Advanced Studio IV
Spring 2015
Jeffrey Inaba (ji2129@columbia.edu) and Benedict Clouette (bcc2104@columbia.edu)

Technologies of Architecture and the City

A building is a condensation of an extensive landscape of material resources and exchanges, from the electrical grid, to water and sewer systems, to telecommunications infrastructure, to transportation. All of these systems are necessary (at least in a conventional building) to support life in architecture; without them, architecture would be reduced to basic shelter.

And yet, it is these same systems that are most vulnerable to disruption by rising sea levels and the extreme weather events associated with climate change. The resiliency of a building is an effect not of the isolated structure, but its points of contact and interdependency with a greater socio-technical landscape: the city. When thinking about resiliency at an architectural scale, it is necessary to consider not only the technologies that support buildings, but also how they negotiate their relationship to a larger geography of energy, resources, and infrastructure.

The studio will therefore focus on the technologies that make life in buildings possible—the machines that provide heating, cooling, lighting, electricity, data, and circulation—as well as the specific points of contact between these systems and larger scales of organization at the regional and geopolitical levels. We will consider the relationship between the design of technological systems and the design of architecture, as well as how those systems connect to, draw from, and feed into the city. Buildings will be understood as a meso-scale interface between the forms of life that they support in their interiors and the urban geography that, in turn, supports buildings.

A critical question for the studio will be whether buildings, which are today wholly dependent on urban resource systems while offering little in return, might be cast in a more mutualistic relationship, in which the strength of a city's systems could be multiplied by strategies implemented at the building scale. No longer at the mercy of fragile and incredibly complex urban networks, architecture might even become a life support system for cities in moments of crisis.

Mechanical and Post-Mechanical

The studio will explore novel approaches to the relationship between architectural design and conventional technical-mechanical systems, as well as post-mechanical approaches, in which the form of the building reduces its reliance on mechanical technologies. Devising buildings that are less dependent on their mechanical systems, where mass and machines work together to support the interior, improves on the default relationship between architecture and environmental technology, which has had enormous consequences on resource consumption, ecological degradation, and ultimately the vulnerability of cities. The studio will enlist the environmental and mechanical performance of a building as an active

input of the design process, and environmental thinking will serve as a vehicle to explore new building forms.

Smart and Dumb

The studio will interrogate the recent fascination with “smart cities” and, more generally, constructed environments that rely heavily on information and communication technologies to ostensibly increase resource efficiency. Without reflexively rejecting smartness, we are interested in strategies that use the physical properties of buildings—such as their form, materials, and surfaces—to create environmental effects. Even seemingly simple forms can produce remarkably complex environmental performances, energy cycles, and systems of resource exchange. Perhaps this is a new kind of smart city, one that is more resilient for being less reliant on a fragile layer of digital sensors and controls, because communication and information are built into the physical performance of its buildings and, by extension, the city.

Backflow and Feedback

One of the unpleasant effects of Superstorm Sandy were the reported incidents of sewer backflow, where the massive volumes of water in the combined system caused untreated sewage to flow back into residents’ bathrooms. Backflow violates the normal relation between the architectural interior and urban systems, wherein high-quality material (clean water) is delivered to the building, consumed in the interior, and expelled in a lower, less useable state (sewage). The same general relationship holds for conventional energy systems, in which high quality electrical energy is delivered to buildings, where it is consumed, transformed into heat and radiated into the atmosphere as wasted energy.

The studio will study another possible relationship, in which buildings might feed back into material and energy cycles with higher quality, more useable forms of resources and energy, particularly in moments when urban systems are compromised.

Life Cycle

In thinking about the resiliency of the city, the studio will consider the life cycle of buildings as a key driver of design decisions. Life cycle concerns not only the replacement, renovation, and modernization of the many elements of a building, but also the embodied and operating energy over the building’s duration, as well as how materials are sourced, transported, and disposed of or reused. Thinking about the life cycle of a building can make a design more adaptable to changes—not only violent events such as disasters, but also slow, incremental shifts in use and resource availability—and also can reduce negative environmental impacts, which are major source of instability today.

Schedule
(A full schedule will be posted online)
Mid-review: week of 2 March
Final review: week of 27 April

Course policies
Students are encouraged to work in pairs so that a more ambitious scope of design can be explored and developed; students are also welcome to work individually.

Emphasis will be placed on a collaborative approach to formulating ideas. To promote this collective process of contributing and sharing concepts, please remember that any insight, observation, or comment made in the context of the course will be considered to be authored by the group rather than any one person, and available for use and interpretation by all.

Final Submission: Following the final review and prior to the grading deadline, students are required to submit their presentation materials, including photos of your physical model, in a digital format to an FTP site that will be provided.