Thermal Standards in Santiago de Chile. Creating and regulating thermal environments

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Thermal standards shape the way cities are built and climatically experienced. By establishing the boundaries between interior and exterior, or setting constant conditions in buildings for instance, this *normalization* creates evermore homogeneous global thermal environments, with little care for local specificities. However, it does not look to simply be a tension between local and global, but rather what the place of experts is around the definition of norms. Taking Santiago de Chile as case, I analyse the *deviations* from so-called objective, rationally defined codes, to ones transformed by architectural, socio-cultural or historical contingencies. Three Case Studies will serve to reinforce this argument, nuancing the apparent *universality* of standards.

My main hypothesis is that regulations and standards are not fixed but subject to *interpretation* over their many stages of existence. They are not "out there", waiting to be used, but rather constantly manipulated and changed by different actors, giving them different values in the process. This hermeneutic approach can found some theoretical bases in Science and Technology Studies (STS), whose scholars tried to grasp how technical development occurs. Taking a critical stand at Modernity theory and going away from a positivist view of technological change, it is pretty clear by now that it does not follow a linear, deterministic path. In fact, as Andrew Feenberg wrote: "Existing technology is not the result of purely rational decisions about the most efficient way to do things but depends on social choices between alternative paths with different environmental consequences"[1]. He continues by arguing that technology is not an external force moulding society, but rather a result of societal changes themselves (Feenberg, 2010).

So, even though defined as purely rational, standards must not be categorized as merely technical-scientific artefacts, because they are not independent of localized practices. To be able to grasp thermal standards, how they influence thermal environments in Santiago, no distinction has to be made between the forces that shape them. As technological change incorporated in a market, these forces can be technical, economic or political, but also architectural, social and cultural. Indeed, there is a thin line between function and meaning, that I wish to navigate. An Actor-Network-Theory (ANT) framework can help assessing all the forces and powers at play in the creation and implementation of thermal standards.

[1] Feenberg, A. (2010). "Between Reason and Experience - Essays in Technology and Modernity". Cambridge, Mass.: MIT Press.

The first Case Study concerns mass housing production promoted by the State throughout the second half of 20th century, in particular the "Villa Frei". These modernist complexes are relevant in analyzing housing standardization and institutionalization processes, as well as shedding some light on architectural means of climate control at the scale of the neighborhood. The second Case Study focuses on the importation of international standards, being then mixed up with local practices and regulations. The investigation turns here to a place I call "LEED Street" that developed in the last twenty years. I question the *raison d'être* of using LEED in certifying building and its effect on the resulting city climate, looking at materiality and seasonal change. Lastly, at the scale of the house, I discuss examples of adaptation to & deviation from the standard(s). A case of partially self-built house, "Lo Barnechea" by elemental, would help questioning the opposition between minimum standards, written in law, static and universal, and the minimum affordable (or desired), fixed by the user, dynamic and local.

All in all, each of these Case Studies put in question the evolving role of the architect in design in general, and in city climate specifically. Based on climatic maps, historical plans, as well as interviews and photographs, they reveal various expressions of thermal standards and regulations in different areas of the city, eras and socio-economic groups. What concerns me in the end is the consequences of the use of thermal standards. If it is true they represent a new form of norm, they can substitute un-formalized practices or building traditions, where formal ways might replace experience (and consequently, performance, *delight* ?). The question would then be what kind of thermal environment is brought with it. Finally, it should offer some insights when navigating *between reason and experience* in thermal governance and climate control.

Keywords: Thermal Regulation, standardization, certifications, climate control, urban climates, Santiago de Chile.