

Florida International University incorporated solar thermal tubes into its submission for the Solar Decathlon 2011 – a fully solar-powered house.

# Solar Heating and Hot Water

## Moving Toward 100% Clean, Renewable Energy on Campus

*Installing solar heat and hot water systems on campus is a great way for America's colleges and universities to shift to 100 percent clean, renewable energy. Campuses across the U.S. are installing solar heat and hot water systems to save energy, provide learning opportunities for students, and achieve their climate goals.*

## Solar Heating Is a Key Building Block of a Clean Energy Future

Capturing the warmth of the sun to meet our heating and hot water needs is just common sense. It's a key piece of the puzzle to help our society shift away from today's energy system built on polluting fossil fuels. The first house to convert sunlight into energy, the Solar One House, was built by a University of Delaware researcher in 1972; today, solar heaters can cut hot water costs by more than half.

## How Do Solar Heat and Hot Water Work?

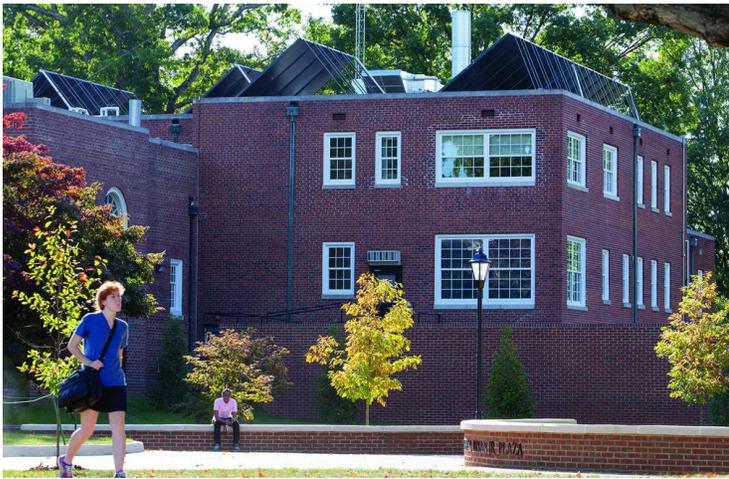
While solar photovoltaic panels convert sunlight directly into electricity, solar heat and hot water systems capture heat from freely available sunshine to:

- Heat up water that is pumped to a tank for use and storage, to provide hot water for cooking, bathing or laundry, or for heating campus buildings,
- Heat or cool air in buildings using solar air heat collectors,
- Heat or cool buildings through passive solar design, laying out the building, choosing materials and placing windows to best use the sun's heat without mechanical systems.

## Campuses Are Benefiting from Solar Energy Opportunities

Solar heating and hot water offer many opportunities for colleges and universities:

- **Physical Attributes:** Campuses are perfect locations for solar thermal energy projects, with open rooftops and large hot water usage in residence halls, on-campus restaurants and in athletic facilities.
- **Cost-Effectiveness:** Solar thermal energy also makes economic sense, protecting colleges from the volatile prices of fossil fuels while reducing heating costs. Colleges and universities also have strong facilities departments that can ensure regular maintenance of solar heating systems.
- **Academic and Pre-Professional Opportunities:** Solar thermal energy projects create opportunities for collaboration between students and faculty, providing learning, research and training opportunities for students, and can help universities engage with their local communities.
- **Research:** New techniques are also being developed to store solar thermal energy. At the University of South Florida, researchers have developed a latent heat storage system that could cut the cost of thermal energy storage systems by more than 80 percent.



*Guilford College has nearly 200 solar thermal panels installed on nine buildings across campus, in one of the largest solar thermal energy systems installed at any U.S. college or university campus.*

## Solar Thermal Energy Covers Guilford College's Hot Water Needs

Guilford College in Greensboro, North Carolina, has opted for solar heating, with 200 panels on campus that produce more than 9,000 gallons of hot water each day. After an initial 12-panel array installed in 2007 resulted in lower energy bills and emissions, Guilford partnered with FLS Energy, a local solar energy provider, to install another 188 panels on another eight buildings in 2010. The combined system covers almost all the hot water needs of the campus residence and dining halls.

To fund its 2010 solar thermal array, Guilford entered into a solar energy purchase agreement with FLS Energy, whereby FLS financed the installation and maintains the system, and Guilford pays FLS a guaranteed, competitive price for clean hot water. With no upfront capital investment, Guilford was able to immediately save energy and cut down its emissions.

Today, Guilford's solar thermal arrays are a symbol of the school's commitment to sustainability, visible throughout campus. In the words of Jon Varnell, Vice President for Administration, "Solar thermal is a no brainer; if you use a lot of hot water and you're not using solar, you're really losing out."

## Gustavus Adolphus Adopts Solar Thermal Energy to Reduce Use of Natural Gas

In St. Peter, Minnesota, Gustavus Adolphus College uses the sun's energy year-round to heat several of campus buildings. Gustavus has deployed 100 flat plate panels on the rooftops of three buildings on campus to provide hot water for the pool and facilities at the Lund Athletic Complex and for the dining service operation at the Jackson Campus Center, and to help heat the LEED-platinum Beck Academic Hall in the winter and reheat chilled air in the summer to remove humidity. At the Melva Lind Interpretive Center, two types of solar thermal technology – flat plate and evacuated tube solar – are installed side-by-side for demonstration purposes for students and the wider community.

Gustavus has embraced solar thermal energy to replace natural gas consumption on campus, reducing greenhouse gas emissions from natural gas heating by 15 percent since the college first signed the American College and University Presidents' Climate Commitment in 2007.

*This factsheet is one of a 10-piece series.  
For citations, and to read the other factsheets,  
please visit  
[EnvironmentAmericaCenter.org/Campus101](http://EnvironmentAmericaCenter.org/Campus101)*



## List of Resources

To start your campus' push to go solar:

- Assess the cost and energy efficiency of solar water heating systems: [energy.gov/energysaver/estimating-cost-and-energy-efficiency-solar-water-heater](http://energy.gov/energysaver/estimating-cost-and-energy-efficiency-solar-water-heater)
- Benefit from the Solar University Network's assistance to create "shovel-ready" solar energy campus projects: [www.solarendowment.org](http://www.solarendowment.org)
- Use the U.S. National Renewable Energy Laboratory's REopt model for expert analysis, solar screenings and implementation assistance: [reopt.nrel.gov](http://reopt.nrel.gov)