



PROJECT SUMMARY

RACE TO ZERO MIAMI OH



LoHi MULTIFAMILY HOUSING

LoHi is a unique student residence concept at the intersection of Low Energy and High Performance design. As an off-campus residential community, LoHi fills a void in housing options for the graduate and nontraditional student demographic at Miami University in Oxford, Ohio. Multiple unit sizes serve the individual needs of these students of varied backgrounds and family structures, while efficiently planned common areas promote water and energy conservation, interaction and development of community. LoHi makes a big impact with a small footprint as its compact form yields higher density housing than the norm in its neighborhood. By meeting DOE Zero Energy Ready Home requirements and following Passive House design best practices, the project enables students to actively participate in a net zero energy living-learning community with a lower energy and carbon footprint.



RELEVANCE OF PROJECT TO THE GOALS OF THE COMPETITION

LoHi embodies the spirit of residential sustainability by responding to site dynamics, applying proven passive and active low-energy design strategies in innovative and cost-effective combination, and integrating renewable technologies. The result is a low-impact, affordable high-performance multifamily housing complex that enhances quality of life and community for its residents.

DESIGN STRATEGY & KEY POINTS

The high-performance, low-energy design relies on a combination of passive and active best practices. Concept studies using Sefaira assist us to optimize the building mass, fenestration and unit layout to balance energy and daylighting concerns. WUFI and REM/Rate energy models are employed to optimize construction and equipment specifications. Key passive strategies are: Building massing to accommodate the less-than-ideal site orientation, compact footprint with minimal hallway, highly insulated building envelope, fixed awings and fins to shade south, east, and west windows. Key active strategies include geothermal system with ground-source heat pump in individual units, centralized unit ventilation, PV array on roof and south-facing overhangs, and solar thermal array to optimize hot water heating in units and common laundry.

PROJECT DATA

Location: Oxford, Ohio
Climate Zone: 5A
Square Footage: 35,929 ft²
3 stories with 38 units
(6) Studios, (20) 1-Bedroom, (12) 2-Bedroom
EUI estimate = 15 kBtu/annual (Sefaira Revit model)
HERS Index (average of 38 units) = 52 w/o PV
HERS Index (average of 38 units) = 9 with PV
Est. Whole Building annual energy cost = \$6,698
Est. Unit average monthly energy cost (average of 38 units) = \$10.39

TARGET TECHNICAL SPECIFICATIONS

Wall Insulation: R20+R12
Foundation Slab Insulation: R15
Roof Insulation: R60
Window Performance: U-0.14 (R7)
HVAC Specifications: A 20-well/150-gpm geothermal system serves decentralized GSHP water-to-air heating/cooling equipment for 38 units; Centralized ventilation via rooftop ERV ducted to units; DHW for units and common laundry via hybrid heat pump/ electric hot water heaters central to each floor coupled to Solar Thermal array; 103kW Photovoltaic array on roof (33.5° tilt) and 20W Photovoltaic array mounted to facade (vertical).

SUMMARY