housing for a changing climate

The climate is changing with greater speed and severity than we thought even a few years ago. As architects, our ability to change that trajectory is small, but our opportunity to shape how humans survive is tremendous. But we need more than resolve; we must extend our knowledge and skills so that as society shifts towards a more resilient way of dwelling, we have some clear and ready answers. We should respond to global concerns with a range of universal types that can fulfill our changing needs and address our changing circumstances, and with a firm grasp on emerging technologies that will enable us to reach those goals.

The carbon footprint of the United States is largely the result of our preference for the detached house and the consequent development pattern of sprawl over the past half-century, a pattern that has now spread to the rest of the world that can afford it. If we are to make any progress in slowing climate change, we must find alternative models for housing our population.

But while we architects welcome innovation, everyone else in the housing production process likes the status quo (even here in ecotopia). Most neighborhoods don’t want new housing types or higher density. Government agencies take forever to change codes and regulations. Developers want to keep making money doing the same kinds of projects. If our proposals are ever to have an impact in the world outside academia, we must learn how to adapt our universal goals and types to meet local concerns and conditions, to reinforce the existing places. Technological solutions which ignore the reality of current constraints – market preferences and financial feasibility – will see limited implementation and have little effect.

Beginning in the prerequisite fall term Resilient Housing (ARCH 4/510), students will engage the critical issues we face, and research the solutions we will need. In the winter term we will examine typical unit and building designs that will work with typical sites, developing a kit-of-parts that can be applied on a range of typical sites. Later in the term, students will focus in upon specific types in sites to develop in great detail.

Premises and goals

- Architects can do little to change the climate change that has already been locked in, but we can do a lot towards building resilience - the ability for humans and their societies to adapt to and thrive in changing conditions.
- This can only be achieved through changing the typical patterns of building and dwelling in the modern world, at all scales. Individual signature buildings will not do it.
- Housing and settlement pattern are critical places to focus, perhaps the most critical.
- The current system has not only caused the crisis we are in, but it uniquely vulnerable to it. We must change it to 1) do no more harm, and 2) protect ourselves from the imminent changes.
- While housing design must respond to particular parameters (site, market, program), it must also respond to global parameters (building technology, production system, economics, environmental goals).
- Responding intelligently to the global parameters will yield clear housing types (at all scales) and systems, which can then be adapted to address local and particular conditions.
- Projects should push the boundaries towards serious environmental response, integrating issues of resilience with programmatic demands and spatial design from the beginning.
- However, students must demonstrate where their projects fall in terms of technological, social and economic feasibility, according to current conditions.
- Architecture students should graduate with more than good intentions - we can use this time in school to test new ideas and prototypes, seeing which ones could rebuild and reorient the housing production system.

Studio methodology

- **Typology:** Development of an integrated set of concepts and types for multi-family housing, from the scale of the room to that of the site.
- **Energy, environmental and resilience strategies:** These will be developed from the beginning of winter term, in tandem with typological explorations, to ensure that building performance is one of the generators of conceptual design. Detailed energy modelling will follow in the spring, with the goal of achieving net-zero performance, in buildings that will shelter us through catastrophic events.
- **Program:** Students will produce their own programs for their projects, which should reflect their understanding of demographics and market trends in the next 50 to 100 years. Program statements should be overwhelmingly focussed upon housing components; any ancillary uses should be minimal and diagrammatic.
- **Sites:** Rather than picking a site and designing a building, students will develop typical approaches and look for sites that work with
them. Site selection will occur later in winter term, after this development of types and strategies.

- **Density:** Much prior work and analysis has shown that low-rise high density is the way to go, for reasons of practicality and lowered impact. Target minimum net densities in this studio will be in the 30 units or 75 residents per acre range.

- **Scale:** Studio projects that are too ambitious in scale often fail to reach the desired degree of development, as students spend their time solving problems they've inadvertently created for themselves. So specific design projects should be limited in size and complexity.

### Format and Process

- All students in this studio must enroll in Arch 410/510, Resilient Housing, in fall term. This course will cover current issues, technologies and processes in housing production.
- Terminal studio students in this course will lead teams comprising other enrolled students to conduct research into the threats being faced with climate change, and appropriate resilient strategies, at the district and building scales. This research will inform the design studies in this studio.
- The studio will follow the diagram below, first addressing global parameters, to develop a conceptual / typological kit-of-parts. So inverting the usual studio order, much of **winter term will be for preliminary design development**. This conceptual kit-of-parts will then used to design particular buildings on real sites.

- **spring term will continue with schematic design,** including unit, building and site design simultaneously. A second round of design development will follow, as students revisit the technology decisions made during winter term.
- Throughout the studio, we will engage with architecture firms at the cutting edge of thinking about resilience.
- Design decisions will be driven by clear criteria, some of them quantitative. Schematic economic and energy modelling will be used throughout the whole process.

### Issues to be explored

The full range of issues as enumerated in the LEED criteria, or the Green Studio Handbook, will be covered as will the criteria established through student research in the fall (as enumerated in the **Resilient Housing** course description). The instructor will also attempt to steer students towards issues he is particularly interested in, such as:

- Unit designs that work for underserved household types and demographics
- building envelopes and edges that work technically and socially
- passive heating and cooling strategies (including ventilation)
- open spaces that balance privacy and community
- development patterns which create pedestrian neighborhoods, or enhance existing neighborhoods
- futureproofing and adaptability for changing demands in the next century
- innovative building systems.