Ecosystem Regeneration as Adaptation to Climate Change." Policy Research and Innovation Group, Issue Brief No. 1, WWF-India, Jan. 2016.

⁵⁶ Mörner, Nils-Axel. "Sea Level Changes in Bangladesh: New Observational Facts." *Energy & Environment*, vol. 21, no. 3, 2010, pp. 235–249.

products, and rivers or estuaries for fishing give little income. Ironically, the region surrounded by water has a constant water shortage since the river water is saline.⁵⁷ There is a gender gap in how people perceive climate change.⁵⁸ Climate change is more likely to affect women than men due to the fact that women make up the bulk of the world's impoverished population. Climate change also threatens the natural resources that women rely on more for their livelihood.⁵⁹ The women of India's Sundarbans region are not immune to the consequences of climate change. Women frequently assume the role of managers of family resources, and their responsibilities increase as they seek new sources of food and resources to sustain their families, necessitating longer travel and greater time investment to mitigate resource constraints. The Sundarbans, as a coastal region, frequently encounter intense cyclonic events, flooding, saline water intrusion, and soil erosion. During these intense events, women have sanitary challenges, particularly if they are menstruation or pregnant. Climate change induces alterations in agricultural output and marine fisheries. This leads to a reduction in revenue, as these two are the primary occupations in the Sundarbans. Decreasing income results in the migration of male individuals to different states and nations. In the absence of male members, female members must manage the entire family, provide social security, and earn income through various jobs. Consequently, the burden intensifies for women.⁶⁰

Women face significant vulnerabilities due to a range of situational and structural causes. In a study of women in Bangladesh affected by floods, Azad et al. discovered that around 61% of respondents were displaced from their

residences during severe flooding, and 21% experienced damage to their sanitation facilities. 90% of the surveyed women reported illness due to wearing damp clothing, as they lacked sufficient replacement garments. Women are susceptible to sexual and various forms of harassment, including psychological torment, verbal abuse, and domestic violence, during a flood.⁶¹ Uncertainties in livelihood and associated poverty have substantially changed the community's social structure. The alterations exert a varied influence on the overall vulnerabilities of the women islanders. The data indicated alterations such as a rise in domestic violence, early marriage, and the disintegration of families.

According to Das and Ghosh,⁶² the Sundarbans' patriarchal social structure allowed marital abuse to persist for a considerable period before the first shift; respondents, however, found a positive correlation between its slow rise and the worsening livelihood uncertainties and poverty that followed. After losing their conventional means of subsistence, males, according to respondents, worry too much about the future and become easily annoyed. Although disputes are commonplace, domestic violence against wives is frequently reported by the interviewed female respondents.

As climate change affects physical and social surroundings and the frequency of natural disasters increases, a greater number of individuals may be displaced and may be vulnerable to trafficking. Women are coerced into prostitution. In Dholkhali, situated in the Sundarbans on the eastern coast of the Indian subcontinent, climate change is the catalyst for rising human trafficking rates. The

⁵⁷ Kanjilal, Barun, et al. "Health Care in the Sundarbans (India): Challenges and Plan for a Better Future." Future Health Systems Research Programme Paper, 2010.

⁵⁸ "Gender and Climate Change Strengthening Climate Action by Promoting Gender Equality." IUCN Issue Brief, Nov. 2015.

⁵⁹ UN Women Watch. *Women, Gender Equality and Climate Change*. 2009.

⁶⁰ Karmakar, Subarna. "Gender and Climate Change: The Condition of Women in the Indian Sundarbans." *Scholars*

Journal of Arts, Humanities and Social Sciences, vol. 9, no. 1, Jan. 2021, pp. 1-5.

⁶¹ Azad, Abul Kalam, et al. "Flood-Induced Vulnerabilities and Problems Encountered by Women in Northern Bangladesh." *International Journal of Disaster Risk Science*, vol. 4, no. 4, Dec. 2013, pp. 190-99.

⁶² Das, Debjoyoti, and Upasona Ghosh. "Those Who Stay Behind: Lived Experiences from Indian Sundarbans Amidst Climate Change and Migration." *RLS Southasia*, 2022.

compounded impacts of poverty and climate change enhance traffickers' capacity to entice women and children into coerced prostitution, marriage, and labour. Cyclone Aila, which displaced over a million individuals in May 2009, precipitated trafficking. The situation is dire, since the Sundarbans coastline is receding by approximately 650 feet annually, with a significant portion of the islands perhaps submerged within 15 to 25 years.⁶³

Environmental changes brought on by climate change have disproportionately negative effects on women on both a social and economic level, as well as their physical health. Those impacts also affect the women of the Sundarbans. Their health is jeopardised due to saltwater intrusion, cyclones, and soil erosion. Water shortages and changes in rainfall patterns cause farmers to earn less money, which puts further strain on women's lives. Changes brought forth by ocean acidification impact the fishing community, particularly women. Men go for other jobs as the family income drops. As a result, women end up shouldering a disproportionate share of the domestic chores. In order to make ends meet, they are also forced to do odd jobs. Migration throughout ecosystems is another facet of global warming. Women are more likely to be victims of trafficking as a result of this migration.

Women are less able to adapt to climate change due to their lack of autonomy and decision-making authority. In many households, women need the power to manage the family money or assets. Despite women accounting for half of the global population and bearing the gendered impact of climate change, they are underrepresented in global government policy and decision-making forums. When it comes to developing policies around climate change, women should be

involved. They can provide a wealth of indigenous knowledge in terms of adaption tactics. Moreover, assistance provided to victims of natural catastrophes should be based on gender. Menstrual hygiene products, women's underwear, and clothing should all be part of the assistance.

III. A Study of the Doctrine of State Obligation: Legal and Moral Responsibilities

Nations have a responsibility to provide safety and aid to those who are forced to flee their homes due to persecution, war, or natural disasters, as stated by Miller.⁶⁴ This responsibility stems from the doctrine of *parens patriae*, and such vulnerable groups should be given protection because climate change threatens their right to life under the International Covenant on Civil and Political Rights. It seems ethically arbitrary to grant protection to conventional refugees while denying it to those forced to escape because of ecological destruction. Theorists have predominantly analysed the intersection of climate change and forced migration through the framework of liberal international justice theories, such as those proposed by Bell,⁶⁵ or through theories concerning territorial rights and property ownership, as articulated by Risse.⁶⁶ For proponents of unrestricted global mobility, however, providing refuge for environmental migrants is imperative. Nevertheless, these viewpoints have not yet garnered extensive support. What might the environmental refugee rightfully anticipate from the host state upon admission? The principal obligation of the international refugee system is to maintain the principle of non-refoulement, which forbids returning displaced individuals if it subjects them to significant danger.⁶⁷ The applicability of this approach is constrained when addressing the protection requirements of individuals

⁶³ Priyadarshini, S. "Climate Change Pushing Sundarban Farmers into 'Awkward Jobs'." *Nature India*, Feb. 2015.

⁶⁴ Miller, David. "Distributing Responsibilities." *Journal of Political Philosophy*, vol. 9, no. 4, Dec. 2001, pp. 453–471.

⁶⁵ Bell, Derek. "Environmental Refugees: What Rights? Which Duties?" *Res Publica*, vol. 10, no. 2, 2004, pp. 135–152.

⁶⁶ Risse, Mathias. "The Right to Relocation: Disappearing Island Nations and Common Ownership of the Earth." *Ethics & International Affairs*, vol. 23, no. 3, 2009, pp. 281–300.

⁶⁷ Bradley, Megan. "'Migrants in a Feverland': State Obligations towards the Environmentally Displaced." *Journal of International Political Theory*, vol. 8, no. 1–2, Apr. 2012, pp. 147–158.

relocated from tiny island governments that may ultimately become submerged. Host governments are obligated to abstain from deporting these refugees to places where they would encounter significant insecurity. Walzer contends that host states are mandated to confer citizenship upon refugees, asserting that members must be willing to embrace those they admit as equals within a framework of shared responsibilities; thus, territorial admission is a matter of significant gravity.⁶⁸ Environmental refugees from small island states who lack the prospect of returning to their countries of origin must be afforded the opportunity to obtain membership rights in their host states, along with access to the benefits typically provided by the host society, including medical care and education.⁶⁹

The principle of non-refoulement is now considered customary international law. The 1951 Refugee Convention prohibits governments hosting refugees from repatriating them to a place where their safety or freedom may be unfairly endangered.⁷⁰ Under international human rights law, the non-refoulement concept extends beyond the traditional definition of a refugee to provide protection to those in transit. People who risk suffering torture or other forms of irreversible harm upon repatriation or expulsion are protected under international human rights law under the principle of non-refoulement. As the first case involving environmental migration caused by climate change to be brought before the Human Rights Committee, *Teitiota v New Zealand*⁷¹ sheds light on the requirements for the activation of non-refoulement obligations as outlined in international human rights law.⁷² The ruling of the Human Rights Committee, in this case, was widely recognized as a groundbreaking event. It was the first time that an international human rights body had recognised the link between severe

environmental conditions caused by climate change and the potential violation of the right to life, specifically in the context of non-refoulement and migration.⁷³ Climate change is another distinct problem that governments and decision-makers face in relation to non-refoulement. This problem is deciding whether the current environmental circumstances in the nation of origin are dangerous to a person's right to life. Rising sea levels, more violent storms, salinisation, conflicts over limited resources, and other abrupt and slow environmental threats pose a particularly serious challenge to developing states. But when do these disorders become life-threatening? The petitioner who "has substantiated the claim that he faced upon deportation a real risk of irreparable harm to his right to life," as established in *Teitiota v New Zealand*, is the one who must prove this in non-refoulement instances.⁷⁴ The Committee determined that there was no imminent danger to Teitiota's life since the danger was not genuine, personal, and reasonably foreseeable. While this was going on, the Committee also found that the Kiribati environment was deteriorating to the point that the island country may become uninhabitable within ten to fifteen years after the judgment was made, constituting a real danger to the right to life.

Migrants fleeing Bangladesh's environmental catastrophe and the worsening effects of climate change are increasingly making their way to the Indian Sundarbans, where rising sea levels have wiped out whole ecosystems and caused a dramatic loss of land. People living along the shore often move from island to island in quest of better living conditions. People from Bangladesh are flooding into this area, and some have even labelled them as crisis migrants since they came here illegally to escape danger at home only to find themselves ensnared in a humanitarian

⁶⁸ Walzer, Michael. *Spheres of Justice: A Defense of Pluralism and Equality*. Basic Books, 1983.

⁶⁹ *ibid.*

⁷⁰ Zolberg, Aristide, et al. *Escape from Violence: Conflict and the Refugee Crisis in the Developing World*. Oxford University Press, 1989.

⁷¹ *Teitiota v New Zealand* [2019] UNHRC, Comm No 2278/2016, UN Doc CCPR/C/127/D/2728/2016.

⁷² Bergova, Ivanka. "Environmental Migration and Asylum: Ioane Teitiota v. New Zealand." *Justice System Journal*, vol. 42, no. 2, 2021, pp. 222-224.

⁷³ McAdam (n 27) *supra*.

⁷⁴ *ibid.*

catastrophe. Floods, tropical cyclones, and storm surges are quite common in Bangladesh, and they greatly affect the coastal population.⁷⁵ Farmers are on the hunt for additional land as a result of shrinking land areas, riverbank erosion, and the incursion of salt seas into agricultural fields. Degradation of the human habitat, high unemployment, economic inequality, and widespread landlessness are all results of this. The majority of individuals have a very low level of involvement in choices that impact their lives, and there are no rehabilitation programs.⁷⁶ Many individuals who have lost their homes and families due to climate change have nowhere to turn for help or reintegration.⁷⁷

At the global level, in the absence of substantial help, climate-displaced individuals turn to international law as their potential salvation, although their expectations are misplaced. According to prevailing international refugee law, individuals displaced by climate change are ineligible for refugee status.⁷⁸ Currently, international promises to save the world from the persistent threat of climate change lack legal enforceability. In light of the sixty-two comprehensive comments provided by countries and transnational organisations, the International Court of Justice will issue an advisory opinion that may facilitate the criminalisation of climate inaction in accordance with international law.⁷⁹ The petition for an advisory opinion recognises that “climate change is an unprecedented challenge of civilizational proportions and that the well-being of present and future generations of humankind depends on our immediate and urgent response to it.” The UNGA Resolution acknowledges the scientific

consensus articulated, among other sources, in the reports of the Intergovernmental Panel on Climate Change.⁸⁰ The Resolution emphasises that human-induced emissions of greenhouse gases are “the dominant cause of the global warming observed since the mid-20th century” and that anthropogenic climate change “has resulted in extensive detrimental effects and associated losses and damages to both nature and humanity.”⁸¹ Even though this advisory opinion of ICJ will not be binding upon the states, it will streamline the state obligations to act in cases of climate displacement. This could be the guiding framework to enact a domestic policy, or could catalyse the international community coming together to frame an international framework to deal with the climate refugee crisis.

IV. From Static to Dynamic: Interpreting Fundamental Rights and Expanding Climate Justice through Transformative Constitutionalism in India

Transformative constitutionalism is characterised as a political yet peaceful instrument rooted in law aimed at effectuating significant social change via the enactment, interpretation, and enforcement of the Constitution. According to Klare, this transformational process aims to fundamentally alter a nation’s political and social institutions, as well as power dynamics, steering them towards democracy, participation, and equality.⁸² Judges are pivotal in the transformation process; their progressive interpretation of the constitution is essential for realising the justice, democracy, and equality promised by transformational constitutions.⁸³ The judiciary, via diverse constitutional courts,

⁷⁵ *ibid.*

⁷⁶ *ibid.*

⁷⁷ Ghose, Anuttama, and S M Aamir Ali. “Resilience and Mental Health Challenges of Climate Refugees: Adjusting to Forced Relocation in the Current Legal Landscape.” *Impact of Climate Change on Mental Health and Well-Being*, edited by Debabrata Samanta and Muskan Garg, IGI Global, 2024, pp. 45–66.

⁷⁸ Bergeron, Tyler. “No Refuge for ‘Climate Refugees’ in International Law.” *Lewis & Clark Law School Blog*, 20 Jan. 2023.

⁷⁹ Srivastava, Pratyaksh. “ICJ to Present ‘Advisory Opinion’ on Global Environmental Obligations as Small Island Nations Raise Alarm: What Does It Mean?” *Down To Earth*, 20 Aug. 2024.

⁸⁰ UNGA Resolution A/Res/77/276.

⁸¹ *ibid.*

⁸² Klare, Karl. “Legal Culture and Transformative Constitutionalism.” *South African Journal on Human Rights*, vol. 14, no. 1, Jan. 1998, pp. 146–188.

⁸³ *ibid.*

has significantly influenced and moulded the legal framework of India. In recent years, the notion of transformative constitutionalism has garnered significant attention, as reflected in the ongoing discussions and debates regarding establishing a permanent Constitutional Bench composed of judges from the Supreme Court of India.

In the absence of a legal framework, India's present refugee system relies on much divergent legislation and a rights-based approach implemented by the court under the Indian Constitution.⁸⁴ However, it still lacks a uniform legal mechanism to grant refugee status, and is more on a case-by-case basis. Historical practices in India encompass the protection of refugees from neighbouring nations such as Tibet, Sri Lanka, and Afghanistan, while at times, they also involve the denial of such protections within a rights-based framework.⁸⁵ The provisions of Article 14, which guarantees the right to equality, alongside Article 21,⁸⁶ which safeguards the right to life, collectively affirm that non-citizens are afforded protection against removal, provided they possess a valid visa,⁸⁷ have not engaged in any offences,⁸⁸ whether minor or major and do not pose a threat to national security.⁸⁹ According to the Indian Supreme Court's March 2024 ruling in *M K Ranjitsinh v Union of India*,⁹⁰ citizens have a right to protection from the negative consequences of climate change under Articles 21 (right to life) as well as 14 (right to equality). Additionally, the ruling makes it clear that courts must consider other rights of impacted populations, such as the right against relocation and associated rights while granting effect to this right. Before reaching a

conclusion in any given case, the Court further stressed the need to weigh different fundamental rights thoroughly. Indian courts have already acknowledged disaster, cataclysm, and right to life protection.⁹¹

Natural catastrophes, such as floods, violate the right to life as guaranteed by Article 21 of the Indian Constitution, as the High Court of Patna held in the case of *Arvind Kumar v the Union of India*.⁹² Flooding violates Article 21 of the Indian Constitution, which guarantees the right to livelihood and the right to labour, according to the Court's decision in *Olga Tellis v Bombay Municipal Co-corporation*.⁹³ The Bombay High Court recognised in the case of *Sushil Ratnakar Nimbalkar v State of Maharashtra* that flooding is a major cause of death and destruction of property and livelihoods.⁹⁴ The petitioner further said that the floods have introduced new health risks, such as gastroenteritis, and have compromised people's fundamental hygiene practices due to drinking water and sewage contamination.⁹⁵

In India, climate refugees confront convoluted legislation and judicial decisions. Although India lacks explicit refugee legislation pertaining to climate change, the aforementioned norms and statutes may be applicable. There are bills addressing climate change proposed in the parliament that have been unsuccessful.⁹⁶ Another measure introduced as a Private Members' Bill in India in 2022 was the Climate Migrants (Protection and Rehabilitation) measure. Nonetheless, the primary objective of this legislation is to establish an appropriate policy framework for the rescue and recovery of climate migrants

⁸⁴ Gauri and Gloppen (n 38) *supra*.

⁸⁵ Ghose, Anuttama, et al. "Politics of Slaughter: A Critical Review of Constitutional Failure in Myanmar and India During Rohingya Crisis." *Novum Jus*, vol. 17, no. 2, 2023, pp. 253-277; see *NHRC v Arunachal Pradesh* [1996] AIR 1234 (alleging violations of human rights); see further *Louis De Raedt v Union of India* [1991] 3 SCC 554.

⁸⁶ see *NHRC* (n 85) *supra*.

⁸⁷ *Hasan Ali Raihany v Union of India* [2006] 3 SCC 705.

⁸⁸ *Hans Muller of Nuremburg v Superintendent, Presidency Jail* [1955] SCR (1) 1284.

⁸⁹ *Mohammad Salimullah v Union of India* [2021] SCC OnLine SC 296.

⁹⁰ *M K Ranjitsinh v Union of India* [2024] SCC OnLine SC 326.

⁹¹ *Purushendra Kumar Kaurav v Union of India* [2006] (2) MPHT 416.

⁹² *Arvind Kumar v Union of India* [2022] Patna HC, CWJC 4176/2022.

⁹³ *Olga Tellis v Bombay Municipal Corporation* [1985] 3 SCC 545.

⁹⁴ *Sushil Ratnakar Nimbalkar v State of Maharashtra* [2020] Bombay HC, WP (C) 3543.

⁹⁵ *ibid*.

⁹⁶ The Climate Change Bill, Bill No. 23 of 2015, 27 Nov. 2014.

who have fled their homes, as well as for any other related issues. The measure does not address the issue of climate-related migration across borders.

As part of the right to life guaranteed by Article 21 of the Indian Constitution, citizens are entitled to safety against natural and climate-related catastrophes. One way to think about climate refugees in India is via the lens of the rights-based approach found in the Indian Constitution. Both citizens and foreign nationals are subject to Article 21.⁹⁷ Furthermore, non-citizens are likewise protected against refoulement under Article 21, and legislation itself establishes the mechanism for deportation.⁹⁸ In India, non-citizens may be protected as climate refugees if specific legal precedents are combined and applied. Thereby, through a broad interpretation of Article 21 of the Indian Constitution, the crisis of climate refugees can be catered to by looking into past precedents and judicial activism.

Furthermore, Article 21 also ensures the right to a healthy environment.⁹⁹ The term 'environment' is explicitly defined in the Environment Protection Act of 1986. The Act defines environment as including water, air, land, and their interrelations with humans, other species, flora, micro-organisms, and property.¹⁰⁰ The word climate change is addressed as a phenomenon in international law and lacks a definition in Indian domestic law. The UNFCCC defines the 'climate system' as the whole of the atmosphere, hydrosphere, biosphere, and geosphere, together with their interconnections.¹⁰¹ The concepts of 'environment' in Indian law and the 'climate system' in international law are fundamentally analogous. This definition of

the climate system can be read together with the definition of environment in order to recognise climate refugees as a population that faces catastrophe in their climate system. While the Indian government is obligated to safeguard its citizens' environmental rights under the larger framework of the right to life, the applicability of this obligation to non-citizens has yet to be determined.

It is time for climate change victims' Article 21 rights to be seriously pursued and protected. It is unreasonable to expect the climate change victims who are homeless to seek writs from the constitutional courts in order to vindicate their rights. The courts must act *suo moto* due to the seriousness of the matter.¹⁰² In order to help climate migrants with relocation, rehabilitation, and ultimate integration into host communities, policymakers at the federal and state levels should collaborate on action plans. When potentially harmful occurrences come together with characteristics such as exposure, susceptibility, and the tendency to generate extensive disruptions in society or communities, the result is a disaster, according to the United Nations Office for Disaster Risk Reduction.¹⁰³ These disruptions can result in various losses and impacts, including human lives, material possessions, economic losses, and environmental degradation.¹⁰⁴

V. Evaluating the Applicability of the Disaster Management Act of 2005 in the Context of the Sundarban Crisis

This Section elaborates on the applicability and remedies offered by the Disaster Management Act of 2005 in India, which serves as a comprehensive legislative framework for managing both natural and man-made disasters. Both migratory and

⁹⁷ *State Trading Corp. of India Ltd & Ors v Commercial Tax Officer, Visakhapatnam & Ors* [1963] AIR 1811, at 7.

⁹⁸ Sanderson, Mike. "The Role of International Law in Defining the Protection of Refugees in India." *Wisconsin International Law Journal*, vol. 33, no.1, 2015, pp. 46-113.

⁹⁹ *MC Mehta v Union of India* [1987] 1 SCC 395 ("Oleum Leak Case").

¹⁰⁰ The Environment Protection Act 1986, s. 2 (a).

¹⁰¹ United Nations Framework Convention on Climate Change, 1771 UNTS 107, 9 May 1992.

¹⁰² DasGupta, Rajarshi, and Rajib Shaw. "An Indicator Based Approach to Assess Coastal Communities' Resilience against Climate Related Disasters in Indian Sundarbans." *Journal of Coastal Conservation*, vol. 19, no. 1, 2015, pp. 85-101.

¹⁰³ United Nations. "International Strategy for Disaster Reduction." *UNISDR Terminology on Disaster Risk Reduction*, 2009.

¹⁰⁴ *ibid.*

climate change sites may be subject to invocations under the National Disaster Management Act of 2005 for this reason.¹⁰⁵ Refugees fleeing climate change should have access to the bare minimum of assistance services required by the law. Migrants impacted by catastrophes caused by climate change are encompassed under the broad term 'disaster' in s.2(d) of the 2005 Act. Authorities at the national, state, and local levels have been set up under the legislation to deal with the problems of climate migrants. After rapid and sufficient capacity building at the relocation site, national and state governments may be asked to set aside funds for the purpose of implementing additional mitigation measures to help climate refugees with their migration, rehabilitation, and resettlement. In addition, the National Disaster Response Force (NDRF) was created by the Act as a highly trained, multi-skilled, specialised force that can be quickly mobilised in the event of any disaster. Along with the National Disaster Management Authority (NDMA), the Act mandated the creation of similar entities at the state and district levels to be headed by the chief ministers and district judges, respectively, to oversee disaster management.¹⁰⁶ Disaster management policies, strategies, and guidelines are developed and put into action on a national level by the NDMA in collaboration with district and state management agencies. Supporting the NDMA in its mission, the National Executive Committee ensures that initiatives and instructions are carried out in accordance with protocol. It also coordinates with other agencies and related ministries, including the military and the NDRF. In times of crisis, the NDRF provides assistance to local and state governments.

Both the National Disaster Response Force and the National Institute of Disaster Management were established under the 2005 Act, and it is imperative that they demonstrate compassion

and understanding toward climate migrants.¹⁰⁷ The four pillars of disaster management (prevention, mitigation, preparation, and reaction) are emphasised in the National Policy on Disaster Management. Preventing, mitigating, and being prepared for disasters in regions hit hard by climate change is essential, but so is responding to, repairing, and recovering from, disasters in areas where people have migrated as a result. These two sets of efforts must be coordinated if we are to end the cycle of climate change disasters.¹⁰⁸

VI. The Path Forward: Strengthening Legal Protections for the Sundarbans

A. India's Approach to Climate Refugees and Policy Adaptations

India is one of the few nations that still needs to ratify the United Nations Refugee Convention and its 1967 Protocol, even though the United Nations High Commissioner for Refugees has recognised our country as an asylum seeker safe haven. The treaty stipulates that member countries must offer refugees a certain level of hospitality and lodging. The government may resort to discriminatory practices like forced deportation, incarceration, and selective protection and aid based on religion, gender, location, and other characteristics in order to protect and assist climate refugees in the absence of a legally enforceable framework and a specific policy for this population.

However, India is taking part in adaptation efforts and has adopted the National Action Plan for Climate Change (NAPCC). The NAPCC may offer a venue for ideas about policy frameworks that acknowledge climate refugees as a vulnerable group and provide criteria for granting climate refugee status, even if much of the plan is still being built. India does not have any law on internally displaced climate migrants. Energy efficiency, sustainable agriculture, sustainable cities, and increased solar power utilisation are some of

¹⁰⁵ Disaster Management Act 2005.

¹⁰⁶ Sarkar, Subhradipta, and Archana Sarma. "Disaster Management Act, 2005: A Disaster in Waiting?" *Economic and Political Weekly*, vol. 41, no. 35, 2006, pp. 3760–63.

¹⁰⁷ *ibid.*

¹⁰⁸ Kapur, Anu. "Insensitive India: Attitudes towards Disaster Prevention and Management." *Economic and Political Weekly*, vol. 40, no. 42, 2005, pp. 4551–4560.

the major objectives of the National Action Plan on Climate Change 2008, which aims to address the imminent climate change catastrophe. It also stresses the need for water resource management that is up to par. However, there is still no long-term plan to help climate migrants overcome the obstacles they face. Most South Asian countries agree that climate change is a key factor in relocation, but they do not have the means to act. India has to update its action plan to deal with climate-related displacements; the current strategy does not target coastal zone management specifically. There is no strategy in place to address the relocation and targeted rehabilitation of climate refugees. Relocation, reconstruction, and similar processes are instead given top priority. There is a serious dearth of credible data on the number and situation of climate migrants. Given these circumstances, it is crucial to set up a system for the efficient administration of migration and the adaptation-oriented mitigation of the effects of climate change in order to eradicate migration as a phenomenon progressively.¹⁰⁹

B. Integrating Ecosystem-Based Approaches into Legal Frameworks

If people can learn to thrive on smaller plots of land, they will be able to save themselves from being forced to leave the Sundarbans. The economic difficulties faced by the people of the Sundarbans may be significantly alleviated via the adoption of high-value sustainable agriculture practices, enhanced pisciculture, and a committed effort to create tourism that highlights the area's distinctive ecosystem. Governments at the federal and state levels should work together to devise a strategy to meet this need and aid citizens in constructing cyclone-proof homes on elevated terrain.¹¹⁰ To help those who have moved or are considering it, the government should keep track of who lives there, what skills they bring with them, and what they do to make

sure they can make a living and feel safe where they settle. In a world where climate change is already generating major difficulties, protected mangrove plantations are highly sought after because they serve as an essential barrier against strong storms and cyclones. The West Bengal Government's Department of Sundarban Affairs and Environment must engage the region's traditional Indigenous people in planting and caring for mangroves along the coast, foreshore, roadway, riverbank, canal bank, embankment, mudflats, and intertidal zone of garlands.¹¹¹ Because they have first-hand experience planting various mangrove species in optimal environments, local communities can provide better outcomes than forest officials when involved in mangrove restoration. While communities can track the exact expansion of these mangrove species in their area, it will also provide low-income marginal households with an extra source of revenue.

The study region's main industry is agriculture; thus, to reduce poverty there, climate-adaptive farming must be expanded. In order to improve food security for households and reduce reliance on the market, there is an urgent need for training and seminars on integrated agricultural practices in this area. Additional dirt may be utilised to raise the plot level, which will provide the required support during farming, and a pond can be dug next to the agricultural plot for collecting rainwater and freshwater fishing.¹¹² An exterior border of plantations can add to the crop yield, while an interior border of a surrounding trench can be planned to ensure irrigation throughout the year. Vegetables with green cover can be grown on the edge of the artificial pond. Paddy fields can be aerated, pests can be controlled, fish feed can be made from cow dung, and fodder for animals may be organised from agricultural

¹⁰⁹ Mukherjee, Nabanita, and Giasuddin Siddique. *Impact of Climate Change in the Indian Sundarbans Region*. Springer, 2024.

¹¹⁰ Mence, Victoria, and Alex Parrinder. "Environmentally Related International Migration: Policy Challenges." *A Long Way to Go: Irregular Migration Patterns, Processes,*

Drivers and Decision-Making, edited by Marie McAuliffe and Khalid Koser, ANU Press, 2017, pp. 317–342.

¹¹¹ Allison, Mead. "Geologic Framework and Environmental Status of the Ganges-Brahmaputra Delta." *Journal of Coastal Research*, vol. 14, no. 3, 1998, pp. 827–836.

¹¹² Mukherjee and Siddique (n 109) *supra*.

wastes and grasses; raising livestock is an alternative option. It is recommended that traditional salt-tolerant rice varieties such as Sada Getu, Nona Khirish, Nona Bokra, Talmugur, Hamilton, Matla, Rupsal, Marichsal, Kalomoti, Dudhomoti, Hamai, Hogla, and so on, be widely used. These varieties can endure increasing salinisation, irregular rainfall, and waterlogging issues, requiring less chemical fertiliser and pesticides. Additionally, they provide better yields over time, have good flavour, and require less labour.¹¹³

In order to promote the aforementioned sustainable agricultural practices, nationalised and rural banks could offer short-term loans, create crop insurance, dig drainage channels to improve irrigation, build cold storage facilities, institute soil health testing, and so on.¹¹⁴ Immediate action requires a coordinated effort by West Bengal's Agriculture and Sundarban Affairs Departments.

C. Collaborative Governance Models for the Sundarbans

In addition, the Sundarbans region requires the efficient execution of several social programs, including the Kendriya Awas Yojana, Geetanjali, Kanyashree, Rupashree, MNREGA, and others. These programs should be expanded and improved to help the disadvantaged people in the region survive and thrive. Relocating populations can be better prepared for changes in climate and other extreme events if medium and small businesses are encouraged to set up shop in the regions affected.¹¹⁵ Crop insurance, the Integrated Coastal Zone Management Project (ICZMP), and the Prime Minister National Relief Fund (PMNRF) are all programs that might greatly benefit the area's small-scale farmers. The government should step in and help the residents of the Sundarbans construct homes that can withstand cyclones and grow

rice kinds that can withstand salt water instead of the high-yield variety that cannot.¹¹⁶ Additional oversight of the construction and maintenance of multifunctional cyclone and food shelters is required by the Civil Defence and Disaster Management Department. During times of disaster, it is crucial for Block Development Offices to guarantee that school buildings have basic sanitary facilities and nutritional needs met. Government investment and intervention have allowed certain nations, including Australia and Alaska, to undertake planned mass migrations successfully.¹¹⁷

Transferred skillsets can be a strategy for adaptability rather than a hopeless last option, allowing one to take advantage of possibilities in other locations. The current exodus from the Sundarbans is largely associated with human labour and carries a negative stigma. If the locals can be well-educated in some areas, their relocation might be seen as a chance for a better life rather than a threat.

D. The Role of Judicial Activism in Climate Refugee Protection

As with the rest of the globe, India is currently confronted with the realities of climate change. As society strives to cut emissions, create resilience against a fast-warming globe and variable weather patterns, and adapt to the changing climate, judicial institutions, such as courts and tribunals, play an important role in adjudicating climate problems. The melting of glaciers, the increase in sea levels, the decrease and extinction of species, and, on a personal and societal level, the rise in disputes, aggressive behaviour, and migration are all consequences of climate change.¹¹⁸ Climate change has not yet played a significant role in Indian court rulings. Principles like polluter pays, sustainable development, and the public trust concept have largely evolved via case law and court declarations to form India's environmental

¹¹³ *ibid.*

¹¹⁴ Mence and Parrinder (n 110) *supra*.

¹¹⁵ Mukherjee and Siddique (n 109) *supra*.

¹¹⁶ *ibid.*

¹¹⁷ *ibid.*

¹¹⁸ Keshen, Shaindl, and Steven Lazickas. "Non-Refoulement: A Human Rights Perspective on Environmental Migration from Small Island Developing States." *Journal of International Affairs*, vol. 74, no. 2, 2022, pp. 21-36.

jurisprudence. However, the stagnation in climate change discussions, coupled with a pervasive sense of hopelessness, has prompted civil society organisations to adopt various ways to galvanise public opinion and urge nations to pursue more aggressive climate action.¹¹⁹ A prominent method has been utilising national and international courts, with the expectation that they will address the regulatory void and compel nations to take action. Both directly, as in cases of displacement, and indirectly, as in cases of related problems like causation, many of these assertions are pertinent to climate refugees.

Indian courts are urged to assume a more proactive role in resolving the legal intricacies associated with climate change, prompting the judiciary to employ innovative interpretations of existing legislation to protect environmental rights. Following the long history of the Indian judiciary's broad interpretation of the Indian Constitution and Environment Protection Act while developing doctrines like the polluters pays principles, precautionary principles, and so on, it is prudent to argue that a similar activism is required to cater to the climate refugee crisis as it relates to both environmental safeguards and human rights protection.

VII. Conclusion

The plight of climate refugees has been pressing for decades, yet victims have received little genuine attention. Economic and political factors become relevant in moments of desperation and matters of life and death. It is imperative to recognise that life takes precedence; all decisions made at such times must prioritise individuals. No nation is immune to this humanitarian crisis; it affects the entire world. Despite various measures to address climate change, more action must be taken for climate refugees. The detrimental consequences of climate change are evident, and there is no imminent indication of improvement. Recognising and

providing these refugees with help is an urgent matter that demands a quick international response. India must prepare for this disaster and establish a robust refugee policy framework. Acknowledging climate-induced migration at the national level and establishing an appropriate definition for sending and receiving countries is crucial to safeguard those displaced by the climate disaster. Environmentally sensitive deltaic areas, such as the Sundarbans, should have special rules and protections put in place to ensure the safety of the migratory populations. Policymakers must formulate localised adaptation strategies on two fronts: at the origin of migration to mitigate outflow and at the destination communities to facilitate the influx. It is essential to develop climate-resilient infrastructure and livelihood models at the source. Consequently, considering local demographics, geography, and socio-economic aspects, each plan must be tailored to ensure that communities possess incentives, support, and resilient infrastructure within their own regions. Considering India's geographic variety, the central government must incentivise and facilitate decentralised planning for climate change mitigation and adaptation. As a result, states should establish adaptation strategies that account for the cultural, social, and economic factors influencing their communities both now and in the future.

It is evident that the Sundarbans are suffering from the adverse effects of climate change. After every devastating weather event caused by cyclones, erosion, and subsidence, the Sundarbans' inhabitants see their homes and possessions destroyed and their futures cast in doubt. The landscape is covered in flooded topography, creating a dystopian setting. Consequently, in order to eradicate the phenomenon of migration progressively, it is crucial to set up a system for the efficient administration of migration and the adaptation-oriented mitigation of climate change impacts. Restoring mangrove forests is

¹¹⁹ Dutta, Ritwick. "Climate Change in the Courts: An Environmental Lawyer's Viewpoint." *Contributions to Indian Sociology*, vol. 55, no. 3, Oct. 2021, pp. 438–458.

one feasible, inexpensive, and highly beneficial option for rescuing West Bengal's coastal districts. Also, the government has to run a variety of social initiatives that are tailored to the needs of the Sundarban people. In order to support smallholder farmers in the area, crop insurance is a must-have. In order to assist the Indigenous population of the Sundarbans, the government must intervene in the construction of cyclone-resistant dwellings and the sowing of salt-tolerant rice varieties as opposed to high-yield varieties that are unable to withstand salinity conditions. Hope for better circumstances in the Sundarbans rests on the implementation of these solutions and on the seriousness of

the global community in tackling climate change.

Incorporating a Rights of Nature Approach into the EU Legal Framework: Exploring Legal Mechanisms for Enhanced Wadden Sea Habitat Protection

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KEYWORDS

the Rights of Nature, EU environmental law, ecocentrism, the Wadden Sea

ABSTRACT

This research explores the incorporation of a Rights of Nature approach into the legal framework of the European Union on habitat protection. The study assesses the existing EU environmental framework and the barriers to Rights of Nature in the EU. It further analyses international case studies where Rights of Nature have been implemented. Drawing from this analysis, the study explores the feasibility and effectiveness of two legal instruments regarding the objective of enhancing habitat protection in the Wadden Sea. Through a comparison of these legal mechanisms, the research identifies practical implications of incorporating a Rights of Nature approach into the EU legal framework, in particular concerning the criteria for legal standing. The findings suggest that each legal mechanism faces significant challenges to incorporating a Rights of Nature approach, especially if not accompanied by a broader ecocentric shift across the EU legal framework. The implications of this study therefore have significance beyond the case of the Wadden Sea, providing insights into the broader integration of Rights of Nature into EU environmental law.



I. Introduction

One of the most prominent environmental problems of the present day is the rapid deterioration of coastal ecosystems around the globe. Many coastal ecosystems worldwide are experiencing a significant loss of populations and species, thereby threatening to permanently damage crucial ecosystem

functions and their ability to recover.¹ The reasons for these are multifold, including pollution, human exploitation, climate change, and commercial activities.² The Wadden Sea, bordered by Denmark, Germany, and the Netherlands, is such a coastal system under threat.³ As this unique tidal ecosystem is home

¹ Eriksson, Britas, et al. "Major Changes in the Ecology of the Wadden Sea: Human Impacts, Ecosystem Engineering and Sediment Dynamics." *Ecosystems*, vol. 13, 2010, pp. 752-764.

² Lambooy, Tineke, et al. *Granting Rights of Nature to the Wadden Sea? An Exploratory Study*. Wadden Academy Report, 2022.

³ Lotze, Heike. "Radical Changes in the Wadden Sea Fauna and Flora over the Last 2,000 Years." *Helgoland Marine Research*, vol. 59, 2005, pp. 71-83.

to a diverse array of animal and plant species,⁴ it is imperative that its critical ecological functions can flourish without disturbance. However, the condition of the Wadden Sea has declined significantly.⁵ Not only does the global problem of climate change also apply to the Wadden Sea, which threatens to ‘drown’ the tidal flats, but there are also numerous activities in the local context that disturb the Wadden Sea’s natural ecosystem. Various industrial and commercial activities in and along the coastal areas of the Wadden Sea have negative impacts on the natural environment. Pollution occurs through agricultural activities that deposit nitrogen into the environment and the operations of several industries, such as shipyards and refineries. Commercial activities like gas exploration, salt drilling, electric cable installations, and fishing pose additional threats to the natural ecosystem functioning of the Wadden Sea. Considering the multiplicity of activities and factors negatively impacting the Wadden Sea, its protection is a highly complex and challenging task.⁶

The protection of the Wadden Sea has been the subject of national, multinational, and international agreements, thereby emphasising the need for coordinated efforts to ensure its preservation. In particular, much European Union (EU) legislation applies to the Wadden Sea. Environmental protection and sustainable development are integral to the EU’s legal framework through Article 3 of the Treaty on the European Union (TEU).⁷ In terms of conservation, the EU has implemented key directives that also apply to

the Wadden Sea. For example, the 1979 Birds Directive and 1992 Habitats Directives have incorporated the Wadden Sea into the Natura 2000 network, mandating that habitats and species listed therein be maintained or restored to a favourable conservation status. Additionally, Member States are required to report periodically on the conservation measures taken.⁸

Despite this seemingly wide-ranging body of environmental protection measures, the decline of environmental quality across Europe is still ongoing.⁹ The common explanation for this is that the European framework of environmental law faces various enforcement and implementation challenges.¹⁰ However, there are also more structural factors that hinder the EU’s environmental goals. In particular, the anthropocentric¹¹ nature of the current EU environmental legal framework has been identified as the main reason for its failure to meet its environmental objectives.¹² The instrumental definition of nature and the environment in the legal framework of the European Union negatively affects the achievement of the desired objectives of environmental protection, because there is an inherent discrepancy between the top-down, instrumentalist legal framework and the holistic and dynamic system of nature.¹³ Therefore, Carducci and others suggest moving beyond this worldview toward a Rights of Nature approach, which recognises the interconnectedness of humans and nature.¹⁴

⁴ Lambooy et al. (n 2) *supra*.

⁵ Lotze (n 3) *supra*.

⁶ Lambooy et al. (n 2) *supra*.

⁷ Schoukens, Hendrik. “Granting Legal Personhood to Nature in the European Union: Contemplating a Legal (R)evolution to Avoid an Ecological Collapse? (Part 1).” *Journal for European Environmental and Planning Law*, vol. 15, no. 3-4, 2018, pp. 310-332.

⁸ Directive 92/43/EEC, art. 3

⁹ Carducci, Michele, et al. *Towards an EU Charter of the Fundamental Rights of Nature*. European Economic and Social Committee, 2019.

¹⁰ *ibid*.

¹¹ Anthropocentrism entails human-centeredness. It constitutes the belief that only humans have intrinsic

value and deserve ‘direct moral consideration’; see Goralnik, Lissy, and Michael Paul Nelson.

“Anthropocentrism.” *Encyclopedia of Applied Ethics*, edited by Ruth Chadwick, 2nd ed., Academic Press, 2012; Batavia, Chelsea, and Michael Paul Nelson. “For Goodness Sake! What is Intrinsic Value and Why Should We Care?” *Biological Conservation*, vol. 209, 2017, pp. 366-376.

¹² Ito, M, et al. “Towards an EU Fundamental Charter for the Rights of Nature: Integrating Nature, People, Economy.” *Rights of Nature in Europe: Encounters and Visions*, edited by J G Ruales et al., Routledge, 2024, pp. 281-302.

¹³ Carducci et al. (n 9) *supra*.

¹⁴ *ibid*.

This study contributes to the discourse on reframing EU environmental law to achieve its environmental protection objectives, particularly within habitat protection. Focusing on the Rights of Nature approach within the EU's legal framework, it finds that current measures have been inadequate due to the anthropocentric nature and fragmentation of EU environmental legislation.¹⁵ By integrating a Rights of Nature perspective into EU environmental legislation,¹⁶ this study argues that such an approach shows promise in addressing the Wadden Sea's environmental challenges. To do this, both legislation and judicial development will be analysed. I will assess both mechanisms for their feasibility and effectiveness in habitat protection for the Wadden Sea. Feasibility is defined following Pedreschi and Scott, encompassing compatibility within the EU legal framework and the enforceability of each proposed method.¹⁷ Effectiveness is viewed broadly, involving behavioural and problem-solving outcomes.¹⁸ This way, effectiveness is ultimately about "obtaining results that are as close as possible to realizing the ideal

expressed by the political actors, considering the context of operation."¹⁹ This conception of effectiveness includes the measure of legal compliance and enforcement.²⁰

II. The Rights of Nature Approach

Essentially, advocates of the Rights of Nature argue in favour of a fundamental shift in our approach to nature. They argue that nature can be better protected by adopting the view that nature has intrinsic value and therefore should be endowed with rights.²¹ Rights of Nature can be distinguished between Rights of Nature as a legal philosophy and the legal provisions that are associated with it.²² The underlying idea of the Rights of Nature approach in legal philosophy is to create a paradigm shift in how humans and nature interact.²³ The Rights of Nature as legal provisions are seen as a way to attain this objective.

Since the idea of granting rights to nature was first explored by United States lawyer Christopher Stone in 1972, the concept has

¹⁵ Ito et al. (n 12) *supra*.

¹⁶ The focus here is placed on the EU legal framework due to its far-reaching influence into the jurisdiction of the EU Member States, thereby allowing for a more unified and harmonised strategy for habitat protection across the three EU Member States that encompass the Wadden Sea. It also follows from the argumentation in this study that a more whole systems approach is needed to address the transboundary problems facing the Wadden Sea, which I argue can better be achieved at the EU level.

¹⁷ Pedreschi, Luigi, and Joanne Scott. "External Differentiated Integration: Legal Feasibility and Constitutional Acceptability." EUI Working Paper RSCAS 2020/54, European University Institute, 2020.

¹⁸ Carducci et al. (n 9) *supra*.

¹⁹ Zamboni, Mauro. "Legislative Policy and Effectiveness: A (Small) Contribution from Legal Theory." *European Journal of Risk Regulation*, vol. 9, no. 3, 2018, pp. 416-430.

²⁰ Snyder, Francis. "The Effectiveness of European Community Law: Institutions, Processes, Tools and Techniques." *Modern Law Review*, vol. 56, no. 1, 1993, pp. 19-31.

²¹ To have intrinsic value is to hold a certain significance that cannot be reduced to human interests; see Gilbert, Jérémie, et al. "Understanding the Rights of Nature: Working Together Across and Beyond Disciplines." *Human Ecology*, vol. 51, 2023, pp. 363-378.

²² Kauffman, Craig, and Pamela Martin. *The Politics of Rights of Nature: Strategies for Building a More Sustainable Future*. MIT Press, 2021.

²³ When it comes to Rights of Nature as a legal philosophy, I would like to point out two ideologies that have greatly shaped the trajectory of the Rights of Nature movement, namely the philosophy of Earth Jurisprudence and Indigenous ontologies. The idea of Earth Jurisprudence is to incorporate a more 'Earth-centered' approach to law and jurisprudence. This requires a reconceptualisation of current political, economic, and social structures to align them more closely with the natural world, rather than attempting to impose human will upon nature. Moreover, many of the ideas that Rights of Nature scholars advocate for can be found in various Indigenous ontologies and traditions. It can be stated that the underlying principles of Rights of Nature are closely related to many Indigenous worldviews that have historically perceived the interconnectedness of humans and nature. For more discussion on the Rights of Nature as a legal philosophy see, for example, Berry, Thomas. *The Great Work: Our Way into the Future*. Broadway Books, 1999, cited in Fukurai, Hiroshi, and Richard Krooth. *Original Nation Approaches to International Law*. Palgrave Macmillan, 2021; Cullinan, Cormac. "A History of Wild Law." *Exploring Wild Law: The Philosophy of Earth Jurisprudence*, edited by Peter Burdon, Wakefield, 2011; Harden-Davies, Harriet, et al. "Rights of Nature: Perspectives for Global Ocean Stewardship." *Marine Policy*, vol. 122, 2020.

been increasingly adopted in different jurisdictions around the world. In recent years, the concept of Rights of Nature has been codified into positive law in different legal orders, ranging from national constitutions to judicial rulings, each with unique approaches to implementation.²⁴

Bolivia was one of the first countries to incorporate a Rights of Nature approach into its jurisdiction. Bolivia adopted the Law of the Rights of Mother Earth in 2010, which was converted into the Framework Law of Mother Earth and Integral Development for Living Well in 2012.²⁵ The Bolivian Indigenous community played a significant role in creating this new legislative act to enshrine the Rights of Nature into the domestic legal framework by advocating for a Rights of Nature approach and exerting pressure on the government to adopt a development model that is in line with Indigenous values.²⁶ The concept of Mother Earth, also referred to as *Pacha Mama*, has been defined in Article 3 of the 2010 Law as “a dynamic living system made up of an indivisible community of all living systems and living organisms that are interrelated, interdependent, and complementary, sharing a common destiny. Mother Earth is considered sacred in the worldviews of communities and peasant indigenous peoples.” Furthermore, Bolivia has adopted an enforcement mechanism in which citizens are empowered to bring lawsuits in case of perceived violations of the subjects covered by the Framework Law.²⁷

New Zealand has also developed the Rights of Nature through their national legislation. The development of the Rights of Nature discourse in New Zealand is inextricably linked with the government’s increasing recognition of the worldview of Indigenous populations and

their struggle to restore their relationship with the environment.²⁸ Most recently, this has led to New Zealand’s recognition of the legal rights of certain ecosystems, such as the Whanganui River and the national park of Te Urewera.²⁹ The granting of rights to the Whanganui River was established through the Whanganui Agreement. The Agreement includes provisions that seek to safeguard and implement the Māori’s physical and spiritual attachment to the river. The most notable result was the recognition of the Whanganui River as a legal entity with rights upon which ownership was transferred to a legal body that represents the river itself. This legal body is made up of two individuals who act as official guardians of the Whanganui River. These guardians are tasked with speaking and acting on behalf of the river, ensuring the consistent application of the identified needs and interests of the river.³⁰ In 2014, a similar struggle for self-determination and recognition resulted in the granting of rights to the national park of Te Urewera.³¹

Another example of granting rights to nature can be found in Colombia. In 2016, the Constitutional Court of Colombia ruled that the Atrato River is a subject of rights. This judgment stemmed from the necessity to take measures against harmful human activities in the Atrato River and its tributaries.³² Due to the government’s failure to take action, the Center of Studies for Social Justice, Tierra Digna, initiated legal proceedings against the government. In the proceedings that followed, the court found a “serious violation of the fundamental rights to life, health, water, food security, the healthy environment, the culture and the territory of the ethnic communities that inhabit the Atrato River basin and its tributaries, attributable to the Colombian State entities.”³³ According to Article 8 of the

²⁴ Tănăsescu, Mihnea. *Understanding the Rights of Nature: A Critical Introduction*. New Ecology, 2022.

²⁵ Fukurai and Krooth (n 23) *supra*.

²⁶ Kauffmann and Martin (n 22) *supra*.

²⁷ *ibid*.

²⁸ *ibid*.

²⁹ *ibid*.

³⁰ Boyd, David. *The Rights of Nature: A Legal Revolution That Could Save the World*. ECW Press, 2017.

³¹ Kauffman et al. (n22) *supra*.

³² Vargas-Chaves, Iván, et al. “Recognizing the Rights of Nature in Colombia: The Atrato River Case.” *Revista Jurídica*, vol. 17, 2020, pp. 13-26.

³³ Pecharroman, Lidia. “Rights of Nature: Rivers That Can Stand in Court.” *Resources*, vol. 7, no. 1, 2018, pp. 1-12.

Constitution, the Court observed that the protection of the environment is intrinsically related to the fundamental rights to life, health, territory, and culture.³⁴ The court demonstrated the interconnectedness of nature and human existence, emphasising the importance of the conservation of nature for the preservation of the “ways of life and cultures that interact with it.”³⁵ The court referred to the ecocentric conception of nature, thereby conceptualising nature as a “real subject of rights that must be recognized by the States and exercised under the protection of its legal representatives, such as, for example, [namely] by the communities that inhabit nature or that have a special relationship with it.”³⁶ Thus, the court ordered the protection of the Atrato River by granting it legal personhood and by assigning it representation.

The above examples, among others, demonstrate how Rights of Nature has been incorporated into different legal systems, reflecting the environmental, cultural, and social contexts that have contributed to its development. Considering these examples, I have identified two ways in which Rights of Nature have been incorporated into different legal contexts, namely (i) through new legislation, and (ii) through development by courts.³⁷ In the case of the latter, I assert that by employing a teleological interpretation method, courts can draw from existing legislation to progressively recognise and protect the intrinsic rights of nature. The teleological interpretation method is based on the notion that legal provisions pursue a particular objective and that these provisions should be interpreted in such a way to best promote this objective.³⁸ Despite the different legal instruments used, the goal remains to

assert the Rights of Nature in various legal settings.

III. Introducing Rights of Nature into the European Union

Despite the seemingly comprehensive protection of the environment throughout the EU legal framework, Carducci and others criticise the substantive rights that the environment currently has in the EU, asserting an anthropocentric bias, meaning that they are not based on the intrinsic value of nature, but rather on the notion that the environment needs protection because its importance can be found in its use by humans.³⁹ Additionally, a significant barrier to enhanced environmental protection in the EU seems to be the criteria for standing faced by those advocating for the protection of nature. Nature itself does not currently have legal standing within the European Union. There are three primary legal pathways through which environmental cases can be brought before the Court of Justice of the European Union (CJEU) by environmental protection advocates. These are: the annulment procedure (Article 263 TFEU), the preliminary reference procedure (Article 267 TFEU),⁴⁰ and the administrative review process established by the Aarhus Regulation.

Firstly, Article 263 TFEU enables the CJEU to review the legality of EU acts. It distinguishes between privileged applicants (EU institutions and Member States) and non-privileged applicants (individuals and NGOs), with the latter required to meet stricter standing requirements, such as demonstrating “direct and individual concern.” This has posed significant challenges for NGOs and individuals seeking to advance environmental cases, as they often fail to meet these criteria where the Court does not consider the

³⁴ Vargas-Chaves et al. (n 32) *supra*.

³⁵ *ibid*.

³⁶ Judgment T-622/16, *The Atrato River Case*, Constitutional Court of Colombia, 2016.

³⁷ This does not exclude other ways of how Rights of Nature has been incorporated into different legal orders. For example, Ecuador was the first country to incorporate Rights of Nature into its constitution.

However, this study will not focus on this legal mechanism.

³⁸ Harašić, Žaklina. “More About Teleological Argumentation in Law.” *Pravni Vjesnik*, vol. 31, 2015, pp. 23-38.

³⁹ Carducci et al. (n 9) *supra*.

⁴⁰ European Union, Consolidated Version of the Treaty on the Functioning of the European Union [2008] OJ C115/47.

legislative act in question to be of direct or individual concern to those initiating the proceedings.⁴¹ The preliminary reference procedure, outlined in Article 267 TFEU, allows national courts to seek the CJEU's interpretation of EU law. While this procedure provides a potential mechanism for individuals to challenge non-compliance with EU law, its effectiveness is contingent on the willingness of national courts to make referrals, which varies across Member States. Considering these barriers to standing in environmental cases due to the difficulty of showing direct and individual concern, the CJEU has strongly contributed to the development of greater access to justice in environmental matters for environmental NGOs to align with the objectives of the Aarhus Convention, in particular after the adoption of the so-called Aarhus Regulation.⁴² This Regulation aims to strengthen access to justice in environmental cases by easing standing requirements for NGOs. For example, the 2021 amendment to the Aarhus Regulation permits NGOs to request internal reviews of EU administrative acts without demonstrating direct or individual concern. However, Article 12 of the Regulation does not guarantee automatic standing for NGOs in the CJEU, as they must still meet the admissibility conditions set by Article 263(4) TFEU.⁴³ As such, despite the expanded opportunities for NGOs to challenge EU acts, their access to the CJEU remains constrained by the overarching requirements of primary EU law.

Against the backdrop of deteriorating environmental quality across Europe, the question that arises is whether the current EU environmental law framework can tackle the systematic challenges of environmental protection. In this study, I argue that the Rights of Nature approach, with its fundamentally different understanding of

substantive and procedural rights for nature, can address these challenges.⁴⁴ In the following Sections, I will focus on each incorporation method I have identified and apply them to the legal framework of the European Union.

IV. New Legislation

Bolivia and New Zealand have incorporated Rights of Nature into their national legislation in distinct ways, differing in (i) the scope of rights and (ii) how the rights in question are enforced. In other words, the main differences between the two jurisdictions can be found in the substantive and procedural rights of nature. This Section analyses the method of integrating Rights of Nature into the EU legal framework through new legislation. I will look at the cases of Bolivia and New Zealand to assess their feasibility and effectiveness regarding the integration of Rights of Nature into EU secondary law.

In accordance with Article 288 TFEU, the types of legislative acts that the European Union can adopt to exercise its competences are regulations, directives, decisions, recommendations, and opinions. The legal effects that each type of act entails ultimately depend on its specific nature.⁴⁵ A regulation has general applicability and is binding and directly applicable in the Member States, whereas a directive is binding upon all Member States insofar as the results achieved, leaving the choice of methods and form up to the Member States.⁴⁶

Compared to regulations, directives provide a more flexible mechanism since Member States are allowed to choose the implementing form and method that is most suitable to them. At the same time, however, since a regulation is binding upon all Member States and directly applicable, it is usually the preferred

⁴¹ Case C-565/19, *Armando Carvalho & Ors v EU Parliament & Council*, Court of Justice of the European Union, 25 Mar. 2021, [73].

⁴² Regulation (EC) No 1367/2006 of the European Parliament and of the Council of 6 Sep. 2006.

⁴³ Garçon, G  radine. "The Rights to Access to Justice in Environmental Matters in the EU – The Third Pillar of the Aarhus Convention: Validity and Scope of the Review

Procedures under Regulation (EC) No 1367/2006." *European Food and Feed Law Review*, vol. 8, no. 2, 2013, pp. 78-89.

⁴⁴ Schoukens (n 7) *supra*.

⁴⁵ Terziev, Venelin, et al. "Sources of European Union Law." *International E-Journal of Advances in Social Sciences*, vol. 19, 2021, pp. 346-354.

⁴⁶ TFEU (n 40) *supra*.

mechanism to achieve coherence and uniformity across the EU.⁴⁷ Directives need to be transposed into national law for their implementation which complicates the process of effecting uniform environmental protection. However, as Hoek and others argue, the integration of a Rights of Nature approach into the EU legal framework potentially touches upon sensitive administrative and constitutional matters, which is why a directive seems more feasible by allowing Member States some discretion to cooperate with this novel approach to environmental protection.⁴⁸ This is also why, I argue, proposals for secondary legislation incorporating Rights of Nature into the EU have focused on the legislative act of a directive. This can be exemplified by Nature's Rights' proposal on a new Directive on the Rights of Nature and Hoek and others' proposal for an EU Natureship Framework Directive.⁴⁹ Drawing from these proposals, this Section will focus on the legislative act of a directive.

A. Extending the Bolivian Case to the European Union?

In 2017, the organization Nature's Rights proposed a Draft Directive on the Rights of Nature.⁵⁰ The Draft Directive proposes a holistic view of nature, recognising the interconnectedness of the natural world, and broad procedural rights to empower anyone to litigate the rights of nature in front of courts. Following Article 1, the Draft Directive seeks to provide for the "substantive and procedural rights of nature, the rights of people in relation to nature, establishing a duty of care, protection and enforcement, and ecological

governance." These substantive rights of nature are to be protected and enforced by "any physical person, individually or collectively, government, or non-governmental organization of the European Union." This understanding of procedural rights goes beyond what currently exists in EU environmental law, including the Aarhus Convention,⁵¹ by allowing essentially anyone to act on behalf of nature in exercising its right to legal standing.⁵² But is this approach feasible within the current EU legal framework?

The proposal of a directive is compatible with the EU legal framework, drawing upon the EU's legislative authority as outlined in Article 288 TFEU. Consequently, the content of such a proposal must align with the values expressed by the European Union. Pedreschi and Scott refer to this as the "constitutional acceptability" of EU measures, in which the proposed measure must align with the objectives and values established in EU primary legislation.⁵³ A way through which a new Directive on the Rights of Nature can be advanced is through the Commission. The Commission is the sole EU institution with the right of initiative in accordance with Article 17 TEU. This provides that the Commission can propose new legislation, including directives. It can use its right of initiative following a successful European Citizens' Initiative (ECI), but it can also come up with its own proposal following broad stakeholder consultations and impact assessments.⁵⁴ Typically, the adoption of new legislation follows a so-called ordinary legislative procedure. Through this procedure, the Commission submits a proposal to the

⁴⁷ Hoek, Niels, et al. "Implementing Rights of Nature: An EU Natureship to Address Anthropocentrism in Environmental Law." *Utrecht Law Review*, vol. 19, no. 1, 2023, pp. 72-86.

⁴⁸ *ibid.*

⁴⁹ See, for example, Ito, Mumta. "Draft Directive ECI for Rights of Nature." *Nature's Rights*, 2017; Hoek et al. (n 47) *supra*.

⁵⁰ Därpo, Jan. *Can Nature Get It Right? A Study on Rights of Nature in the European Context*. European Parliament's Policy Department for Citizens' Rights and Constitutional Affairs, 2021.

⁵¹ As I have argued, the Aarhus Convention allows for broader standing for environmental NGOs. However,

these NGOs still have to meet certain criteria to gain standing.

⁵² Schoukens, Hendrik. "Granting Legal Personhood to Nature in the European Union: Contemplating a Legal (R)evolution to Avoid an Ecological Eclipse? (Part II)." *Journal for European Environmental and Planning Law*, vol. 16, no. 1, 2019, pp. 66-90.

⁵³ Pedreschi and Scott (n 17) *supra*.

⁵⁴ The 2017 Draft Directive on the Rights of Nature was to be advanced through such an ECI, but it was later abandoned due to the high costs and perceived challenges related to the process of the ECI.

European Parliament and the Council, who will have to agree on and approve the text of the proposal. In the Council, the adoption of a new directive becomes subject to negotiation between national representatives where they negotiate their nations' interests, requiring a balancing of national interests to ultimately reach an agreement. These negotiations often take a considerable amount of time. It can result in the weakening of the proposal drawn up by the Commission which usually involves revising the proposal to include "norms with a low degree of obligation, vague legal terminology, long transition and adjustment periods, and extensive exceptions to the rule."⁵⁵

The Draft Directive seeks to establish a holistic view of nature accompanied by broad procedural rights for anyone to act on behalf of nature. Therefore, in its application, it requires Member States to "review national laws in light of the rights of nature."⁵⁶ By proposing to grant nature such rights, this inevitably means that the Draft Directive will require Member States to reassess and potentially modify their existing national legislations to ensure compliance with the new directive. For example, the Draft Directive requires Member States to develop mechanisms to ensure that perceived breaches become punishable by fine, or imprisonment.⁵⁷ I contend that the above aspects might lead to significant opposition and pushback from Member States in the legislative process. The broad scope of environmental protection based on a holistic notion of nature may raise questions regarding its implementation on the part of the Member States.⁵⁸ Moreover, the Draft

Directive's requirement of Member States to review their national laws in light of the rights of nature, accompanied by the legislative steps that must follow such review, may be perceived as infringing upon Member States' sovereignty. Member States then deliberately oppose such a proposal due to its demand to fundamentally change pre-existing national legislation.⁵⁹ Therefore, from a political perspective, the adoption of the Draft Directive in this form therefore seems unlikely.⁶⁰

B. Extending the Case of New Zealand to the European Union?

Hoek and others explore the possibility of a Natureship Framework Directive to implement a Rights of Nature approach into the framework of EU environmental law.⁶¹ The concept of a "natureship" has been developed by Lambooy and others.⁶² A natureship will function as both a public institution and a legal person that can be defined geographically and functionally. The statutory purpose of a natureship would be to safeguard the ecological integrity of a geographically defined area.⁶³ The natureship arrangement by Hoek and others reflects the arrangements present in New Zealand where specific natural entities enjoy legal personhood through a guardianship arrangement to preserve their interests. In this regard, the EU Natureship Framework Directive would appoint formal representatives with the authority to speak on behalf of and make decisions regarding the governance of a particular natural entity or area, which is called an EU Natureship.⁶⁴

In the Natureship Framework Directive, a clear link is established with other fields of EU

⁵⁵ Knill, Christoph, and Duncan Liefferink. *Environmental Politics in the European Union: Policy-Making, Implementation, and Patterns of Multi-Level Governance*. Manchester University Press, 2007.

⁵⁶ Ito (n 49) *supra*.

⁵⁷ *ibid*.

⁵⁸ In this way, it fundamentally differs from other EU Directives that ensure environmental protection. For example, the Birds Directive and the Habitats Directive specify what ecosystems or species are protected under it. Within the framework of the Natura 2000 network, as put forward in Article 3 of the Habitats Directive, Member States have a high level of discretion in

determining what ecosystems and species should be part of this. The Draft Directive's holistic notion of nature can therefore lead to questions regarding Member States' implementation.

⁵⁹ Falkner, Gerda, et al. "Non-Compliance with EU Directives in the Member States: Opposition Through the Backdoor?" *West European Politics*, vol. 27, no. 3, 2004, pp. 452-473.

⁶⁰ Schoukens (n 52) *supra*.

⁶¹ Hoek et al. (n 47) *supra*.

⁶² Lambooy et al. (n 2) *supra*.

⁶³ Hoek et al. (n 47) *supra*.

⁶⁴ *ibid*.

environmental law, such as the Nature Directives and the Natura 2000 network. This way, the Framework Directive can build on these legislative acts by automatically considering Natura 2000 areas to be eligible for legal personhood under a natureship arrangement.⁶⁵ This strategy can be effectively employed for the Wadden Sea since it enjoys the status of a Natura 2000 area. Consequently, this can enhance consistency in EU environmental law. Since the Natureship Framework Directive utilises existing environmental legislation, I argue that it could be more readily accepted by Member States because it allows them a degree of discretion to decide what areas they want to consider as natureships.⁶⁶

C. Effectiveness of the Rights of Nature through EU Secondary Law

The effectiveness of a new Directive on the Rights of Nature entails its capacity to achieve the goal of improved habitat protection in the Wadden Sea. In the context of the EU, compliance refers to the extent to which national actors adhere to EU requirements by integrating and implementing EU legislation into their national context.⁶⁷ A directive first needs to be transposed into national legislation for its implementation.⁶⁸ The correct transposition of a directive into national law is essential for its effective implementation.⁶⁹ Once a directive has been adopted, this means that it must be transposed

into national law “correctly” and in “due time.”⁷⁰ Member States’ compliance with these criteria depends on a number of factors, including Member States’ willingness and national preferences on the one hand, and the legal complexity of the proposed directive on the other.⁷¹ The generally long process of adopting a directive, including many different actors and opinions, can result in texts that may be more ambiguous and leave room for different interpretations.⁷² This can then complicate the process of transposition and thereby result in non-compliance. Yet, to enforce the provisions in the adopted directive, it is essential that Member States correctly transpose the provisions into their national contexts.

The Commission can employ enforcement mechanisms to ensure Member State compliance with EU laws, such as infringement proceedings based on Article 258 TFEU. Infringement proceedings for EU directives can be initiated when a Member State does not transpose the provisions of a directive in a correct and timely manner into their national legislation or for acting contrary to the provisions in the directive.⁷³ Due to the increased costs of non-compliance, infringement proceedings can urge Member States to comply with their obligations concerning EU directives.⁷⁴ Nevertheless, the existence of compliance mechanisms does not automatically imply enforcement, for

⁶⁵ *ibid.*

⁶⁶ As expressed by the authors themselves, the concept of a natureship has not been extensively developed and currently holds no legal value. Therefore, it is still unsure what such an arrangement would look like in the EU context. However, regarding the readiness of acceptability of a Natureship Framework Directive, the authors suggest that the ultimate decision for selecting natureships is left to the discretion of the Member States. This approach underscores the importance of establishing a “stable and transboundary union of environmental governance ... while keeping in mind the sensitive constitutional and administrative considerations underlying a potential EU Natureship.” For a more comprehensive explanation of what an EU Natureship arrangement could look like, see Hoek et al. (n 47) *supra*.

⁶⁷ Zhelyazkova, Asya. “Complying with EU Directives’ Requirements: The Link between EU Decision-Making and the Correct Transposition of EU Provisions.” *Journal*

of European Public Policy, vol. 20, no. 5, 2013, pp. 702-721.

⁶⁸ Steunenberg, Bernard, and Mark Rhinard. “The Transposition of European Law in EU Member States: Between Process and Politics.” *European Political Science Review*, vol. 2, no. 3, 2010, pp. 495-518.

⁶⁹ *ibid.*

⁷⁰ König, Thomas, and Brooke Luetgert. “Troubles with Transposition? Explaining Trends in Member-State Notification and the Delayed Transposition of EU Directives.” *British Journal of Political Science*, vol. 39, no. 1, 2009, pp. 163-84.

⁷¹ *ibid.*

⁷² Falkner et al. (n 59) *supra*.

⁷³ “Implementing EU Law.” *European Commission*, 14 Jul. 2023.

⁷⁴ It must be noted that infringement proceedings are only those cases that the Commission detects and decides to act upon.

example, because it is not used due to political considerations.⁷⁵ Enforcement also includes the effective use of a directive in the national context. This means that directives must not only be transposed correctly and within due time by Member States, but that they must also be effectively applied within each national context to achieve the intended results. This reflects the need for actors to apply and refer to the provisions of the directive. Taking the example of Bolivia to reflect this necessity, it became clear that the 2010 Law of the Rights of Mother Earth faced several challenges in its application in the domestic context. One major reason for this was essentially that the civil society actors that had helped create the new legislation had abandoned support for the law.⁷⁶ This significantly weakened the power of the Rights of Nature laws in Bolivia, since the civil society actors that could invoke these laws did not do so as they did not perceive them as useful to support their cause.⁷⁷ This is problematic since newly introduced laws and provisions need time to develop through courts to establish themselves within the legal framework and set precedents. However, they must first be invoked before they can do so.

Bolivia empowers citizens to bring cases on behalf of nature, which allows for a broad participation of the public to enforce the rights of nature. Yet, Kauffman and Martin argue that the current arrangement of empowering anyone to represent the rights of nature has one major limitation, being that “while anyone can represent Nature to protect its rights, no

one is obligated to do so.”⁷⁸ This means that without the institutional framework in place to support the enforcement of the rights of nature, it is ultimately up to individuals to take such initiatives. This means that the enforcement of the Rights of Nature would also face challenges regarding collective action, such as concentrated costs and diffused benefits.⁷⁹ In the context of the EU, such broad procedural rights, as put forward by the Draft Directive on the Rights of Nature, would be complicated further since the application of these provisions in front of EU courts would be more difficult since it signifies a significant deviation from the rules of standing set out by the Treaties.⁸⁰ Therefore, it can be questioned whether such an approach can be most effective in ensuring the enforcement of the rights of nature.

On the other hand, a natureship approach can be effective since it establishes a transparent body to maintain the “ecological integrity” of the natural entity or area while lifting the burden from the EU Commission, the Member States, or NGOs to enforce and implement the rights of nature.⁸¹ This way, a natureship can provide an “additional safeguard” for nature.⁸² However, Gilbert and others critically note that a guardianship arrangement for nature has not been very developed in the EU environmental law framework and should thus be further explored.⁸³

Based on this analysis, I contend that the case of New Zealand appears to be more feasible in

⁷⁵ I have explained this in more detail in the introduction.

⁷⁶ This was because the 2012 Framework Law that was supposed to support the enforcement of the 2010 Law of the Rights of Mother Earth was perceived as diverging too much from the original draft that aligned more closely with Indigenous worldviews. Consequently, the 2012 Framework Law was criticised for no longer adequately representing the views of the Indigenous groups and NGOs supporting the original draft, leading to a loss of support for the law: see Kauffman and Martin (n 22) *supra*.

⁷⁷ This is because the 2012 Framework Law argues that the Rights of Nature must be considered in light of socioeconomic rights to economic development. In practice, this resulted in many cases in which government officials invoked other socioeconomic rights

to prioritise natural resource extraction against environmental protection, thereby weakening the Rights of Nature. For more explanation, see Kauffman and Martin (n 22) *supra*.

⁷⁸ Kauffman and Martin (n 22) *supra*.

⁷⁹ *ibid*.

⁸⁰ Schoukens (n 52) *supra*.

⁸¹ Hoek et al. (n 47) *supra*.

⁸² Stone, Christopher. *Should Trees Have Standing? Law, Morality, and the Environment*. Oxford University Press, 2010.

⁸³ Gilbert, Jérémie, et al. “‘Caring for Nature’: Exploring the Concepts of Stewardship in European Philosophies, Spiritual Traditions, and Laws.” *Rights of Nature in Europe: Encounters and Visions*, edited by J G Ruales et al., Routledge, 2024.

the European context. This is because a guardianship arrangement can build on and co-exist with current EU environmental legislation, such as the Nature Directives and the established Natura 2000 network. Nevertheless, the introduction of a new directive, in either form, can be questioned regarding its effectiveness. Even though a directive introducing a Rights of Nature approach is highly ambitious, for the effective application of its provisions it must be embedded in an institutional context that allows for such ambition, which it currently does not. For this reason, Schoukens queries whether a directive, as part of EU secondary law, would be at the right level through which to pursue the Rights of Nature in the European Union.⁸⁴ This is because a Rights of Nature approach aims to bring about a paradigm shift that promotes a less instrumentalist approach to nature. Therefore, it can be questioned whether a directive is the best way to implement such a fundamental shift while leaving untouched the constitutional principles that are arguably inherently anthropocentric.⁸⁵

V. Development through Courts

The second legal mechanism I have identified is the strategy of gradually incorporating a Rights of Nature approach into the legal framework of the European Union through court decisions, such as through the case law of the Court of Justice of the European Union.

For the feasibility of this mechanism, it is first important to consider the CJEU and its employment of the teleological interpretation method and whether rights of nature can be interpreted from existing EU law. The CJEU is

tasked with ensuring that the law is observed in the interpretation and application of the Treaties.⁸⁶ The CJEU must interpret the law with the aim of filling any gaps in either primary or secondary EU legislation.⁸⁷ The Treaties lay down the framework of the European Union and are therefore drafted in broad terms, containing “many general notions and few concrete rules.”⁸⁸ Therefore, the CJEU must fill normative gaps by providing concrete interpretations of these general provisions in practical cases. In its decisions, the CJEU has favoured a teleological interpretation method when interpreting EU primary legislation.⁸⁹ This is because the Treaties are “imbued with a purpose-driven functionalism” which is best served by an interpretation strategy considering its underlying objectives.⁹⁰ Thus, the CJEU has considerable discretion in interpreting the provisions of EU law but it must ensure that it does not encroach upon the limits conferred to it by the Treaties. Otherwise, this would constitute a type of judicial activism that exceeds its mandate. Therefore, the teleological interpretation method has been criticized for allowing excessive judicial discretion for the CJEU as it “removes all constraints resulting from the wording of the EU law provision in question.”⁹¹ Lenaerts and Gutiérrez-Fons argue that such criticism would be well-founded if the authors of the Treaties had solely intended the CJEU to be the “mouthpiece of the law.” Yet, such a limited role for the CJEU contradicts the competence given to the CJEU to ensure the observation of the law in the interpretation and application of the Treaties.⁹²

⁸⁴ Schoukens (n 52) *supra*.

⁸⁵ Schoukens argues that the choice for a Directive to implement the rights of nature will have major repercussions on the existing EU legal order, upon which he questions whether it might not be more beneficial to implement nature’s rights into the EU constitutional order. Pursuant to the hierarchy of EU law, implementing rights of nature at the highest level of law can offer a more structural and holistic solution to the problems EU environmental law currently faces. Yet, Schoukens argues, the extremely complex and lengthy process of a treaty review will downplay the success of

the “constitutional scenario.” For further explanation, see Schoukens (n 52) *supra*.

⁸⁶ European Union, Consolidated Version of the Treaty on European Union [2008] OJ C115/13, art. 19(1).

⁸⁷ Lenaerts, Koen, and José Gutiérrez-Fons. *To Say What the Law of the EU Is: Methods of Interpretation and the European Court of Justice*. EUI Working Paper AEL 2013/9, European University Institute, 2013.

⁸⁸ *ibid.*

⁸⁹ *ibid.*

⁹⁰ *ibid.*

⁹¹ *ibid.*

⁹² *ibid.*

The question that follows is whether the rights of nature can be interpreted from existing EU law. Epstein and Schoukens argue that elements of an ecocentric approach can already be identified in the practices and laws of the EU.⁹³ The Rights of Nature rationale is about recognising the intrinsic value of nature and maintaining its ecological integrity. Schoukens perceives these objectives to be protected under some rules and decisions in EU law.⁹⁴ This is because EU environmental laws contain many positive and negative obligations to protect and refrain from damaging the environment.⁹⁵ According to Epstein and Schoukens, the obligations regarding the protection of nature following the strict interpretations of the CJEU can be taken as legal rights of nature.⁹⁶ This follows the Hohfeldian conception of rights that has been adopted by the Rights of Nature approach. This conception of rights regards legal rights as correlatives of legal obligations.⁹⁷ Thus, it asserts that “non-humans already have rights where their interests are protected by law.”⁹⁸ The legal obligations imposed by EU environmental law are taken to protect the interests of nature, thereby granting nature rights that can be claimed and enforced.⁹⁹

It should then be questioned whether this approach allows for the effective

implementation of Rights of Nature into EU legislation. Compliance with CJEU judgments is ensured through their being binding and final.¹⁰⁰ If Member States fail to comply with the judgment of the CJEU, an infringement proceeding can be initiated by the Commission or another Member State through Article 258 TFEU and Article 259 TFEU respectively. When the CJEU issues a judgment, it does not merely apply the law to the specific case at hand but it also contributes to legal development by setting precedents.¹⁰¹ The development of precedents can be a useful tool to gradually insert and enforce a Rights of Nature approach into the EU legal framework. The case law of the CJEU has been developed by actors bringing cases to court. However, as I have demonstrated, there are still institutional barriers to standing in the EU that are not easily overcome. Nevertheless, the CJEU can only rule on cases that have been brought before it. Therefore, it remains important that actors continue bringing cases. This can be done by the EU institutions or Member States who, as privileged applicants, can increasingly challenge EU environmental regulations or by individuals or environmental NGOs through other pathways. The latter can, for example, initiate cases at the national level that can be referred to the CJEU through a preliminary reference procedure.¹⁰² Moreover, to effectively ensure a Rights of

⁹³ Epstein, Yaffa, and Hendrik Schoukens. “A Positivist Approach to Rights of Nature in the European Union.” *Journal of Human Rights and the Environment*, vol. 12, no. 2, 2021, pp. 205-227.

⁹⁴ Schoukens (n 52) *supra*.

⁹⁵ Epstein and Schoukens (n 93) *supra*.

⁹⁶ *ibid*.

⁹⁷ Hohfeld, Wesley Newcomb. “Fundamental Legal Conceptions as Applied in Judicial Reasoning.” *Yale Law Journal*, vol. 26, no. 8, 1917, pp. 710-770.

⁹⁸ Epstein and Schoukens (n 93) *supra*.

⁹⁹ It must be acknowledged that, within the rights of nature approach, there are debates regarding eligibility for rights and legal personhood. This debate surrounds the ideas regarding the basis of granting nature or natural entities rights. Epstein and Schoukens refer to the Hohfeldian conception of rights here, where rights are correlatives of environmental duties. However, there are also different conceptions of rights under the rights of nature approach. For example, following Joseph Raz’s interest theory, entities can be assigned legal personality if they have interests. Thus, an entity’s interest is sufficient in granting it legal rights, because it is part of

the entity’s well-being which has ultimate value. These conceptions of rights ultimately entail a different approach as to why nature should receive rights. However, for the purpose of Epstein and Schoukens’ argument that rights of nature can already be derived from EU environmental legislation, it is logical to employ the Hohfeldian conception of rights. For a more in-depth discussion on the conception of rights in the rights of nature approach, see, for example, Epstein, Yaffa, and Eva Bernet Kempers. “Animals and Nature as Rights Holders in the European Union.” *Modern Law Review*, vol. 86, no. 6, 2023, pp. 1336-1357.

¹⁰⁰ Beck, Gunnar. “Judicial Activism in the Court of Justice of the EU.” *University of Queensland Law Journal*, vol. 36, no. 2, 2017, pp. 333-353.

¹⁰¹ Derlén, Mattias, and Johan Lindholm. “Characteristics of Precedent: The Case Law of the European Court of Justice in Three Dimensions.” *German Law Journal*, vol. 16, no. 5, 2015, pp. 1073-1098.

¹⁰² Schoukens, Hendrik. “Rights of Nature as an Unlikely Saviour for the EU’s Threatened Species and Habitats: A Critical Introduction to a Revolutionary Idea.”

Nature consistent interpretation, it would be beneficial to educate lawyers and judges on its principles.¹⁰³ Even though the CJEU has increasingly taken a more proactive stance when it comes to environmental regulation, exemplified among other things through its broadening of standing for environmental NGOs, it can still be questioned whether the Court will always rule in favour of the environment, especially considering the inherently anthropocentric system within which it operates. Therefore, since a Rights of Nature approach necessitates a significant shift away from this anthropocentric thinking, it can be questioned whether the level of the judiciary is where this radical shift can be achieved.

VI. Concluding Remarks and Recommendations

This research has examined two legal mechanisms for incorporating a Rights of Nature approach into the EU legal framework. Focusing on the Rights of Nature approach within the EU's legal framework, this study finds that current measures to environmental protection have been inadequate due to the anthropocentric focus and fragmentation of EU environmental legislation, which often prioritises human interests over the intrinsic value of nature itself. Shifting towards an ecocentric approach through the Rights of Nature, where nature's intrinsic value is legally recognised, could provide a better foundation for protecting vulnerable ecosystems like the Wadden Sea. Advocates of Rights of Nature seek a shift in our treatment of nature, arguing that the protection of nature is improved by recognising its intrinsic value through endowing it with rights. This study examined which legal instruments might be most feasible and effective for integrating Rights of Nature in the EU to enhance habitat protection in the Wadden Sea. Providing the Wadden Sea with substantive and procedural rights creates new opportunities for protection, though each

mechanism varies in feasibility and effectiveness.

For new legislation, a directive that incorporates a guardianship model for specific natural entities seems more feasible, as it can leverage existing EU environmental laws. Yet, the specifics of guardianship within the EU remain underdeveloped and require further exploration. Additionally, directives face institutional challenges, especially regarding the ability of individuals and NGOs to enforce nature's rights before the CJEU. On the other hand, judicial integration through the CJEU appears more feasible. However, the gradual nature of judicial development and barriers to legal standing raise concerns about its effectiveness in driving the systemic change needed. Considering both legal mechanisms, I argue that new legislation would be much more effective in implementing the Rights of Nature uniformly across the EU, but considering the feasibility of this approach, it is unlikely for a new legislation to be implemented any time soon. Therefore, in the short term, I think it is more realistic to focus our efforts on bringing the Rights of Nature approach into courts. Courts can introduce a Rights of Nature approach into the EU legal framework by prompting legal practitioners and policymakers to consider a new approach to environmental protection.

Based on my analysis, I have formulated the following recommendations for further research:

1. More research should be done on how the transition from an anthropocentric to an ecocentric approach can be facilitated across the EU. This can include comparative studies on countries that have successfully integrated the Rights of Nature, identifying best practices, and proposing concrete policy changes to EU environmental legislation. In

Environmental Law for Transitions to Sustainability, edited by M Boeve et al., Intersentia, 2021.

¹⁰³ Rühls, Natalie, and Aled Jones. "The Implementation of Earth Jurisprudence through Substantive Constitutional

Rights of Nature." *Sustainability*, vol. 8, no. 2, 2016, pp. 1-19.

particular, focus should be placed on the balancing exercise between human interests and nature's interests in these best practices. This research is important since, as I have shown, the introduction of a Rights of Nature provision does not automatically entail successful implementation. The research should thus focus on those cases where implementation was a success and what were the conditions for this success.

2. Based on my findings regarding the institutional barriers to prioritising environmental protection and legal

standing to those advocating for nature, future research is necessary to explore how to ensure the institutional support necessary to empower enforcement bodies to prioritise the intrinsic value of nature. This can include training of EU officials on the importance of Rights of Nature.

Turning Deserts into Paradises: Geoengineering in Science, Practice, and Fiction in the 19th and Early 20th Centuries

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KEYWORDS

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ABSTRACT

This article studies the history of geoengineering in the West in the 19th and early 20th centuries in science, practice, and fiction. Visions of geoengineering at the time, it is argued, were shaped by the birth of climatology, colonial practices and ideals, and widespread techno-optimism. The mutual entanglement of humans and climate was recognised, inspiring speculation over utopian possibilities but also existential threats posed by geoengineering. In light of this history, it is suggested that there is a need to discard framings of geoengineering as a new approach to tackling climate change, rethink simplistic conceptions of Western modernity, and recognise the inherently political nature of technological visions.

I. Introduction

Geoengineering is a contested term without a formal dictionary definition, combining the Greek word *ge*, meaning earth, and *engineering*.¹ The word was first used by the physicist Cesare Marchetti in 1977 in an article that suggested tackling the “CO₂ problem” by injecting CO₂ into the deep ocean.² It gained wider prominence after a 1992 US National Academy of Sciences assessment, which defined geoengineering as “large-scale engineering of our environment in order to combat or counteract the effects of changes in

atmospheric chemistry.”³ At present, geoengineering is commonly understood as a set of speculative technologies aimed at counteracting climate change. A distinction between two forms of geoengineering—carbon capture and solar radiation management (SRM)—is often made.⁴ Proposed SRM methods include brightening sea clouds, deploying mirrors in space, and injecting particles into the atmosphere—which is known as Stratospheric Aerosol Injection (SAI)—to cool the Earth by deflecting sunlight.⁵ SAI, in particular, has been widely

¹ Keith, D. “Geoengineering the Climate: History and Prospect.” *Annual Review of Energy and the Environment*, vol. 25, no. 1, 2000, pp. 245–284.

² Marchetti, C. “On Geoengineering and the CO₂ Problem.” *Climatic Change*, vol. 1, no. 1, 1977, pp. 59–68.

³ *Policy Implications of Greenhouse Warming: Mitigation, Adaptation, and the Science Base*. National Academies of Sciences, Engineering, and Medicine, 1992.

⁴ Shepherd, J. “Geoengineering the Climate: Science, Governance and Uncertainty.” *The Royal Society*, 2009.

⁵ Augustine, G, et al. “Constructing a Distant Future: Imaginaries in Geoengineering.” *Academy of Management Journal*, vol 62, no. 6, 2019, pp. 1930–1960.

discussed after Nobel laureate Paul Crutzen argued that it should be given “serious consideration.”⁶

Attention to geoengineering as a potential tool to address climate change has grown in recent years, with an increasing number of academics, scientists, and policymakers engaging with the subject. A 2023 review by the United Nations Environment Programme (UNEP) concluded that “SRM is the only option that could cool the planet within years.”⁷ SRM is highly controversial, however. Many academics have called for an international non-use agreement.⁸ Concerns have been raised regarding potential negative environmental, climatic, and political effects, among others.⁹ Reflecting the controversial nature of geoengineering, a planned outdoor SAI experiment led by Harvard researchers funded by Bill Gates was cancelled in 2021 after protests from the Saami Council in Sweden.¹⁰

I will use the term geoengineering in this article to refer to intentional climate manipulation. This definition allows for an analysis of the long history of geoengineering.¹¹ Visions of geoengineering, in fact, far predate the current climate crisis. As the climate historian James Fleming emphasises, there is a “perennial story” of

weather and climate modification in Western science and culture, dating back thousands of years.¹² Indeed, weather control can be found in the *Odyssey*, where various gods disrupt Odysseus’ return to Ithaca by conjuring storms.¹³ I draw on Fleming and other scholars tracing the long history of geoengineering in the article.¹⁴ I focus on the 19th and early 20th centuries, a period marked by lively discussions about geoengineering and climate change in the West.¹⁵ Moreover, the vast majority of existing historical research on geoengineering focuses on the post-1945 era, rendering this period particularly rewarding to study.

My aim is to help redress the scarcity of historical perspectives on geoengineering. As with many other technologies, geoengineering is typically conceived of in a “historical vacuum” in contemporary debates that fails to recognise similar technological visions in the past.¹⁶ When history does get mentioned, geoengineering is often portrayed as a new idea, emerging in response to growing concerns with climate change.¹⁷ Geoengineering was previously a ‘taboo’ subject, the story goes, but it is now taken seriously for the first time. A recent article in the *Wall Street Journal* sums this portrayal up well: “[s]cientists are resorting to *once unthinkable techniques* [emphasis added] to

⁶ Crutzen, P. “Albedo Enhancement by Stratospheric Sulfur Injections: A Contribution to Resolve a Policy Dilemma?” *Climatic Change*, vol. 77, no. 3, 2006, p. 216.

⁷ “One Atmosphere: An Independent Expert Review on Solar Radiation Modification Research and Deployment.” United Nations Environment Programme, 2023.

⁸ *Solar Geoengineering Non-Use Agreement*, 2022.

⁹ Robock, A. “20 Reasons Why Geoengineering May Be a Bad Idea.” *Bulletin of the Atomic Scientists*, vol. 64, no. 2, 2008, pp. 14–18.

¹⁰ Temple, J. “Harvard Has Halted Its Long-Planned Atmospheric Geoengineering Experiment.” *MIT Technology Review*, 18 Mar. 2024.

¹¹ Fleming, J. *Fixing the Sky: The Checkered History of Weather and Climate Control*. Columbia University Press, 2010.

¹² *ibid* at p. 2.

¹³ Schneider, S. “Geoengineering: Could—or Should—We Do It?” *Climatic Change*, vol. 33, no. 3, 1996, pp. 291–302.

¹⁴ *see, e.g.,* Bonnheim, N. “History of Climate Engineering.” *WIREs Climate Change*, vol. 1, no. 6, 2010, pp. 891–897; Fleming (n 11) *supra*; Masco, J. “The Age of

Fallout.” *History of the Present*, vol. 5, no. 2, 2015, pp. 137–168; Baskin, J. *Geoengineering, the Anthropocene and the End of Nature*. Palgrave Macmillan, 2019; Scheffran, J. “The Entwined Cold War Roots of Missile Defense and Climate Geoengineering.” *Bulletin of the Atomic Scientists*, vol. 75, no. 5, 2019, pp. 222–228; Oomen, J. *Imagining Climate Engineering: Dreaming of the Designer Climate*. Routledge, 2021; Schubert, J. *Engineering the Climate: Science, Politics, and Visions of Control*. Mattering Press, 2021.

¹⁵ Stehr, N, et al. “The 19th Century Discussion of Climate Variability and Climate Change: Analogies for the Present Debate?” *World Research Review*, vol. 7, no. 4, 1995; von Storch, H, and N Stehr. “Anthropogenic Climate Change: A Reason for Concern Since the 18th Century and Earlier.” *Geografiska Annaler: Series A, Physical Geography*, vol. 88, no. 2, 2006, pp. 107–113; Lehmann, P. *Desert Edens: Colonial Climate Engineering in the Age of Anxiety*. Princeton University Press, 2022.

¹⁶ Bell, D. “Les Tecnòpolis.” *Barcelona Centre For International Affairs*. Nov. 2023, pp. 174–187.

¹⁷ Fleming (n 11) *supra*.

cool the planet because global efforts to check greenhouse gas emissions are failing.”¹⁸ This historical portrayal is not limited to the media but can be found in academic papers as well. For instance, a widely cited paper by Augustine et al. suggests that geoengineering emerged as a response to the climate crisis in the 1970s and 80s.¹⁹

My argument in the article proceeds in three Sections. The following Section surveys the history of geoengineering in science and practice, tracing its links to climatology, colonialism, and techno-optimism. The subsequent Section analyses visions of geoengineering in science fiction, showing how authors imagined both utopian and apocalyptic consequences of geoengineering. The final Section discusses the implications of recognising the long history of geoengineering in the West, arguing for the need to reject framing geoengineering as a new approach, rethink simplistic conceptions of Western modernity, and recognise the politics of technological visions.

II. Geoengineering in Science and Practice

For centuries, thinking about geoengineering has gone hand in hand with thinking about the climate. To understand how geoengineering was envisioned in the 19th century, it is therefore necessary to survey contemporary thinking about the climate. Notably, the climate was becoming a topic of increasing scientific scrutiny in the West in the 19th century. Efforts to collect data and infer general laws about nature gave rise to climate science, or climatology, which from its very inception sought to predict and, ultimately, control.²⁰ As Fleming has argued, the “quest to control nature, including the sky, is deeply rooted in the history of Western science.”²¹

The aim of climate control included presumed societal benefits and political control. Indeed, 19th-century geoengineers “tended to not distinguish between the “natural” and the “social” spheres.”²² Social and climatic improvements were understood as intertwined. In particular, ‘European’ climates were seen as superior and assumed to boost health and productivity. Geoengineering non-European climates thus became an aim of Western scientists and policymakers.²³

Western colonialism played an important role in the emergence of early climate science and visions of geoengineering. Colonial officials sought to “develop more formal, scientific knowledge of colonial atmospheres.”²⁴ This knowledge was important to governments when making decisions on risks and opportunities in colonies. As the environmental historian Lehmann notes, “modern climatology emerged as imperial climatology.”²⁵ Western colonies, particularly in North Africa, were seen as “living laboratories” for experimentation with nature, including the climate.²⁶ The goal was the “Europeanisation” of “indigenous landscapes” to make them suitable for European agriculture and settlement.²⁷ As Mahony and Endfield argue, “ideas of climatic improvement became central to the colonial enterprise” based on beliefs that “Europeans had a right, even a duty, to “civilize” both barbarous peoples and wild nature.”²⁸

A wide range of geoengineering methods were envisioned in the 19th and early 20th centuries. In the US, there were sustained rainmaking efforts. For instance, in the 1890s, in response to sustained droughts, the US government sponsored efforts by the self-proclaimed rain-maker R G Dyrenforth to

¹⁸ Niiler, E. “Scientists Resort to Once-Unthinkable Solutions to Cool the Planet.” *Wall Street Journal*, 14 Feb. 2024.

¹⁹ Augustine et al. (n 5) *supra*.

²⁰ Fleming (n 11) *supra*.

²¹ Fleming (n 11) *supra* at p. 49.

²² Lehmann, P. *Desert Edens: Colonial Climate Engineering in the Age of Anxiety*. Princeton University Press, 2022, p. 8.

²³ *ibid.*

²⁴ Mahony, M, and G Endfield. “Climate and Colonialism.” *WIREs Climate Change*, vol. 9, no. 2, 2018, p. 2.

²⁵ Lehmann (n 22) *supra* at p. 26.

²⁶ Tilley, H. *Africa As a Living Laboratory*. University of Chicago Press, 2011.

²⁷ Lehmann (n 22) *supra* at p. 51.

²⁸ Mahony and Enfield (n 24) *supra* at p. 10.

produce rain through loud explosions.²⁹ In colonial settings, geoengineering efforts were driven by ideas about the inferiority of particular climates. The most common geoengineering scheme introduced was large-scale forest planting and conservation in North Africa, aiming to increase rainfall and reverse desiccation. More radical proposals were debated but never implemented. Many of these projects included flooding deserts in Africa, including the Kalahari and the Sahara.³⁰ For instance, the French engineer François Roudaire envisioned the ‘Sahara Sea’ project in the 1870 and 1880s, which aimed to flood large parts of the Sahara to achieve a more temperate climate in the region.³¹ It ended up unrealised, but was discussed at length among French politicians and was widely publicised at the time. The Arctic was also seen as an undesirable region, inspiring ideas to melt the ice sheets. For instance, Nathaniel Shaler, an American geologist at Harvard University, suggested melting the Arctic in the 1870s by diverting warm ocean currents.³²

The climate science underlying geoengineering visions was enabled by the spread of instruments recording meteorological data in Western colonies.³³ Colonialism allowed climate data from across the world to be collected and analysed by Western scientists. In the early 19th century, climate observations were often made by individual European explorers.³⁴ Over time, however, the collection of climate data became more systematised, contributing to the rise of climatology. In 1836, the German geographer Alexander von Humboldt suggested that the Royal Society use Britain’s

imperial reach to improve the recording of global weather patterns.³⁵ Indeed, toward the end of the 19th century, state-sponsored meteorological stations recorded climate data on a global scale. This data was analysed in Western academic journals and spread during international conferences, culminating in the creation of the International Meteorological Organization in 1873.³⁶

At the end of the 19th century, the climate began to be understood as global in scale and capable of radical change, influencing how geoengineering was conceived. A transnational network of Western scientists argued that local and regional weather patterns were part of a global climate system.³⁷ These ideas were fuelled by the eruption of the Indonesian volcano Krakatoa in 1883.³⁸ The eruption was studied by meteorologists in Dutch-controlled Indonesia and globally. Global effects included disturbances in barometric pressures, cooling, and unusual optical phenomena, lasting several years.³⁹ A scientific report on the eruption by the Royal Society described the “startling character of the worldwide effects to which it gave rise.”⁴⁰ This understanding, the report states, was achieved through “extensive correspondence with all parts of the globe.”⁴¹ The eruption suggested not only that the climate was an interconnected whole but also that it could be transformed, fuelling speculation about global climate change.⁴²

The 19th century also saw the emergence of large-scale climate change theories in the West. Observed data suggested that the climate had radically changed in the past. For instance, in Africa, fossils and cave paintings revealed that the Sahara had previously been

²⁹ Fleming (n 11) *supra*.

³⁰ Lehmann (n 22) *supra*.

³¹ *ibid*.

³² Fleming (n 11) *supra*.

³³ Fleming, J. *Historical Perspectives on Climate Change*. Oxford University Press, 1998.

³⁴ Brännimann, S. “Picturing Climate Change.” *Climate Research*, vol. 22, no. 1, 2002, pp. 87–95.

³⁵ Mahony and Enfield (n 24) *supra*.

³⁶ Lehmann (n 22) *supra*.

³⁷ *ibid*.

³⁸ Asselin, S. “A Climate of Competition: Climate Change as Political Economy in Speculative Fiction, 1889–1915.” *Science Fiction Studies*, vol. 45, no. 3, 2018, pp. 440–453.

³⁹ *ibid*.

⁴⁰ Judd, J. “On the Volcanic Phenomena of the Eruption, and on the Nature and Distribution of the Ejected Materials.” *The Eruption of Krakatoa, and Subsequent Phenomenon: Report of the Krakatoa Committee of the Royal Society*, edited by G Symons et al., Harrison, 1888, p. 1.

⁴¹ *ibid* at p. vi.

⁴² Asselin (n 38) *supra*.

home to forests and large animals. As Bonneuil and Fressoz write, “colonial expansion played a key role in the emergence of reflection on anthropic climate change.”⁴³ The idea that Earth had gone through one or more ice ages also became popularised during the 19th century. The Swiss-American geologist Louis Agassiz put forward the idea of a past glacial epoch in the 1840s, but ice age theories were only widely accepted by scientists towards the end of the century. As a result of glacial theories, Lehmann points out, “Westerners reimagined the earth as a dynamic and changing place.”⁴⁴ Ice age theories suggested that the Earth had a dynamic history involving radical climatic changes. This, in turn, fuelled speculation over the causes of climate change, including the role of humans in producing climate change.⁴⁵

A wide range of climate change theories were presented in the 19th century, predicting both future warming and cooling. Factors such as changes in the Earth’s orbit, ocean currents, volcanic activity, and solar storms were all suggested as potential drivers of climate change.⁴⁶ Cooling due to the gradual heat loss of the sun and Earth was a particular worry of physicists at the time, leading to concerns about future glaciation.⁴⁷ A different theory was presented in 1896 by the Swedish physicist Svante Arrhenius, arguing that variation in the levels of atmospheric carbon dioxide had caused past ice ages, drawing on earlier research by Joseph Fourier and John Tyndall on the greenhouse effect. Arrhenius’ colleague, Nils Ekholm, suggested that humanity could raise the Earth’s temperature by burning fossil fuels, thereby preventing future ice ages. In 1899, Ekholm wrote that “it seems possible that Man will be able

efficaciously to regulate the future climate of the earth and consequently prevent the arrival of a new Ice Age.” This grand possibility, Ekholm continued, could “afford to Mankind hitherto unforeseen means of evolution.”⁴⁸

Visions of geoengineering in the 19th and early 20th centuries reflected the strong techno-optimism prevalent at the time. There was a growing belief in calculability, the idea that the effects of engineering interventions could be accurately predicted if enough data was available.⁴⁹ As a result, large-scale climate interventions were considered feasible; if not in practice, then in theory. It was widely believed that science and technology would over time allow humans to overcome all obstacles.⁵⁰ Since the dawn of the Industrial Revolution, science and technology had radically transformed the natural world. Large-scale engineering projects had been planned and successfully implemented, for example the opening of the Suez Canal in 1869.⁵¹ Hence, the idea that control over the climate was the next step in human evolution, as Ekholm suggested, seemed like a natural conclusion.⁵²

Debates about climate change and geoengineering declined in vitality by the time the First World War broke out and subsequently entered a quiet period in the 1920s and 30s.⁵³ The war ruptured transnational exchanges on climate research which took decades to recover. There was also a problem with an absence of data necessary to validate or refute different climate change theories, meaning scientific debates hit a dead end.⁵⁴ Nonetheless, geoengineering continued to occupy the imagination of scientists and policymakers. Geoengineering was proposed

⁴³ Bonneuil, C, and J Fressoz. *The Shock of the Anthropocene*. Verso, 2015, p. 176.

⁴⁴ Lehmann (n 22) *supra* p. 19.

⁴⁵ Locher, F, and J Fressoz. “Modernity’s Frail Climate: A Climate History of Environmental Reflexivity.” *Critical Inquiry*, vol. 38, no. 3, 2012, pp. 579–598.

⁴⁶ Fleming (n 11) *supra*.

⁴⁷ Lehmann (n 22) *supra*.

⁴⁸ Ekholm, N. “On the Variations of the Climate of the Geological and Historical Past and Their Causes.”

Quarterly Journal of the Royal Meteorological Society, vol. 27, no. 117, 1901 [1899], p. 61.

⁴⁹ Lehmann (n 22) *supra*.

⁵⁰ Asselin (n 38) *supra*.

⁵¹ Lehmann (n 22) *supra*.

⁵² Asselin, S. “Apocalypse, Inc.: Incorporating the Environment into the Boom/Bust Cycle in Fin-de-Siècle Science Fiction.” *New Centennial Review*, vol. 19, no. 1, 2019, pp. 181–204.

⁵³ Stehr et al. (n 15) *supra*.

⁵⁴ Lehmann (n 22) *supra* at p. 35.

in the first US government report mentioning global warming in 1965. The report did not mention limiting fossil fuel emissions but suggested cooling the Earth by dispersing reflective particles in the ocean to deflect sunlight.⁵⁵

III. Geoengineering in Science Fiction

In the 19th and early 20th centuries, geoengineering featured in the new genre of science fiction. The emergence of science fiction in the 19th century was facilitated by a rapid expansion in literacy and scientific knowledge among the Western middle class and a proliferation of cheap printing.⁵⁶ Science fiction emerged in France and England around the peak of Western colonial domination, which is often evident in early works.⁵⁷ Climate science sparked the imagination of authors who envisioned transformative new technologies capable of transforming the climate on both a regional and global scale. These visions of geoengineering in science fiction did not distinguish between nature and society but imagined climate-change technologies radically reordering the world, producing both utopian and apocalyptic effects.⁵⁸

Utopian writing frequently featured weather control, both on a local and global scale. As Meyer has argued, “[v]isions of a perfect earthly future have routinely incorporated a reconstructed earth.”⁵⁹ For example, Feddei Bulgarin speculated in the 1824 novel *Plausible Fantasies* about a future where the Russian Empire has used science to warm its Arctic coast, creating a seaside paradise. Late 19th-century fiction such as *Earth Revisited*

(1893) by Byron Brooks and *Breaking Up* (1896) by Lysander Salmon Richards imagined the Sahara transformed into a fertile landscape.⁶⁰ George Griffith’s *The Great Weather Syndicate* (1906) went even further, imagining a geoengineered utopia on a global scale.⁶¹ In the novel, an English engineer invents a way to control the global climate by establishing weather stations worldwide equipped with “atmospheric disintegrators.” Together with a US businessman, the engineer uses geoengineering to bring a permanent end to war by threatening to unleash extreme weather events and to “increase the fertility of the world by turning deserts into paradises.”⁶² The Sahara is turned into a blossoming landscape and Arctic regions melted. As Griffith writes, “wherever there were waste lands which could be reclaimed through change of climate the same wonders were happening.”⁶³ The techno-optimism at the dawn of the 20th century is starkly on display, as is the colonial idea that the global climate should be adapted to suit Western desires. In all these novels, the idea that climatic and social improvements go hand in hand is taken as a given.

Visions of geoengineering were not solely positive, however. Optimism about rapid technological advancement was not shared by everyone in the West.⁶⁴ Perhaps the most famous science fiction novel featuring geoengineering from the 19th century imagined its catastrophic effects.⁶⁵ In Jules Verne’s *The Purchase of the North Pole* (1889), often referred to as the first-ever work of climate fiction (cli-fi), an American company aims to make a profit by melting the North Pole to access valuable resources presumed to

⁵⁵ “Restoring the Quality of Our Environment.” United States President’s Science Advisory Committee, Nov. 1965.

⁵⁶ Luckhurst, R. *Science Fiction*. Polity Press, 2005.

⁵⁷ Rieder, J. *Colonialism and the Emergence of Science Fiction*. Wesleyan University Press, 2008.

⁵⁸ Williams, R. “Inventing New Worlds: The Age of Manifestos and Utopias.” *The Cambridge History of Science Fiction*, edited by E C Link and G Canavan, Cambridge University Press, 2019, pp. 69–85.

⁵⁹ Meyer, W. “The Perfectionists and the Weather: The Oneida Community’s Quest for Meteorological Utopia,

1848–1879.” *Environmental History*, vol. 7, no. 4, 2002, p. 589.

⁶⁰ Asselin (n 38) *supra*.

⁶¹ Griffith, G. *The Great Weather Syndicate*. F V White and Company, 1906.

⁶² *ibid* at p. 73.

⁶³ *ibid* at p. 312.

⁶⁴ Harpold, T. “European Science Fiction in the Nineteenth Century.” *The Cambridge History of Science Fiction* (n 58) *supra* at pp. 50–68.

⁶⁵ Milner, A, and J Burgmann. “A Short Pre-History of Climate Fiction.” *Extrapolation*, vol. 59, no. 1, 2018, pp. 1–23.

lie underneath.⁶⁶ Their scheme involves shifting the planet's axis by detonating a huge gun to cause global climate change. The catastrophic consequences of the plan are quickly calculated and described in colourful terms: "what a dreadful state of affairs there would be in the world! What cities thrown down, what mountains shaken, what people destroyed by millions, what waters hurled from their beds, what fearful terrors!"⁶⁷ The attempt to melt the North Pole would "menace fourteen hundred millions of people, upset their habits and customs, and disturb their very existence by provoking a general catastrophe."⁶⁸

Similarly, in *The Aerial Brickfield* (1897) by John Mills, geoengineering on a global scale has catastrophic effects.⁶⁹ In this short story, a businessman launches a geoengineering scheme that involves transforming air into bricks to sell people access to any climate from anywhere in the world.⁷⁰ The plan has unintended consequences, however, causing increased rainfall that ruins crops worldwide. It also drains the atmosphere of oxygen, putting everyone at risk. The businessman is thus forced to stop the geoengineering scheme. Had it continued, Mills writes, "the air would have become so thin or attenuated that no one could have breathed with comfort, and thus the human race would have been slowly exterminated."⁷¹ The science fiction of Mills and Verne imagines existential threats from geoengineering, highlighting how humans are united by their shared condition as earthly beings, or as Verne called them, "Terrestrials."⁷² Humans, they show, are vulnerable to geoengineering due to their

fundamental dependency on the stability of the Earth's climate.

IV. Discussion

Examining the history of geoengineering helps fill the historical vacuum characterising present discussions. Visions of geoengineering are much older than often presumed, in turn undermining claims that geoengineering is a new solution to climate change. For instance, Augustine et al. suggest that geoengineering proposals are utopian because they offer "a break from present understandings."⁷³ The history of geoengineering challenges this view. At the same time, studying history undermines attempts to refute geoengineering by referring to it as mere 'science fiction'.⁷⁴ Although geoengineering has featured in science fiction, there is a long history of attempts to implement geoengineering in practice.

Recognising the history of geoengineering also highlights the need to rethink simplistic conceptions of modernity. Visions of geoengineering in the 19th and early 20th centuries, both in practice and in fiction, understood human societies as closely entangled with the climate. This contrasts with the common understanding that Western modernist thinking relied on a sharp distinction between humans and nature and did not fathom any planetary limits to political and technological progress.⁷⁵ Locher and Fressoz call it a popular "myth" about "modern man, oblivious of the impact of his actions and blinded by his faith in progress."⁷⁶ As the history of geoengineering shows, thinking about the intersections between the Earth's climate and human action is not new.

⁶⁶ Verne, J. *The Purchase of the North Pole*. Sampson Low, Marston and Company, 1891 [1889].

⁶⁷ *ibid* at p. 100.

⁶⁸ *ibid* at p. 93.

⁶⁹ Mills, J. "The Aerial Brickfield." *Windsor Magazine*, vol. 6, 1897.

⁷⁰ *ibid* at p. 66.

⁷¹ *ibid* at p. 70.

⁷² Verne (n 66) *supra* at p. 72.

⁷³ Augustine et al. (n 5) *supra* at p. 1934.

⁷⁴ *see, e.g.*, Andersen, G. "Desperate Science Fiction: On How Musk, Bezos, Gates and Google Plan to Escape

Socio-Ecological Collapse." *Culture, Theory and Critique*, vol. 63, no. 4, 2022, pp. 281–295.

⁷⁵ *see, e.g.*, Hamilton, C. *Earthmasters: The Dawn of the Age of Climate Engineering*. Yale University Press, 2013; Burke, A, et al. "Planet Politics: A Manifesto from the End of IR." *Millennium: Journal of International Studies*, vol. 44, no. 3, 2016, pp. 499–523; Lövbrand, E, et al. "The Anthropocene and the Geo-Political Imagination: Re-Writing Earth as Political Space." *Earth System Governance*, vol. 4, 2020, p. 100051.

⁷⁶ Locher and Fressoz (n 45) *supra*.

Rather, as Locher and Fressoz write, “we entered the Anthropocene Age not in a blind modernist geist but saturated with multifaceted reflections and profound worries over human impacts on the climate.”⁷⁷

Finally, studying the history of geoengineering prompts deeper reflection on how and why particular technological visions emerge. Rather than arising as a purely technical solution to the growing threat of climate change, visions of geoengineering are a long-standing feature in the West and always a product of their time. They offer a window into the historical period they emerged in, illuminating particular scientific, social, and political assumptions. For instance, colonial ideals influenced how the purpose of geoengineering was conceived of in the 19th and early 20th centuries, producing schemes aimed at removing deserts and Arctic landscapes. As scholars studying the history of technology have long recognised, technologies are always shaped by the society they emerged in and entrench particular power relations.⁷⁸ Indeed, as many scholars have shown, current visions of geoengineering are not insulated from their social, political, or economic context.⁷⁹

V. Conclusion

Proposals to use geoengineering to tackle climate change are rising on policy agendas

worldwide. However, discussions of climate intervention often lack historical perspective. In response, I sought to invoke deeper historical reflection on the topic in this article by studying how geoengineering was conceived in the West in the 19th and early 20th centuries. I showed how climatology, colonialism, and techno-optimism shaped geoengineering plans and visions. I also highlighted how science fiction imagined geoengineering both as a means of utopian transformation and as a potential existential threat. These visions recognised the intertwined relationships between humans and the climate, I argued, challenging common conceptions of Western modernist thinking. Last but not least, I aimed to encourage thinking about the politics of geoengineering, a topic that will only grow in importance as geoengineering proposals gain traction.

⁷⁷ *ibid* at p. 581.

⁷⁸ *see, e.g.,* Allen, M, and G Hecht. “Authority, Political Machines, and Technology’s History.” *Technologies of Power: Essays in Honour of Thomas Parke Hughes and Agatha Chipley Hughes*, edited by M Allen and G Hecht, MIT Press, 2001, pp. 1–23; *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, edited by W Bijker et al., MIT Press, 1987; Winner, L. “Do Artifacts have Politics?” *Daedalus*, vol. 109, no. 1, 1980, pp. 121–136; Jasanoff, S. “Future Imperfect: Science, Technology and the Imaginations of Modernity.” *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, edited by S Jasanoff and S Kim, University of Chicago Press, 2015, pp. 1–33.

⁷⁹ *see, e.g.,* Yusoff, K. “The Geoengine: Geoengineering and the Geopolitics of Planetary Modification.” *Environment and Planning A: Economy and Space*, vol. 45, no. 12, 2013, pp. 2799–2808; Horton, J, and J Reynolds. “The International Politics of Climate Engineering: A Review and Prospectus for International Relations.” *International Studies Review*, vol. 18, no. 3, 2016, pp. 438–461; Szerszynski, B. “Coloring Climates: Imagining a Geoengineered World.” *The Routledge Companion to the Environmental Humanities*, edited by U Heise et al., Routledge, 2017; Corry, O, and N Kornbech. “Geoengineering: A New Arena of International Politics.” *International Relations in the Anthropocene*, edited by D Chandler et al., Palgrave Macmillan, 2021.

Space Technology and Climate Security: Bridging Justice, Adaptation, and Global Policy

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KEYWORDS

space technology, climate security, climate justice, outer space

ABSTRACT

Climate change poses complex security challenges, including food and water scarcity, displacement, and disaster risks. Addressing these challenges requires innovative solutions, and space technology is crucial. For instance, satellite-based climate monitoring provides critical data for effective climate adaptation and mitigation, while early warning systems help enhance disaster preparedness. These tools, among others, enable countries to track emissions, ensure sustainable resource management, and bridge data gaps. This article examines the role of space technology in advancing climate security, emphasising its integration into crucial global frameworks such as the Paris Agreement, the Sendai Framework, and the 2030 Agenda for Sustainable Development. Space-based technologies are indispensable in shaping a sustainable and equitable response to the climate crisis.



I. Introduction

Climate change is not merely an environmental challenge but a profound global security threat that disrupts essential systems and livelihoods. The increasing frequency of extreme weather events, rising sea levels, and shifting climate patterns exacerbates food and water scarcity, displaces vulnerable populations, and heightens competition over diminishing resources.¹ These impacts are not isolated; they cross national borders, strain economies, and threaten geopolitical stability. Addressing these complex challenges requires robust,

data-driven solutions. This is where space technology emerges as a game-changer, offering hope for a better future. Space-based technologies, including satellites, remote sensing systems, and Earth observation tools, offer unique capabilities to monitor, predict, and mitigate climate impacts.² These technologies provide critical data for climate modelling, early warning systems for disasters, and real-time resource management, enabling governments and international bodies to respond more effectively to climate threats.³

¹ Kaspersen, Roger, and Jeanne Kaspersen. "Climate Change, Vulnerability and Social Justice." *Social Contours of Risk*, Routledge, 2012, pp. 301-321.

² Faiyetole, Ayodele Adekunle. "Potentialities of Space-Based Systems for Monitoring Climate Policies and

Mitigation of Climate Process Drivers." *Astropolitics*, vol. 16, no. 1, 2018, pp. 28-48.

³ Riaz, Khurram, et al. "Management of Climate Resilience: Exploring the Potential of Digital Twin Technology, 3D City Modelling, and Early Warning Systems." *Sensors*, vol. 23, no. 5, 2023, p. 2659.

Beyond Earth's immediate concerns, the sustainability of space itself has become a pressing issue. The growing accumulation of space debris and the need for sustainable use of orbital resources present new challenges for global governance.⁴ Addressing Earth-based and space-based climate risks underscores the dual role of space technology in promoting resilience and sustainability, providing reassurance for the future. This article explores how space technology advances climate security and justice, particularly for the most vulnerable populations disproportionately affected by climate change. It examines the integration of space-based systems into key international frameworks such as the Paris Agreement, the Sendai Framework, and the 2030 Agenda for Sustainable Development. By bridging gaps in data, fostering international cooperation, and enhancing resilience, space technology offers a vital pathway toward a sustainable and equitable future.

II. The Climate-Security Nexus

Climate change, a pressing issue, is a catalyst for global instability. While some may argue that its primary effects are ecological, overwhelming evidence points to climate change driving significant security challenges. The devastation caused by extreme weather events, such as hurricanes and floods, not only destroys infrastructure but also displaces millions, leading to humanitarian crises that strain the resources of both host and source countries.⁵ The threat of rising sea levels looms over coastal communities, necessitating mass migrations that further exacerbate tensions in already resource-scarce regions.⁶ Moreover, resource scarcity, particularly in water and arable land, fuels competition and conflict. Some contend these conflicts are

localised, but history demonstrates that resource disputes often spill over into broader geopolitical tensions. For instance, the 2011 conflict in Syria was exacerbated by a severe drought that drove rural populations into cities, intensifying social and political instability.⁷

These cascading effects underscore the urgency of adopting innovative solutions to monitor, predict, and mitigate climate-induced risks. While traditional approaches are necessary, they are insufficient to address the scale and complexity of these challenges. Space technology is a critical advantage, providing accurate, real-time data that can significantly enhance global preparedness and response. With such tools, the world can be better prepared as climate impacts intensify, bolstering national and global security. Addressing this multidimensional threat requires integrating data-driven strategies, such as predictive modelling, risk assessment, and early warning systems, with space technology playing a pivotal role in mitigating risks and ensuring stability.

III. The Role of Space Technology in Climate Security

Climate change amplifies threats to security, economies, and global stability by driving extreme weather, resource shortages, and displacement. The interconnectedness of these issues is profound, as the effects of climate change permeate social, economic, and political systems, creating challenges that traditional governance frameworks are ill-equipped to manage.⁸ Addressing these issues demands innovative, data-driven solutions, with space technology emerging as an indispensable tool in mitigating climate risks and enhancing global security. For this study,

⁴ Öz, Besir Suleyman. *Space Debris as a Super-Wicked Problem: A System Dynamics Approach to Achieving Long-Term Sustainability in Low Earth Orbit*. MS Thesis, University of Bergen, 2021.

⁵ O'Sullivan, Terrence. "Environmental Security Is Homeland Security: Climate Disruption as the Ultimate Disaster Risk Multiplier." *Risk, Hazards & Crisis in Public Policy*, vol. 6, no. 2, 2015, pp. 183-222.

⁶ Battaglia, Fabio-Massimo. "Fighting for the Ocean: Climate Change and Fragility in Oceania." *21st Century*

as the Pacific Century: Culture and Security of Oceania States in Great Power Competition, 2023, pp. 83-95.

⁷ Ide, Tobias. "Climate War in the Middle East? Drought, the Syrian Civil War and the State of Climate-Conflict Research." *Current Climate Change Reports*, vol. 4, 2018, pp. 347-354.

⁸ Shearman, David, and Joseph Wayne Smith. *The Climate Change Challenge and the Failure of Democracy*. Bloomsbury, 2007.

‘climate security’ refers to the intersection of climate change and global security; how climate-related risks, such as food and water scarcity, displacement, and resource conflicts, exacerbate vulnerabilities and threaten societal stability. This definition aligns with those provided by organisations such as the UN and IPCC, which describe climate security as how climate change exacerbates human and national security threats. However, it expands on conventional definitions by integrating the role of space technology in addressing these risks, which is a novel addition. While the standard narrative focuses on the socio-political and ecological dimensions of climate security, the definition highlights the urgent need for adaptive measures to protect communities, ensure resource access, and maintain geopolitical stability in the face of escalating climate impacts. For instance, satellite data enables real-time resource monitoring, enhances disaster preparedness, and fosters transparency in international climate commitments.

A. Climate Challenges: From Instability to Opportunity

1. Extreme Weather and Displacement

The increasing frequency and intensity of extreme weather events such as hurricanes, floods, and droughts wreak havoc on communities, destroying infrastructure and displacing millions of people.⁹ For instance, hurricanes and typhoons have caused widespread devastation in regions such as Southeast Asia, where entire coastal towns have been submerged.¹⁰ Rising sea levels compound these threats, endangering low-lying nations and island states. This phenomenon forces large-scale migrations, straining the resources of both host and source countries and heightening regional tensions. Such displacement presents

profound humanitarian challenges and risks fuelling social unrest. Host nations face increased competition over housing, employment, and services while displaced communities endure prolonged uncertainty and marginalisation. Without timely interventions and coordinated responses, the social fabric of these regions could fray, destabilising entire nations.

2. Resource Scarcity and Conflict

Climate change intensifies the competition for critical resources, particularly water and arable land. In many regions, reduced rainfall, prolonged droughts, and desertification exacerbate water scarcity while shifting weather patterns, hence disrupting agricultural productivity.¹¹ Although some view these resource conflicts as isolated or localised issues, they frequently escalate into broader geopolitical tensions. The 2011 conflict in Syria serves as a stark example. A severe drought, exacerbated by climate change, devastated agricultural livelihoods, prompting mass rural-to-urban migration.¹² This rapid demographic shift contributed to economic strain and heightened political discontent, ultimately fuelling broader conflict. Similar dynamics can be observed in other regions, where resource competition catalyses violence and instability.

3. The Pivotal Role of Space Technology

Given the scale and complexity of climate-security challenges, traditional monitoring and response methods are increasingly insufficient. However, there is hope in the form of space technology, which provides unparalleled capabilities to address these issues.¹³ It offers real-time, precise data critical for proactive decision-making. By leveraging satellite systems, remote sensing, and geospatial analysis, nations can better

⁹ “The Impacts of Climate Change Upon Urban Areas.” *Areas Facing Urban*, 2024.

¹⁰ Nicholls, Robert. “Storm Surges in Coastal Areas.” *Natural Disaster Hotspots, Case Studies*, The World Bank Hazard Management Unit Working Paper, Disaster Risk Management Series 6, 2006, pp. 79-108.

¹¹ Jain, Shubham, et al. “Global-Scale Water Security and Desertification Management Amidst Climate Change.”

Environmental Science and Pollution Research, 2024, pp. 1-25.

¹² Fatli, Tiba. “Water Scarcity and Population Displacement in Southern Iraq: Perceptions and Reality.” MA Thesis, American University in Cairo, 2018.

¹³ Roco, Mihail, and William Sims Bainbridge. “Converging Technologies for Improving Human Performance: Integrating from the Nanoscale.” *Journal of Nanoparticle Research*, vol. 4, 2002, pp. 281-295.

anticipate, mitigate, and respond to climate-induced risks, paving the way for a more secure future.

B. Space Technologies for Climate Security

1. Monitoring Climate Variables

Satellites and remote sensing tools are at the forefront of climate monitoring, tracking indicators such as global temperatures, sea-level rise, and greenhouse gas emissions. For example, the European Space Agency's Sentinel satellites provide continuous data on atmospheric composition, enabling scientists to detect and measure emissions with unprecedented accuracy.¹⁴ This information feeds into sophisticated climate models, offering more reliable predictions of future climate scenarios and helping governments prepare for long-term impacts.

2. Disaster Management

Space-based systems are crucial in disaster management, mainly through early warning systems. Satellites monitor real-time weather patterns, enabling authorities to issue timely alerts for hurricanes, floods, and other extreme events.¹⁵ In Bangladesh, satellite data has significantly improved flood forecasting, allowing vulnerable communities to evacuate and reduce casualties.¹⁶ Post-disaster satellites are invaluable for assessing damage, mapping affected areas, and coordinating recovery efforts.¹⁷

3. Resource Management

Space technology also facilitates sustainable resource management.¹⁸ Satellites monitor soil moisture, crop health, and water

resources, guiding precision agriculture and optimising irrigation systems. This is particularly critical in drought-prone regions, where efficient resource use can mean the difference between food security and famine. Satellite data supports renewable energy planning by identifying optimal sites for solar and wind power generation, contributing to energy security in the face of climate change.¹⁹

4. Space Sustainability

Beyond Earth's immediate challenges, space sustainability is becoming increasingly relevant. The growing accumulation of orbital debris risks satellites' functionality, which is essential for climate monitoring.²⁰ Addressing this issue, space technology is being used to develop debris-tracking systems and technologies for sustainable orbital management. This ensures critical space-based tools remain operational, safeguarding their long-term contribution to climate security.

The security implications of climate change necessitate a proactive, data-driven approach. Space technology equips us with the comprehensive, real-time insights needed to anticipate and mitigate climate risks before they escalate into full-scale crises.²¹ By enhancing global preparedness and response, these tools enable governments to address vulnerabilities effectively, strengthening resilience across social, economic, and political domains. Without space-based technologies, nations risk being blindsided by the accelerating impacts of climate change. Integrating these technologies into national

¹⁴ Berger, Michael, et al. "ESA's Sentinel Missions in Support of Earth System Science." *Remote Sensing of Environment*, vol. 120, 2012, pp. 84-90.

¹⁵ Schumann, Guy, et al. "Assisting Flood Disaster Response with Earth Observation Data and Products: A Critical Assessment." *Remote Sensing*, vol. 10, no. 8, 2018, p. 1230.

¹⁶ Uddin, Kabir, and Mir Matin. "Potential Flood Hazard Zonation and Flood Shelter Suitability Mapping for Disaster Risk Mitigation in Bangladesh Using Geospatial Technology." *Progress in Disaster Science*, vol. 11, 2021, p. 100185.

¹⁷ *ibid.*

¹⁸ Sanders, Kelly, and Sami Masri. "The Energy-Water Agriculture Nexus: The Past, Present and Future of

Holistic Resource Management via Remote Sensing Technologies." *Journal of Cleaner Production*, vol. 117, 2016, pp. 73-88.

¹⁹ Edwards, Morgan, et al. "Satellite Data Applications for Sustainable Energy Transitions." *Frontiers in Sustainability*, vol. 3, 2022, p. 910924.

²⁰ Gheorghe, Adrian, and Daniel Yuchnovicz. "The Space Infrastructure Vulnerability Cadastre: Orbital Debris Critical Loads." *International Journal of Disaster Risk Science*, vol. 6, 2015, pp. 359-371.

²¹ Guerrero, Juan Carlos. "Modelling and Dynamic Assessment of Space Project Cost and Schedule Performance: Simulation and Review of Policy Implications Using System Dynamics." Dissertation, University College London, 2024.

and international climate strategies is not merely an advantage but a necessity for safeguarding global security and promoting sustainable development. The intersection of climate change and security underscores the critical role of space technology in ensuring a stable and resilient future.²² By providing actionable data and facilitating coordinated responses, space-based systems are indispensable in addressing one of the most pressing challenges of our time.

IV. The Integration of Space Technology into Global Frameworks: A Catalyst for Climate Action

Global climate frameworks, including the 2030 Agenda for Sustainable Development, the Paris Agreement, and the Sendai Framework for Disaster Risk Reduction, represent humanity's collective response to the escalating climate crisis.²³ These frameworks provide essential policy structures, but their effectiveness relies heavily on accurate data, robust monitoring, and international cooperation. Critics argue that these frameworks are primarily political tools with limited enforcement mechanisms, yet the integration of space technology has significantly enhanced their potential.²⁴ Space technology is a critical force multiplier, bridging gaps and driving meaningful climate action by enabling real-time data collection, enhancing transparency, and improving disaster preparedness.

A. The 2030 Agenda for Sustainable Development

The 2030 Agenda is a comprehensive roadmap to achieve global sustainability through its 17

Sustainable Development Goals (SDGs).²⁵ Goal 13, Climate Action,²⁶ directly responds to the climate crisis. However, addressing climate challenges is not confined to Goal 13 alone. Goals 2, Zero Hunger,²⁷ and 6, Clean Water and Sanitation,²⁸ are inherently linked to climate security. It may seem that achieving these goals is overly ambitious without enforceable mechanisms, but space technology has proven to be a powerful enabler of their implementation.

Space-based technologies enhance the efficacy of the 2030 Agenda by offering precise and actionable data. Satellites monitor deforestation, agricultural productivity, and water quality, providing critical insights for policymakers.²⁹ For instance, satellite imagery from programs like NASA's Earth Observing System helps track soil moisture levels, guiding efficient irrigation practices in drought-prone regions. Without these technologies, countries' progress toward meeting SDG targets would remain uncertain, with limited accountability.³⁰ Space technology fosters global cooperation by enabling open access to climate data. This transparency is vital in fostering trust and collaboration among nations, particularly between developed and developing countries. The Aarhus Convention emphasises public access to environmental information, participation in decision-making, and access to justice, principles that align well with the democratisation potential of space technology.³¹ While space-based systems generate vast amounts of critical environmental data, such as emissions, deforestation, and disaster risks, this

²² Lee, Davis. "Climate Change and Global Security: Assessing the Risks and Responses of Major Powers." *International Journal of Multidisciplinary Innovation and Research Methodology*, vol. 3, no. 2, 2024, pp. 288-296.

²³ Peters, Katie, et al. "The Sendai Framework for Disaster Risk Reduction as a Vehicle for Conflict Prevention: Attainable or Tenuous?" Contributing Paper to the Global Assessment Report on Disaster Risk Reduction, 2019.

²⁴ Moltz, James. *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests*. Stanford University Press, 2011.

²⁵ "The 2030 Agenda for Sustainable Development." *United Nations*, 2015.

²⁶ *ibid*, Goal 13: Climate Action.

²⁷ *ibid*, Goal 2: Zero Hunger.

²⁸ *ibid*, Goal 6: Clean Water and Sanitation.

²⁹ Odongo, Rodgers. "Remote Sensing Applications in Environmental Monitoring." *European Journal of Natural Sciences*, vol. 1, no. 1, 2023, pp. 1-12.

³⁰ Moyer, Jonathan, and Steve Hedden. "Are We on the Right Path to Achieve the Sustainable Development Goals?" *World Development*, vol. 127, 2020, p. 104749.

³¹ Velkavrh, Anita Pirc, et al. *The Strategy for Implementing the Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters: The Aarhus Convention*. Serbian Ministry of Environment, 2011.

information often remains restricted to governments and specialised agencies, creating a transparency gap.

By integrating Aarhus principles, space technology can enhance inclusivity and equity in climate governance. Open-source platforms like NASA's Earth Observing System and initiatives like SERVIR exemplify how satellite-derived data can be accessible to grassroots organisations and communities, enabling advocacy and informed policy engagement.³² Localising data, simplifying interfaces, and fostering data-sharing partnerships can further ensure that space-based systems empower marginalised communities and address critiques of unequal resource distribution, making them central to fostering global sustainability and justice.

B. The Paris Agreement

The Paris Agreement is often hailed as a cornerstone of international climate policy, aiming to limit global warming to below 2°C.³³ However, its reliance on Nationally Determined Contributions (NDCs), self-reported by nations, raises concerns about accountability and effectiveness.³⁴ Critics argue that countries may underreport emissions or overstate mitigation efforts without robust verification mechanisms. This is where space technology plays an indispensable role.

Satellites like those in the Copernicus Programme and NASA's Orbiting Carbon Observatory-2 (OCO-2) provide independent, high-resolution data on greenhouse gas emissions.³⁵ These tools allow for real-time monitoring of CO₂ and methane levels,

verifying the accuracy of NDCs. For instance, satellite data was crucial in detecting discrepancies in methane emissions reported by specific industrial sectors, highlighting the need for improved mitigation strategies. Without satellite-based monitoring, the Paris Agreement's reliance on self-reporting would remain vulnerable. Independent verification ensures transparency, bolsters accountability, and builds trust among nations.³⁶

While the Paris Agreement is hailed as a cornerstone of global climate policy, critiques of its enforceability remain valid. Its reliance on NDCs, self-reported by nations, raises concerns about accountability. The availability of satellite-based data has undoubtedly strengthened the capacity to monitor emissions and verify compliance.³⁷ For example, NASA's OCO-2 and ESA's Sentinel-5P satellites offer high-resolution monitoring of CO₂ and methane emissions, providing independently verifiable data that mitigates the risks of underreporting. However, the distinction between monitoring and enforceability is crucial. Technological advancements ensure transparency by identifying discrepancies in emission reports, but they do not inherently create mechanisms to hold states legally accountable for non-compliance.³⁸ Enforceability depends on binding legal frameworks and robust mechanisms to impose penalties or corrective measures. The Paris Agreement lacks such mechanisms, relying on voluntary compliance and peer pressure among states.

To bridge this gap, integrating satellite data into international legal frameworks could strengthen accountability. For instance, real-

³² Di Leo, M, et al. "Digital Earth Observation Infrastructures and Initiatives: A Review Framework Based on Open Principles." *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, vol. 48, 2023, pp. 33-40.

³³ "Nationally Determined Contributions (NDCs)." *UNFCCC Webpage*, 2024.

³⁴ Pauw, W, et al. "Post-2025 Climate Finance Target: How Much More and How Much Better?" *Climate Policy*, vol. 22, no. 9-10, 2022, pp. 1241-1251.

³⁵ "Copernicus Programme." *European Space Agency Webpage*; "Orbiting Carbon Observatory-2 (OCO-2)." *NASA Mission Pages*.

³⁶ Berthin, Gerardo. "A Practical Guide to Social Audit as a Participatory Tool to Strengthen Democratic Governance, Transparency, and Accountability." UNDP Working Paper, 2011.

³⁷ Burke, Marshall, et al. "Using Satellite Imagery to Understand and Promote Sustainable Development." *Science*, vol. 371, no. 6535, 2021.

³⁸ Aganaba-Jeanty, Timiebi, and Anna Huggins. "Satellite Measurement of GHG Emissions: Prospects for Enhancing Transparency and Answerability under International Law." *Transnational Environmental Law*, vol. 8, no. 2, 2019, pp. 303-326.

time emissions data could support third-party verification processes or inform tribunals in cases of alleged non-compliance. However, the absence of legal consequences for failing to meet NDCs means the Agreement's enforceability remains limited. Highlighting this gap underscores the need for complementary legal reforms to convert technological transparency into actionable accountability.

C. The Sendai Framework for Disaster Risk Reduction

The Sendai Framework emphasises the importance of reducing disaster risks and enhancing resilience to extreme weather events.³⁹ While critics may argue that disaster risk reduction depends more on local governance than global frameworks, space technology offers a unique advantage by providing data that local governments often lack.

Satellites are critical for real-time monitoring of extreme weather events. Programs like Japan's Himawari-8 continuously observe typhoons, enabling early warnings that save lives.⁴⁰ For example, during Cyclone Amphan in 2020, satellite-based early warnings facilitated mass evacuations in India and Bangladesh, significantly reducing casualties. Post-disaster satellite imagery aids in damage assessment, helping governments allocate resources effectively. Remote sensing data from platforms like Sentinel-1 have been used to map flood-affected areas quickly, ensuring efficient disaster response and recovery.⁴¹ The data provided by space technology enhances local capacities and ensures timely, informed decision-making. The integration of such

technologies demonstrates that global frameworks like Sendai are aspirational and actionable when supported by cutting-edge tools.

D. Unifying Global Climate Efforts Through Space Technology

The 2030 Agenda, the Paris Agreement, and the Sendai Framework address different dimensions of climate resilience, but their goals are deeply interconnected.⁴² Critics often contend that international climate policies suffer from fragmentation, which limits their collective effectiveness. Space technology, however, acts as a unifying force by integrating these frameworks, enabling shared data use and fostering collaborative approaches that maximise their impact. Space technology facilitates the seamless sharing of data across these frameworks, transforming how they function in practice. For instance, satellite data collected for emission monitoring under the Paris Agreement also supports sustainable development initiatives within the 2030 Agenda, such as Goals 13, 2, and 6.⁴³ Similarly, observations used to enhance disaster preparedness under the Sendai Framework inform climate adaptation strategies in alignment with the Paris Agreement, creating synergies that reduce duplication and optimise resource allocation.⁴⁴ This interconnected use of data ensures that global climate efforts are not siloed but integrated, reinforcing shared objectives of resilience, sustainability, and justice.

By linking the objectives of these frameworks, space technology strengthens global climate governance. Satellite data helps pinpoint high-

³⁹ Aitsi-Selmi, Amina, et al. "The Sendai Framework for Disaster Risk Reduction: Renewing the Global Commitment to People's Resilience, Health, and Well-Being." *International Journal of Disaster Risk Science*, vol. 6, 2015, pp. 164-176.

⁴⁰ Wong, Wai-Kin, and Chun-Wing Choy. "Progress in Hong Kong's Tropical Cyclone Forecasting and Warning Services in Recent Decades." *Tropical Cyclone Research and Review*, vol. 7, no. 1, 2018, pp. 37-50.

⁴¹ Li, Miao, et al. "Monitoring Post-Flood Recovery of Croplands Using the Integrated Sentinel-1/2 Imagery in the Yangtze-Huai River Basin." *Remote Sensing*, vol. 14, no. 3, 2022, p. 690.

⁴² Anderson, Katherine, et al. "Earth Observation in Service of the 2030 Agenda for Sustainable Development." *Geo-Spatial Information Science*, vol. 20, no. 2, 2017, pp. 77-96.

⁴³ *ibid.*

⁴⁴ Cubie, Dug, and Tommaso Natoli. "Coherence, Alignment and Integration: Understanding the Legal Relationship between Sustainable Development, Climate Change Adaptation and Disaster Risk Reduction." *Creating Resilient Futures: Integrating Disaster Risk Reduction, Sustainable Development Goals and Climate Change Adaptation Agendas*, edited by Stephen Flood et al., Springer, 2021, pp. 45-64.

risk regions where disaster preparedness under the Sendai Framework aligns with climate adaptation initiatives under the Paris Agreement.⁴⁵ Such integration enables efficient resource use and ensures that efforts complement rather than compete. Moreover, space-based systems provide independent, verifiable data, fostering transparency and accountability across frameworks.⁴⁶ Nations can track their progress confidently, ensuring that commitments made under one framework align with and support the goals of others. Integrating space technology into global frameworks is not merely a technical enhancement but a transformative solution that bridges gaps, fosters collaboration, and drives meaningful climate action.⁴⁷ However, equitable access to these tools is essential. Without inclusivity, vulnerable nations may struggle to fully leverage the benefits of these frameworks fully, exacerbating existing inequalities and hindering global efforts. To achieve the integrated and resilient future envisioned by these frameworks, it is imperative to empower all nations, particularly those most affected by climate impacts, to access and utilise space-based solutions. Space technology, when made accessible to all, has the potential to unify global climate efforts and create a cohesive and effective response to the climate crisis.

V. Case Studies: Leveraging Space Technology for Climate Resilience

To demonstrate the transformative impact of space technology on climate security, this Section explores practical applications in various global contexts. Examining specific case studies can help us better understand how space-based systems address critical

challenges in agriculture, disaster management, and emissions monitoring.⁴⁸ These examples highlight the technological capabilities and socio-economic benefits of integrating space technology into climate resilience strategies. Space technology offers transformative solutions to climate challenges by providing accurate, real-time data that drives informed decision-making.⁴⁹ The following case studies illustrate its diverse applications across different contexts, demonstrating how space-based systems enhance resilience, promote sustainability, and address critical vulnerabilities.

Space technology has proven instrumental in addressing critical climate challenges through its diverse applications. By providing accurate, real-time data, satellite-based tools empower regions to effectively adapt to and mitigate climate risks.⁵⁰ Two compelling examples, precision agriculture in Sub-Saharan Africa and early warning systems in Southeast Asia, illustrate the transformative potential of space-based solutions in enhancing resilience and addressing vulnerabilities.

A. Agriculture and Food Security

In Sub-Saharan Africa, climate change critically exacerbates food insecurity, as erratic rainfall, prolonged droughts, and soil degradation threaten agricultural productivity and livelihoods.⁵¹ Smallholder farmers, who produce most of the region's food, face heightened vulnerability due to their reliance on traditional farming practices and limited

⁴⁵ Amaratunga, Dilanthi, et al. "United Nations Office for Disaster Risk Reduction Regional Assessment Report on Disaster Risk Reduction 2023: Europe and Central Asia." *UNODR*, 2023.

⁴⁶ Jariwala, Mayur. "Cosmic Ledger: Unveiling Blockchain's Potential to Reshape Space Missions." *International Journal of Computer Applications*, vol. 186, no. 12, 2024, p. 31.

⁴⁷ Voss, Arlo. *The Future We're Building: How Today's Innovations Will Shape Tomorrow's World*. eBookIt, 2024.

⁴⁸ Gadallah, Nasradeen, and Ahmed Siddig. "Space and Ground-Based Earth." *Revolutionizing Earth Observation:*

New Technologies and Insights, edited by Rifaat Abdalla, IntechOpen, 2024, p. 185.

⁴⁹ Dwivedi, Yogesh, et al. "Climate Change and COP26: Are Digital Technologies and Information Management Part of the Problem or the Solution? An Editorial Reflection and Call to Action." *International Journal of Information Management*, vol. 63, 2022, p. 102456.

⁵⁰ *ibid.*

⁵¹ Sirba, Husen Yesuf, and Temesgen Begna Chimdessa. "Review of Impact of Climate Change on Food Security in Africa." *International Journal of Research and Innovations in Earth Science*, vol. 8, no. 3, 2021, pp. 40-66.

access to technological resources.⁵² Satellite-based systems, operated by organisations like the European Space Agency (ESA) and NASA, address these challenges by providing critical, real-time data on soil moisture, vegetation health, and weather patterns. This information enables precision agriculture techniques, optimising irrigation, planting schedules, and fertiliser use to enhance productivity and sustainability.

The AfriCultuReS Project, funded under the EU Horizon 2020 initiative, exemplifies this approach.⁵³ It integrates satellite data, ground observations, and socio-economic variables to deliver tailored farming advice through mobile platforms.⁵⁴ Farmers receive real-time weather and crop health updates, enabling informed decisions that improve yields and reduce waste. The project leverages the Copernicus Sentinel satellites for high-resolution environmental monitoring and advanced algorithms to analyse and contextualise the data. Despite its potential, AfriCultuReS faces challenges. Barriers to access include limited digital infrastructure in rural areas, a digital divide that restricts technology usage among marginalised communities, and funding constraints that hinder large-scale adoption. Cultural resistance to adopting data-driven methods also poses a challenge. To address these, the project collaborates with local organisations, prioritises user-friendly interfaces, and provides training programs to build trust and capacity among farmers.⁵⁵

AfriCultuReS has shown promising results in pilot regions, with participating farmers reporting 15–20% yield increases and more efficient water usage.⁵⁶ Comparatively, NASA's SERVIR initiative, which operates in Africa and Asia, focuses on capacity-building for governments, highlighting how space-based systems can be adapted for different end-users. Together, these programs demonstrate that satellite technology can significantly enhance resilience in climate-vulnerable regions, provided systemic barriers are addressed.

B. Disaster Preparedness and Response

Southeast Asia is highly susceptible to typhoons, floods, and landslides, which disproportionately affect low-income communities and cause severe economic disruption.⁵⁷ Satellite-based early warning systems, such as Japan's Himawari-8⁵⁸ and the EU's Copernicus Emergency Management Service (CEMS)⁵⁹ play a critical role in mitigating these impacts by providing real-time data on weather patterns and predicting extreme events with remarkable accuracy. This enables governments to issue timely alerts, coordinate evacuations, and minimise damage.

During Typhoon Haiyan in 2013, Himawari-8's rapid imaging capabilities provided continuous updates every 10 minutes, while CEMS generated detailed storm impact maps.⁶⁰ These technologies enabled authorities to evacuate over 800,000 people,

⁵² Harvey, Celia, et al. "Extreme Vulnerability of Smallholder Farmers to Agricultural Risks and Climate Change in Madagascar." *Philosophical Transactions of the Royal Society B: Biological Sciences*, vol. 369, no. 1639, 2014, p. 20130089.

⁵³ Pritchard, Rose, et al. "Developing Capacity for Impactful Use of Earth Observation Data: Lessons from the AfriCultuReS Project." *Environmental Development*, vol. 42, 2022, p. 100695.

⁵⁴ *ibid.*

⁵⁵ Aerni, Philipp, and Wenya Zou. "Stakeholder Surveys in Selected African Countries on the Perception of Initiatives to Promote Capacity Development (CD) for Agricultural Innovation." CCRS Working Paper 1/2022.

⁵⁶ Alexandridis, Thomas, et al. "Designing AfriCultuReS Services to Support Food Security in Africa." *Transactions in GIS*, vol. 25, no. 2, 2021, pp. 692–720; Bacco, Manlio, et al. "The Digitisation of

Agriculture: a Survey of Research Activities on Smart Farming." *Array*, vol. 3, 2019, p. 100009.

⁵⁷ Baker, Judy. *Climate Change, Disaster Risk, and the Urban Poor: Cities Building Resilience for a Changing World*. World Bank Publications, 2012.

⁵⁸ Bessho, Kotaro, et al. "An Introduction to Himawari-8/9—Japan's New-Generation Geostationary Meteorological Satellites." *Journal of the Meteorological Society of Japan: Series II*, vol. 94, no. 2, 2016, pp. 151–183.

⁵⁹ Matgen, Patrick, et al. *Feasibility Assessment of an Automated, Global, Satellite-Based Flood-Monitoring Product for the Copernicus Emergency Management Service*. Publications Office of the European Union, 2020.

⁶⁰ Balsamo, Gianpaolo, et al. "Satellite and In Situ Observations for Advancing Global Earth Surface Modelling: A Review." *Remote Sensing*, vol. 10, no. 12, 2018, p. 2038.

saving thousands of lives.⁶¹ In the Philippines, satellite-based flood forecasting models facilitated the pre-emptive relocation of residents in high-risk areas, reducing flood casualties by 60% over the past decade.⁶² Himawari-8, equipped with a 16-band Advanced Himawari Imager (AHI), excels in short-term, high-frequency monitoring, making it ideal for tracking rapidly evolving weather events like typhoons.⁶³ However, its geostationary orbit limits coverage to the Asia-Pacific region. In contrast, CEMS integrates data from multiple satellites, such as Sentinel-1 and Sentinel-2, offering global coverage and comprehensive post-disaster assessments.⁶⁴ While CEMS is slower in generating real-time data, it is more effective in assessing large-scale disasters like floods or wildfires.

Beyond immediate disaster response, these systems inform resilience strategies. Satellite data supports infrastructure planning, identifies safe zones, and influences urban development to reduce vulnerability.⁶⁵ For example, in flood-prone Bangladesh, satellite-informed zoning regulations have minimised construction in high-risk areas, significantly reducing property damage. Despite their transformative impact, these systems face limitations, including delays in integrating data from multiple sources, in the case of CEMS, and challenges in reaching remote areas with real-time alerts. Addressing these gaps will further enhance their efficacy in disaster preparedness and response.

C. Monitoring Emissions and Environmental Protection

Developed countries, as significant contributors to greenhouse gas emissions, face growing pressure to meet international climate targets. However, the reliability of self-reported data under the Paris Agreement has often been questioned, with concerns about underreporting and overstated mitigation efforts.⁶⁶ Satellite technology provides a solution by enabling independent, high-resolution monitoring of emissions. NASA's OCO-2 and the European Space Agency's Sentinel-5P satellites are pivotal in enhancing transparency and accountability. For example, satellite data in 2021 revealed a 25% underreporting of methane emissions from North American oil and gas operations.⁶⁷ This prompted regulatory changes, including stricter reporting mandates and the adoption methane capture technologies. These measures contributed to a 5% reduction in sectoral methane emissions over two years, demonstrating how independent data can influence policy and industry behaviour.⁶⁸

Deforestation driven by illegal logging and agricultural expansion in the Amazon threatens global carbon regulation. Brazil's Deforestation Detection in Real Time (DETER) system leverages high-resolution imagery from satellites like Landsat and Sentinel-2 to identify deforestation hotspots.⁶⁹ Between 2004 and 2012, DETER contributed to an 84% reduction in deforestation, preserving over

⁶¹ Kondo, Chiharu. *Early Childhood Development (ECD) Programs as Protective Environments for Children in Emergencies: A Case of Daycare Centers in Iwate, Japan During the 2011 Earthquake and Tsunami Disaster*. University of Pittsburgh, 2014.

⁶² Sene, Kevin. *Flash Floods: Forecasting and Warning*. Springer, 2012.

⁶³ Okuyama, Arata, et al. "Preliminary Validation of Himawari-8/AHI Navigation and Calibration." *Proceedings of SPIE*, vol. 9607, 2015.

⁶⁴ Krullikowski, Christian, et al. "Estimating Ensemble Likelihoods for the Sentinel-1-Based Global Flood Monitoring Product of the Copernicus Emergency Management Service." *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 16, 2023, pp. 6917-6930.

⁶⁵ Patino, Jorge, and Juan Duque. "A Review of Regional Science Applications of Satellite Remote Sensing in

Urban Settings." *Computers, Environment and Urban Systems*, vol. 37, 2013, pp. 1-17.

⁶⁶ Koller, Katharina, et al. "Identifying Bias in Self-Reported Pro-Environmental Behavior." *Current Research in Ecological and Social Psychology*, vol. 4, 2023, p. 100087.

⁶⁷ Conrad, Bradley, et al. "A Measurement-Based Upstream Oil and Gas Methane Inventory for Alberta, Canada Reveals Higher Emissions and Different Sources than Official Estimates." *Nature Communications Earth & Environment*, vol. 4, no. 1, 2023, p. 416.

⁶⁸ Fernández-Amador, Octavio, et al. "The Methane Footprint of Nations: Stylized Facts from a Global Panel Dataset." *Ecological Economics*, vol. 170, 2020, p. 106528.

⁶⁹ Smith, Vaughn, et al. "Assessing the Accuracy of Detected Breaks in Landsat Time Series as Predictors of

4.3 million hectares of forest.⁷⁰ However, enforcement remains inconsistent due to limited resources and shifting political priorities. The Himalayan region faces similar challenges with glacial lake outburst floods (GLOFs) caused by accelerating glacier melt.⁷¹ Satellite systems like TerraSAR-X and ICESat-2 provide detailed data on glacier mass and lake formation.⁷² The Imja Glacial Lake project in Nepal utilised these tools to implement controlled drainage systems and early warning mechanisms over five years.⁷³ While the project averted potential disasters, it encountered barriers, including inadequate funding and technical expertise. Community engagement was critical to avoid inequitable impacts, such as the forced relocation of residents. These examples highlight the transformative potential of space technology while underscoring the need for sustained investments and inclusive implementation.

D. Preserving Fragile Ecosystems

Coral reefs, vital to marine biodiversity and coastal protection, are increasingly threatened by rising sea temperatures and ocean acidification.⁷⁴ Monitoring these ecosystems is challenging due to their remote locations. Satellites like Sentinel-3 and MODIS track sea surface temperatures, chlorophyll concentrations, and algal blooms, enabling scientists to assess reef health and detect bleaching events.⁷⁵ The Allen Coral Atlas, a global reef monitoring platform, uses satellite

imagery to map and analyse reefs in near real-time.⁷⁶ For example, it provided critical data during the 2020 bleaching event in the Great Barrier Reef, guiding conservation efforts that reduced coral mortality by 25% in targeted areas.⁷⁷ Despite criticisms that satellite monitoring cannot replace ground-based observations, its cost-effective and large-scale capabilities make it indispensable for protecting marine ecosystems. Marine monitoring schemes like these have also had policy implications. Data from Sentinel-3 informed the designation of new marine protected areas in the Pacific, covering over 100,000 sq km.⁷⁸ These initiatives have mitigated overfishing and supported biodiversity conservation, demonstrating the tangible benefits of integrating space-based data into ecosystem management.

E. Urban Adaptation to Climate Change

In megacities such as Tokyo, New York, and Mumbai, the urban heat island (UHI) effect exacerbates heat waves, posing severe health risks. Space technology enables city planners to address these challenges using satellites like Landsat-8 and NOAA's GOES series thermal imaging, which provide data on temperature patterns and high-risk areas.⁷⁹ In Los Angeles, satellite-derived data was critical in the Cool Streets LA initiative. This program applied reflective coatings to pavements, expanded green spaces, and targeted UHI hotspots.⁸⁰ Surface temperatures decreased by

Small Scale Deforestation in Tropical Dry Forests of Mexico and Costa Rica." *Remote Sensing of Environment*, vol. 221, 2019, pp. 707-721.

⁷⁰ Busch, Jonah, and Jens Engelmann. "Cost-Effectiveness of Reducing Emissions from Tropical Deforestation, 2016-2050." *Environmental Research Letters*, vol. 13, no. 1, 2017, p. 015001.

⁷¹ Ahmed, Rayees, et al. "A Review of Glacial Lake Expansion and Associated Glacial Lake Outburst Floods in the Himalayan Region." *Earth Systems and Environment*, vol. 5, no. 3, 2021, pp. 695-708.

⁷² Goud, Goddu Pavan Sai, and Ashutosh Bhardwaj. "Estimation of Building Heights and DEM Accuracy Assessment Using ICESat-2 Data Products." *Engineering Proceedings*, vol. 10, no. 1, 2021, p. 37.

⁷³ Sedai, Shiva. "Glacial Lake Outburst Flood (GLOF) Hazard Mitigation at Himalayan Region, Nepal." PhD Dissertation, University of East London, 2021.

⁷⁴ Anthony, Kenneth. "Coral Reefs under Climate Change and Ocean Acidification: Challenges and Opportunities for Management and Policy." *Annual Review of*

Environment and Resources, vol. 41, no. 1, 2016, pp. 59-81.

⁷⁵ Kavanaugh, Maria, et al. "Satellite Remote Sensing and the Marine Biodiversity Observation Network." *Oceanography*, vol. 34, no. 2, 2021, pp. 62-79.

⁷⁶ Lyons, Mitchell, et al. "New Global Area Estimates for Coral Reefs from High-Resolution Mapping." *Cell Reports Sustainability*, vol. 1, no. 2, 2024, p. 100015.

⁷⁷ Condie, Scott, et al. "Large-Scale Interventions May Delay Decline of the Great Barrier Reef." *Royal Society Open Science*, vol. 8, no. 4, 2021, p. 201296.

⁷⁸ Bouchet, Phil, et al. *Comparative Assessment of Pelagic Sampling Methods Used in Marine Monitoring: Report to the National Environmental Science Programme, Marine Biodiversity Hub*. The Australian Government, 2018.

⁷⁹ Bakker, W. "Satellites & Sensors." *EARSel Newsletter*, vol. 93, 2013, pp. 50-53.

⁸⁰ Hulley, Glynn, et al. "New ECOSTRESS and MODIS Land Surface Temperature Data Reveal Fine-Scale Heat

5–10°F in treated areas, heat-related illnesses declined by 15% in vulnerable communities, and energy consumption for cooling dropped by 7%, highlighting the economic and environmental benefits.⁸¹

While it may be argued that such measures are incremental, Cool Streets LA is a scalable urban adaptation model. Similar initiatives are now being implemented in cities like Phoenix and Houston, demonstrating how satellite data can inform effective urban climate strategies. These case studies underline the critical role of space technology in addressing diverse climate challenges. From combatting emissions and deforestation to protecting fragile ecosystems and adapting urban environments, space-based systems provide unparalleled tools for resilience and sustainability. However, ensuring equitable access and consistent implementation remains essential for maximising their potential.

VI. Climate Justice and Space Technology: Bridging Equity Gaps

Climate justice emphasises the fair distribution of the burdens and benefits of climate change, ensuring that those least responsible for its impacts receive the support necessary to adapt and thrive.⁸² With its ability to collect and analyse comprehensive data, space technology is a transformative tool in advancing climate justice. By empowering marginalised communities, addressing environmental inequalities, and fostering intergenerational equity, space-based systems ensure that no one is left behind in the global fight against climate change.

A. Empowering Marginalised Communities

Climate change disproportionately affects vulnerable populations, including those in low-income countries, indigenous communities, and small island states.⁸³ These groups often face limited access to resources, early warning systems, and infrastructure, making them particularly susceptible to climate-induced disasters and environmental degradation. Critics argue that advanced tools like space technology are inaccessible to these communities, but emerging initiatives challenge this notion.

Space-based systems provide crucial data for disaster preparedness, resource management, and climate adaptation in underserved regions.⁸⁴ For example, satellite imagery helps identify high-risk areas, enabling targeted interventions to protect vulnerable communities. Programs like SERVIR (a NASA-USAID initiative) deliver satellite-derived information to enhance sub-Saharan Africa's agricultural productivity and water resource management.⁸⁵ These programs exemplify the transformative potential of space technology in vulnerable regions. In East Africa, SERVIR's agricultural tools have increased productivity by 20%, while its flood forecasting systems in Nepal and Bangladesh have significantly reduced casualties and property damage. For instance, the Bangladeshi flood warning program, supported by satellite data, enabled pre-emptive evacuation during the 2020 monsoon, saving an estimated 5,000 lives and preventing \$20 million in damages.

Moreover, these programs influence long-term policy decisions, with Bangladesh

Vulnerability in Cities: A Case Study for Los Angeles County, California." *Remote Sensing*, vol. 11, no. 18, 2019, p. 2136.

⁸¹ see Braswell, Mary. "On-the-Ground Guidance for L.A.'s Far-Reaching Climate Strategy." *UCLA Newsroom*, 5 May 2020.

⁸² Rajput, Aniruddha. "Climate Justice and The Greening of Investment Arbitration." *Netherlands Yearbook of International Law 2021: A Greener International Law—International Legal Responses to the Global Environmental Crisis*, edited by Daniëlla Dam-de Jong and Fabian Amtenbrink, TMC Asser Press, 2023, pp. 161–189.

⁸³ Tandrayen-Ragoobur, Verena, et al. "Climate Change, Equity and Sustainable Development in Small Island Developing States." *Equity and Sustainability*, edited by Shahla Seifi and David Crowther, Springer, 2024, pp. 67–90.

⁸⁴ "Policies and Strategies in Incorporating and Using Available New ICT, Including Space-Based Applications, in Multisectoral Regional Cooperation for Resilient, Inclusive and Sustainable Development." UN ESCAP Technical Paper, 2014.

⁸⁵ Dinas, Petros, et al. "Innovative Methods for the Benefit of Public Health Using Space Technologies for Disaster Response." *Disaster Medicine and Public Health Preparedness*, vol. 9, no. 3, 2015, pp. 319–328.

implementing zoning reforms and flood-resilient infrastructure development. Despite claims that these technologies are limited to wealthier regions, increasing access to open-source satellite data and partnerships with local organisations demonstrates the democratising potential of space technology.⁸⁶ By bridging data gaps and providing actionable insights, space-based tools empower marginalised populations to build resilience, protect their livelihoods, and ensure they are included in global climate strategies.

B. Addressing Environmental Inequalities

Environmental justice seeks to rectify the unequal distribution of environmental harms and benefits, which often correlates with race, income, and geography. Marginalised communities frequently bear the brunt of pollution, hazardous industries, and climate risks, while reaping fewer benefits from environmental initiatives.⁸⁷ Critics contend that systemic inequities make achieving meaningful progress in addressing these disparities challenging.

Space technology provides a unique advantage in identifying and quantifying environmental inequalities. Satellites monitor air quality, pollution hotspots, and land use changes, generating objective data highlighting disparities in environmental conditions.⁸⁸ For example, in the United States, satellite data has revealed that urban areas with high minority populations are disproportionately affected by industrial pollution and poor air quality. Initiatives like EnviroAtlas leverage this data to guide policymakers in designing

targeted interventions to reduce environmental disparities.⁸⁹ While remote monitoring has limitations, such as the need for on-ground verification, its large-scale coverage enables a more comprehensive understanding of environmental inequities. Space-based systems are a powerful tool for advancing environmental justice, empowering communities to advocate for policy changes and holding polluters accountable for their actions.⁹⁰

C. Safeguarding Future Generations

Intergenerational equity underscores the responsibility of the present generation to protect the planet for future generations. Climate change directly threatens this principle with long-term impacts, such as biodiversity loss, rising sea levels, and resource depletion.⁹¹ Critics argue that current policies often prioritise immediate economic gains over long-term sustainability. Space technology is pivotal in fostering intergenerational equity by providing long-term data on environmental trends. Satellites track deforestation, glacial melt, and ocean acidification, offering critical insights into the cumulative impacts of human activities.⁹²

Space-based tools like EnviroAtlas and the ESA Climate Change Initiative (CCI) provide essential data for long-term sustainability planning. In the US, cities such as Portland and Chicago have used EnviroAtlas to prioritise urban greening projects, improving air quality and reducing urban heat risks. Similarly, ESA CCI's sea-level rise data has been instrumental in shaping coastal resilience policies in Europe. Dutch policymakers, for example,

⁸⁶ Marino, Alessandra, et al. "Space Technologies for Development? Practicing Sovereignty, Beyond Inclusion." *Environment and Planning D: Society and Space*, 2024.

⁸⁷ Faber, Daniel. *Capitalizing on Environmental Injustice: The Polluter-Industrial Complex in the Age of Globalization*. Rowman & Littlefield, 2008.

⁸⁸ De Sherbinin, Alex, et al. "Using Satellite Data to Develop Environmental Indicators." *Environmental Research Letters*, vol. 9, no. 8, 2014, p. 084013.

⁸⁹ Hartley, Jenna, et al. "Empowering Environmental Justice Decision Makers: Increasing Educational Resources for US Environmental Protection Agency's

Mapping Tools." *Environmental Justice*, vol. 14, no. 5, 2021, pp. 383-390.

⁹⁰ Baumgart, André, et al. "Space for the Sustainable Development Goals: Mapping the Contributions of Space-Based Projects and Technologies to the Achievement of the 2030 Agenda for Sustainable Development." *Sustainable Earth*, vol. 4, no. 1, 2021, p. 6.

⁹¹ Omann, Ines, et al. "Climate Change as a Threat to Biodiversity: An Application of the DPSIR Approach." *Ecological Economics*, vol. 69, no. 1, 2009, pp. 24-31.

⁹² *Monitoring Climate Change Impacts: Metrics at the Intersection of the Human and Earth Systems*. National Academies Press, 2010.

have relied on ESA CCI to strengthen their dike systems, safeguarding millions from flood risks. While EnviroAtlas has primarily influenced urban planners in North America, ESA CCI has had a broader impact, informing global strategies for coastal adaptation and intergenerational equity.

The intersection of climate justice and space technology underscores the transformative potential of data-driven solutions in creating a fairer and more resilient world. From empowering marginalised communities to addressing environmental disparities and safeguarding resources for future generations, space-based systems are indispensable in advancing climate justice. As access to these technologies expands, their ability to foster equity and sustainability will only grow. By leveraging the power of space technology, humanity can ensure that the principles of climate justice become a cornerstone of global climate action, securing a more inclusive and sustainable future for all.

VII. Conclusion

Space technology has emerged as a cornerstone in the fight against climate change, offering transformative solutions to monitor, predict, and mitigate its impacts. From precision agriculture to early warning systems and emissions monitoring, these tools empower nations to build resilience and adapt to a volatile climate landscape. However, despite its immense potential, systemic barriers such as unequal access, high costs, and fragmented policies threaten to widen existing inequities and hinder global progress. Addressing these challenges requires urgent and decisive action. First, investments must be accelerated to democratise access to space technology, particularly for vulnerable nations that bear the brunt of climate impacts. Innovations like AI and CubeSats must be

scaled to ensure cost-effective, high-resolution data is available to all, bridging the gap between developed and developing countries. Equally important is fostering international collaboration through robust frameworks for data sharing, capacity-building, and coordinated responses to climate risks.

The stakes are too high for complacency. Delays in leveraging space technology risk exacerbating global inequalities and undermining resilience efforts. Initiatives such as the Paris Agreement and the 2030 Agenda for Sustainable Development hinge on equitable access to these transformative tools. By addressing the systemic barriers to their implementation, the global community can unlock the full potential of space technology to safeguard resources, protect communities, and promote sustainable development. The path forward is clear, immediate, united action to ensure no nation is left behind. Space technology offers a unique opportunity to address one of humanity's most pressing challenges, but its success depends on our ability to collaborate decisively and equitably. The time for transformative change is now. We can shape a resilient, just, and sustainable future for all by harnessing innovation, fostering partnerships, and prioritising equity.

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