

SWEATING ASSETS

Reflecting on and grappling with the repercussions of cooling technologies in the Arabian Peninsula

THE ARRIVAL OF THE AIR CONDITIONER

Awali, the suburban desert camp, was established in the late 1930s. Conveniently situated beside an oil field, it housed American engineers and geologists who kickstarted the industry in Bahrain and the larger Gulf region. However, suburban picket fences and pitched hip roofs did not do enough for the oil settlements to feel comfortable – like home. The missing element was the climate, which was soon imported from San Francisco in the form of air conditioning units.¹ Carrier's aptly named "Weather-Makers" convinced expatriates that life on the desert island could be tolerated by expelling heat from the home. Suddenly, a Californian spring could be felt in the Manama shelter during a Bahraini summer. Eighty years later, this climatic control constituted what made a *home* for the native island inhabitants as well. With their bodies attuned to controlled conditions, the cooling technology has become a crucial survival mechanism that eventually infiltrated all liveable shelters.

BUILDINGS SWEAT

Sweating Assets, the National Pavilion of the Kingdom of Bahrain at the 18th International Architecture Exhibition at La Biennale Di Venezia explored cooling infrastructure in relation to water scarcity on the island. The exhibition investigated a dichotomy idiosyncratic to Bahrain's geography and climate: the extremities of a harshly dry landscape and a suffocatingly humid atmosphere. Could there be an arrangement where moisture suspended in the air could feed the thirsty soil?

Since the early days of air conditioning, dwellings have become vessels that sweat on behalf of the bodies they house. Their air conditioning units have grappled with hot, humid air to make buildings comfortable and cooled habitations. The hot, thick air coming into contact with copper cooling coils has produced significant condensation for the past eighty years and continues to do so today.

Fig. 1. Speculative Intervention gathers the "sweat" from Manama's skyline and redirects it to depleted springs and their ecologies in the north of the island. Illustrated by Nada Al Mulla alongside the authors.



An incidental phenomenon such as this one is exaggerated in the particular climate of the island. Water is an unanticipated by-product – or at least an unconsidered one – when Californians settled into their homes and set a precedent for using this technology. Hence, it was disregarded, leading to a valuable resource being lost to the sewer drains for decades.

Here, *Sweating Assets* is proposed as an approach to analysing and using all existing systems to their full capacity and best capacities. As such, the hidden and unnoticed must be understood. The research shed light on the water generated by cooling “assets,” simulating its annual production and quantifying how much is lost to the drain. This approach is observation-based, treating modern buildings, systems, landscapes, and ecologies as entangled conditions that demand to be understood and questioned, and their wasteful habits to be unlearned.

SYSTEMS CAUSE SEPARATION: HOW WERE THE WATER RE-SERVES MISSED ALL THESE YEARS?

The phenomenon of the “hidden” was born when window units began to poke out of facades, exhausting heat through mechanisms out of sight and guaranteeing indoor comfort. On the interior, their clunky demeanour and nascent voices camouflaged themselves quickly. As the conditioning systems grew sophisticated, their condenser units littered rooftops, facades, and porches. Eventually, they claimed a space of their own to handle the complex network of airflow, that is, the designated plant room. Mechanical systems have become lifelines that cause separation between inhabitants, the outdoor climate, and comfort mechanisms altogether. This manufactured proximity is both abstract and physical.

The former is the control seized by the individual who has no agency over their own environment beyond the confines of their bedroom or home. For those who spend long hours under the larger umbrella of commercial institutes or organisations, climatic control is set in a top-down and homogenised manner; a symptom of an overly centralised system. Finding space heaters under employees' desks in a cooled office on a warm day is not unusual. Spatial climatic control is out of reach (the thermostats are nowhere to be found!), so inhabitants resort to a highly localised solution that they can control. Redundancies like the space heater microclimate are commonplace when systems amalgamate to host other systems within them.

The less abstract proximity is the physical one between the individual and the outdoor climate caused by the plant room. It exaggerates the notion of the sealed interior as a safe haven and the exterior as a space to be avoided. The two are not to be mixed; that would break the efficiency of the mechanical system, which is the only bridge between them. The stark dichotomy between fleeting encounters with extreme outdoor heat and regulated

indoor thermal comfort captures the contemporary conditions of our built environment, particularly in contexts where this climate control is prevalent.

Transitions between extreme heat and cold environments induce bodily discomfort. The body constantly adjusts through persistent sweating in hot environments followed by exposure to cool conditions, disrupting its homeostatic mechanism. This can result in heightened fatigue, dehydration, and increased susceptibility to respiratory ailments.

Historically, enclosure protected dwellers, but the window (without glass, just a wooden shutter), was within their reach and control. Wind towers, known as the “badgir” were architectural devices with occupiable spaces. According to oral accounts, some households would employ sail-like fabric elements that were swayed back and forth to create gusts of ventilation throughout living units. Lighter-weight palm dwellings like the “areesh”, composed of woven fronds and leaves, would be sprayed with water in the evenings. As wind brushed through them, the evaporative cooling effect would make for a better night’s sleep for dwellers.

Vernacular comfort mechanisms were both passive and active in nature. In the contemporary moment, active implies using an external power source to run a system like an air conditioner. However, the active, in the vernacular moment, was the individual. There was a labour intensity associated with achieving comfort with some measures like water spraying daily. Participation was necessary when architecture alone did not fulfil the role of cooling. Thus, while looking to the vernacular as we design for a critical future is important, it is equally crucial to note living conditions before introducing active mechanisms. Therefore, their complete eradication is not a viable solution, at least in the immediate term.

Nonetheless, what architecture can offer is a minimization of those intensively, almost sacredly conditioned spaces and the elongation of transitional peripheries around them. Introducing thermal gradients can alleviate the impacts of the contrasted dichotomy of inside and outside. Buffers can facilitate slower adjustments to temperature and humidity changes. By allowing individuals to acclimate gradually, such buffers in the form of porticoes or courtyards help minimise the energy needed for cooling and the discomforts associated with temperature disparities. Beyond offering a sustainable approach to climatic control, thermal gradients also reconnect inhabitants to a building’s peripheral zones, making the outdoors a more approachable space. As one may pass through a thermal gradient, their thresholds of comfort can be extended or even blurred over time. Perhaps shading is just enough to protect one from the spring sun? Or does the breeze make for the perfect day to move a meeting outside? Current harsh divisions don’t allow or offer the space for these moments to emerge. They dismiss them altogether.

SYSTEMS OF PRESERVATION

When conducting the research for *Sweating Assets*, we visited the Bahrain National Museum, which was erected in 1985. It is composed of three great halls. The great halls are powered by great plant rooms that wrap around and over the halls to keep artefacts alive with precise and careful tuning of air temperature and humidity. The immensity of this consumption can be imagined when recognizing that these artefacts from Dilmunian history, 4000 years ago, are preserved with continuous, consistent conditioning to survive through the ages. But for how much longer, and at what cost? The excavation of artefacts from the archaeological sites is only recent. Their lifetime in the museum so far is a negligible period in the context of the longer timeline of their existence. Is it far-fetched to imagine a future where they are periodically returned to the ground?

Artefacts would be better off preserved in the ground, as they were found and have survived for thousands of years, or even underwater in anaerobic conditions. The risk of deterioration in these settings is lower than that of when objects are on display. There is a distinction and conflict between displaying and preserving.

Recent trends toward reducing conditioning in museums can be seen in examples such as the Guggenheim Bilbao.² Increasing energy costs led the institution to rethink the norms on climatic control of spaces housing exhibitions and collections. Although the incentive was not necessarily environmentally driven, it is a step that inadvertently forgoes the obsessive preservation of anthropogenic objects for the sake of preserving larger ecologies. When this necessity is still adhered to, protecting cultural artefacts comes with an environmental price that must be noted. One would expect this level of conditioning to be the exception rather than the norm. However, malls, airports, and exposition halls maintain this level of intensive year-long conditioning. Perhaps humans have become fragile artefacts in these spaces.

CONCLUDING NOTES

In the transition from passive to active cooling methods, we have accumulated systems, and they act redundantly at times. Today, spaces are often designed without these in mind, but instead, with a rigid assumption that cooling will retroactively be added to them, doing whatever is necessary to blindly maintain comfort standards. Therefore, these buildings would suddenly fail once air conditioning is not in operation, as they serve them like ventilators to the human body. Intensive conditioning has also caused a major disconnection with exterior climate, by allowing for the nesting of spaces and deeper floor plates, bringing users further away from the possibility of simply operating a window for fresh air. The phenomenon is a

global one. Homogenisation can be observed, not only with style, but also with interior climatic standards or conditions.

Architecture must regain agency through strategic material use and planning, designing for transitory peripheries to the highly conditioned zones. Interventions can be strategically designed in response to their environment, to maximise airflow, and where possible, shading to meet optimal temperatures. Whilst modern demands cannot dismiss the use of conditioning systems altogether, a future trajectory can smartly minimise them and critically consider their necessity.

Through *Sweating Assets*, these accumulated systems were analysed in relation to wider systems that bring together flora, fauna and the air conditioning unit within the same ecology. This was done to highlight ongoing missed opportunities with water waste and potential condensate uses. However, it should also serve to understand the long-term detrimental impact that conditioning our bodies, objects and spaces has on larger ecosystems and environments.

ENDNOTES

¹ James Langton, “How Air Conditioning Changed Life in the Gulf,” *The National*, May 28, 2022, <https://www.thenationalnews.com/weekend/2022/05/27/how-air-conditioning-changed-life-in-the-uae/>.

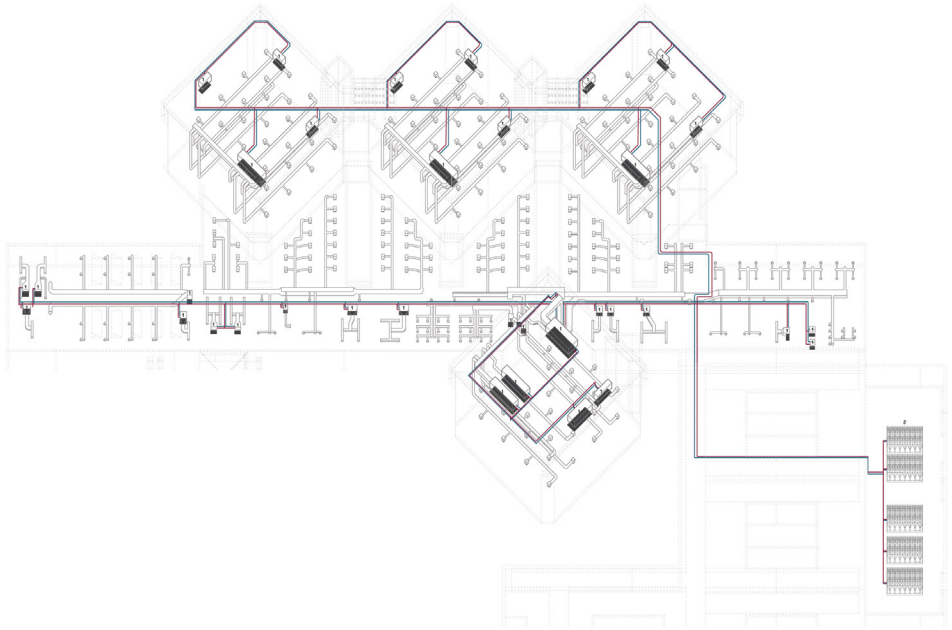
² Marshall, Alex. 2023. “As Energy Costs Bite, Museums Rethink a Conservation Credo.” *The New York Times*, February 1, 2023, sec. Arts. <https://www.nytimes.com/2023/02/01/arts/design/museums-energy-climate-control.html>.



Fig. 2. Often out of sight, these plant rooms are the heart of Bahrain's National Museum. They gather ducts carrying fresh outdoor air into air handling units where the air is cooled and dispersed into the halls and galleries. Photographed by Hussain Al Mosawi.

Fig. 3. Three great halls surrounded by a network of ducts pumping fresh cooled air through the museum. Illustrated by Melad Al Fulaij alongside the authors.

1 FCU
2 Chillers



Bahrain national Museum, Manama, Bahrain



Fig. 4. A cooled vitrine “sweats” moisture when the air around it is hot and humid enough. The condensate is gathered and directed towards small ecologies mimicking wetlands and dry landscapes within the space housing the National Pavilion of the Kingdom of Bahrain. Photographed by gerdastudio.



Fig. 5. Channels of condensate water directed towards landscapes.

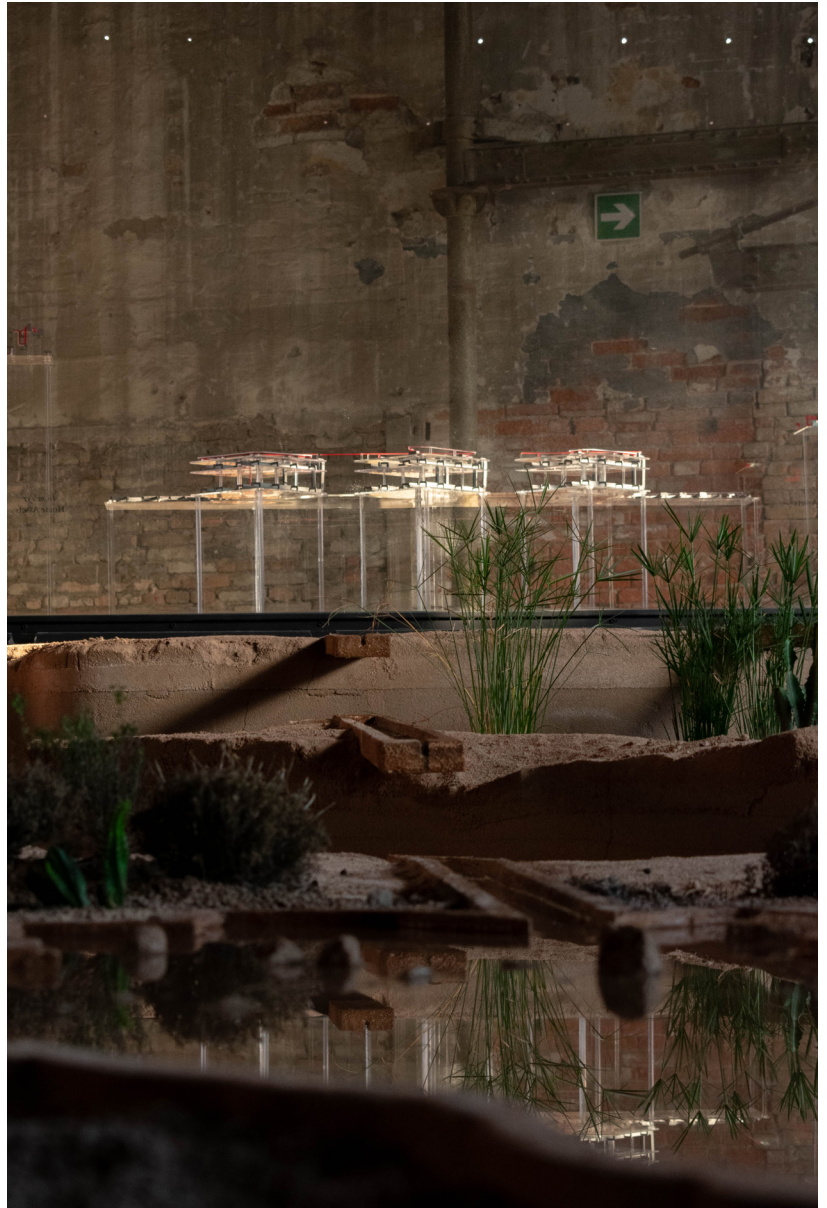


Fig. 6. An architectural model of the Bahrain National Museum's duct system housed within the cooled vitrine, which contrasts against the wetland landscape.