

48752A Zero Energy Housing

Are you interested in designing or renovating the high-performance housing of the future? Net zero buildings are, or will become, a code requirement in some US states and EU countries. There are numerous single-family successes, but far fewer zero-energy multifamily examples despite that fact that multifamily housing is considered an essential typology to address rapid development and urbanization. 48-752 is a graduate level course that explores the requirements and strategies for achieving successful net zero multifamily housing. Through lectures, research, discussion, and a final applied project, we consider the design approaches, codes, policy, technology, and energy infrastructure that support net zero or carbon neutral performance. We begin by comparing global definitions of a zero-energy building since these definitions and the energy infrastructure that supports them influence design. We lay the foundation for understanding zero-energy housing with single family, metered case studies and then move on to the greater challenge of achieving zero energy in multifamily buildings with their greater resident diversity and higher internal loads. Since zero energy performance requires substantial attention to detail, the course covers each aspect of the building, from the envelope to the appliances. We also discuss how the current integration of buildings with grid infrastructure is proving short-sighted for zero-energy operation and how a changing grid, net metering policy, and energy storage will reshape our net zero or carbon neutral strategies for the future.