



## B.R.O.N.Z.E.

## Bronzeville Residence Optimized for Net Zero Energy

Illinois Institute of Technology  
Urban Single Family Home



### ► Project Summary

The B.R.O.N.Z.E. House will be an urban single family home for a family of four designed to meet net zero energy. Located in Bronzeville, a historic Chicago neighborhood, at 4446 Vincennes Avenue on a narrow lot of 21 ft. x 123 ft. With neighboring two story residences on both sides of the lot, window placement and solar gain potential will be limited, which will be the driving constraint for the design of the B.R.O.N.Z.E. House.

### ► Relevance of the Project to the Competition

Through participation in the Race to Zero Competition, building science knowledge has been applied to develop a solution to a common restraint while also meeting net zero energy. The B.R.O.N.Z.E. House will meet DOE Zero Energy Ready Home criteria by integrating efficient systems, cost-effective constructions and a creative form that will overcome the narrow, restrictive urban site.

### ► Design Strategy and Key Points

Our interdisciplinary team of architects and engineers are working in unison to develop the form, function, and aesthetics of the B.R.O.N.Z.E. House. The main key points are the following:

**Architectural Design:** The main concept is providing daylight into our building. Our strategies include a courtyard located on the south side of the house and a lightwell on the N-W side, which channel daylight into the living areas. In addition, we raised the living areas with a split level design to provide better daylight access.

**Building Enclosure:** 2x6 Stud Walls: Densely Packed Cellulose + 4" GPS = R-42

2x10 Roof: Densely Packed Cellulose + 5" GPS = R-62

**HVAC and IAQ:** Ground source heat pump. ERV, 95% eff and up to MERV-13 filters.

### ► Project Data

- Location: Chicago, IL
- ASHRAE zone 5A
- Approximately 2,500 square feet
- 3 bedrooms, 3 bathrooms, 2.5 stories
- HERS score: 38 w/o PV, 0 with PV
- Monthly energy cost of \$87 without PV, \$9 with PV

### ► Technical Specifications

- Wall Insulation = R-42
- Foundation Insulation = R-10 U. Slab + Perimeter 4 ft., R-13+10 Walls
- Roof Insulation = R-62
- Windows Performance = U-0.18 and SHGC 0.20
- HVAC= GSHP EER 19.1 and COP 3.6

