

# Massachusetts Institute of Technology

An energy-efficient, environmentally conscious model of distributed power generation, the MIT "Solar 7" house incorporates passive thermal management practice with state-of-the-art power generation. A flexible interior design facilitates proficient use of dynamic space, while an inviting exterior conveys harmony between habitat and humanity.

## What's Different?

- The team created a grass roots community organization of committed volunteers, students, and experts.
- The house is designed for New England with triple-pane fiberglass windows and recyclable R-control structural insulated panels.
- Cabot Corporation's Nanogel is featured in previously inconceivable ways:
  - The southern facade contains a WarmLight wall, a photo-thermal buffer that converts sunlight into heat and, using Nanogel, directs the heat passively into the home during winter months.
  - The bedroom egress demonstrates a unique, non-sagging Nanogel-filled window that insulates at approximately 60% the R-value of a typical stud wall.
- Daylighting windows are generously placed on the northern façade to reduce the electric lighting load.
- With few exceptions, all windows are operable, which enables configurable cross-ventilated spaces.
- A white rubber roof membrane keeps the solar cells cooler—and more efficient—while recycled rubber accents the visible roof.

## Architecture, Interior Comfort

- Vaulted ceilings and copious daylighting accent the vertical space within the kitchen and living room.
- Pocket and telescoping doors improve the livability of the interior space.

## Heating and Cooling Systems

- The translucent walls allow solar energy to help warm the home in cool weather.
- Two heat pumps are used for water heating, space heating and cooling, and humidity control.
- An energy recovery ventilation system is also used for humidity control.

## Lighting (including daylighting)

- North-facing clerestory windows daylight the home.

## PV and Solar Thermal

- Forty-two SunPower modules, rated at 8.6 kW, are AC-coupled to deliver electricity through 24 MK batteries or two 6-kW Xantrex inverters.
- Sixty Apricus solar thermal tubes deliver hot water to a TurboMax water tank, which distributes water to both Warmboard radiant flooring and domestic hot water.

## Communications

- The MIT Solar 7 is intended to be a virtual shopping depot for renewable energy technologies and environmentally friendly building products. More information will be available at the MIT Solar 7.

## Budget

- The total cost for materials and transportation is estimated to be a little more than \$270,000.

## Future Plans

- The team plans to return the house to Massachusetts and display it for a period of time to offer tours and continue to monitor the systems.

## Kid's Corner

- More information will be provided onsite.

## Team Information

Web site: <http://solar7.mit.edu/>

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