

# MIT Solar Decathlon Team

Diana Husmann

President Hockfield's term represents new steps for MIT in many ways. As the first woman to lead MIT and the first life scientist to take the presidency, she has introduced an Energy Initiative that has pushed MIT to the frontier of energy research. Thus, President Hockfield is continuing MIT's proud history as a leader of renewable energy sources – a history that started in 1939, with MIT's first solar-powered house.



Figure 1: MIT's first house, Solar 1, built in 1936.  
Source: MIT News Office and MIT Museum

MIT's Solar 1 was the first house to use solar-based heating in America. Completed in 1939, it showed how the sun could heat houses in the winter, and experiments were conducted to judge the possibility of solar-powered air conditioning and energy generation. Despite the technological difficulties of the time period, Solar 1 served as inspiration to others. In 1938, Godfrey Lowell Cabot gave a gift to MIT to be used specifically for “the art of converting the energy of the sun to the use of man” – MIT's very first Energy Initiative.

Godfrey Cabot's generous gift enabled the creation of the MIT Solar Energy Research Project. This project, lasting for several decades, culminated in the design and construction of five new solar-powered houses, Solar 2 through Solar 6. However, after the last house was built in 1948, no new solar-powered homes were constructed.

This is about to change. MIT's new Solar Decathlon Team is currently preparing for the construction of Solar 7, the newest addition of the solar-powered family. Not only will it be built on campus, near the Simmons dorm, but it will also participate in the Solar Decathlon Competition held in Washington D.C.

The Solar Decathlon Competition is an international event in which twenty universities, including ones in Canada, Germany, Spain, and Puerto Rico, each build their own solar-powered houses to compete against each other on the National Mall in Washington D.C. Hosted by the Department of Energy, the overall goal of the competition is to show the public how solar energy can both be useful and beautiful. People sometimes shy away from renewable energy sources because of the NIMBY (not-in-my-backyard) effect, which is why the competition places such an emphasis on architectural designs that complement and enhance the look of the solar panels. The Solar Decathlon will take place every other year until 2015, at which point the DOE believes that solar energy will start to cost less than carbon-based fuels. However, this event is not just about the effect it will have on the public; it is also about creating a competition that challenges and excites the participating students.

Each house must have a footprint of 800-square-feet or less and be completely powered by solar energy. Judged for architectural design, marketability, and energy efficiency, these houses must be able to perform just like any consumer's house, including washing dishes and hosting dinner-parties. During the two-week competition, six students will live in the house at all times, leading tours and performing everyday activities such as cooking meals and using the Internet. Furthermore, two additional students will drive around in their very own electric-powered vehicle, using energy generated exclusively by the house. Extra miles mean extra points, so these students will be taking many laps around the National Mall. Although only one house can be named as the winner and take home the bragging rights, the real reward has already been given – to the twenty colleges chosen to build houses. That means that MIT has already won in several ways: not only do we get \$100,000 from the DOE in order to build

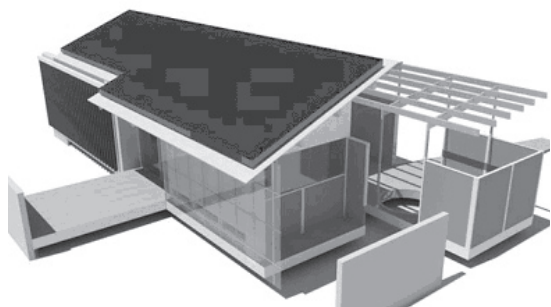


Figure 2: This is a preview of what the newest house, MIT's Solar 7, will look like.

Source: MIT's Solar Decathlon Website

our house, but we also are receiving international attention by participating in this event.

MIT's house was designed by architecture students during a specially-taught class last spring. These students created three designs and one was chosen to be the new Solar 7 house. Open and airy, this house was designed to have a large, light-filled living room, thereby making it feel much bigger. There are many windows on every wall to help save the energy by using as much of the sun's natural light as possible during the day. Both active solar cells and passive solar heating are used in order to maximize the amount of energy captured from the sun.

Like all MIT creations, Solar 7 offers a few technological surprises. First and foremost, it was designed to be a smart house. Although every Solar Decathlon house will have temperature sensors and energy monitors installed for the competition, Solar 7 will be the only house to have these monitors incorporated into its design. At all times, the house will monitor its total energy use and can selectively shut down certain functions in order to conserve energy. Furthermore, a computer screen will be built-into the kitchen countertop, thereby enabling home users to monitor energy usage and turn appliances on or off as necessary. Solar 7 will be as interactive – or as self-reliant – as its owner wants it to be.

Solar 7's backyard will also contain a few surprises. Although the house footprint is limited to 800 square feet, it will have a rather large yard on the National Mall and the Solar Decathlon Team is ready to use it. The space surrounding the house will be a "Solar Sculpture Garden," showcasing a variety of useful and beautiful energy-producing technologies that were developed at MIT. There will be everything from a solar-powered birdbath – for those members of the public who are ready to try out their own solar projects – to energy-producing algae – a new solar power being researched by MIT's Department of Biology. Over the two weeks when Solar 7 is open to the public, thousands of people are going to get a chance to experience some of MIT's solar technologies up-close.

In addition, Solar 7 needs to be mobile. Like the other Solar Decathlon houses, it will be built at its home school before being shipped to Washington D.C. MIT's Solar Decathlon Team is preparing for this challenge by designing a house that will be pre-fabricated. The pre-fabrication process means that many

of the house's integral systems – electrical wires, insulation, and plumbing – will be built into the walls before the walls themselves are "snapped" together. By designing a house that can easily be taken apart and put back together, the Solar Decathlon team is planning on having it ready and find themselves sipping lemonade in the backyard while the other teams continue unpacking the pieces of their houses.

The competition itself is taking place this October. Currently, the designs are being finalized in preparation for submission to the pre-fabrication company. Construction is starting as soon as possible, with the first pieces of the house scheduled for delivery mid-April. From there, Solar 7 will be put together as quickly as possible until it is finished in June, with the goal of having the house take data on itself until August. When students arrive for classes in the fall, the team will finish the backyard sculptures and practice giving as many tours as possible, which means that the entire MIT community will be invited to come see the house. Finally, the house will be packed up at the end of September for arrival on the National Mall by October 3rd. From there, it will be on to the house construction, the Solar Decathlon competition, and open house with thousands of visitors from all over the country!

Although the actual competition will take place in Washington D.C., there are many opportunities for people here to become involved. The Solar Decathlon Team will present at several energy events including the Cambridge Science Festival on April 21. A list of current events, drawings of the house, and descriptions of the competition are posted at [web.mit.edu/solardecathlon/](http://web.mit.edu/solardecathlon/). We are open to any ideas for improving the house and to the backyard sculpture garden, so if you contact us if you are interested in helping. Finally, we would love for you to come participate yourself. We need people who are interested in everything from designing electrical schematics to building and interior decorating to contacting the CEOs of well-known solar energy companies. We even need people to come with us to Washington D.C. and help participate in the contests and lead tours. If you are interested, e-mail us at [join.solar7@mit.edu](mailto:join.solar7@mit.edu), and help continue MIT's long tradition of proving that solar energy can change the world!



Figure 3: This is a photo from the Opening Ceremonies of the 2005 Solar Decathlon Competition.

Source: DOE Solar Decathlon Website