

## Solar Learning Lab™ Case Study



Harvard University, which celebrated its 350th anniversary in 1986, is the oldest institution of higher learning in the United States. Seven presidents of the United States – John Adams, John Quincy Adams, Theodore and Franklin Delano Roosevelt, Rutherford B. Hayes, John Fitzgerald Kennedy and George W. Bush – were graduates of Harvard. Its faculty have produced more than 40 Nobel laureates.



Heliotronics Touchscreen kiosk in lobby

Adding to their legacy of leadership, the Harvard University Faculty of Arts and Sciences (FAS) has created the Campus Energy Reduction Program (CERP). Known as FAS CERP the program's mission is to implement a comprehensive sustainable program within Harvard University's Faculty of Arts and Sciences that will reduce the cost and environmental impacts of every aspect of FAS operations. As part of their initiatives FAS CERP installed the solar array and data display described below. Learn more:

<http://www.greencampus.harvard.edu/>

<http://www.greencampus.harvard.edu/cerp/about.php>

## Harvard University Cambridge, Massachusetts

**Harvard Green Campus Initiative**

**Sunviewer.net™** Solar Energy & Weather Data

The Faculty of Arts and Sciences (FAS) Campus Energy Reduction Program (CERP) was established for the purpose of influencing over 10,000 computer users to shut down their computers when not in use, to purchase flat screen monitors or laptop computers and to activate the sleep software for monitors. The program continues to expand its focus to encourage energy conservation more broadly across the Faculty of Arts and Sciences. Other Schools, such as the Harvard Medical School and Harvard School of Public Health are beginning to model the success of this program.

**What is FAS doing to reduce its environmental impacts?**

Geothermal, solar panels, hundreds of lighting retrofits, water efficient irrigation, and much much more!

**System Snapshot updated every 15 minutes**

Energy generated today:	17.9	KWH
Energy generated since installed:	687.5	KWH
Current power output from solar panels:	0.00	KW
Power in the sunlight:	0.2	KW
Solar panel temperature:	-3.0	°C
Avoided carbon dioxide emissions since installed:	624.9	KG

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VIEW DATA

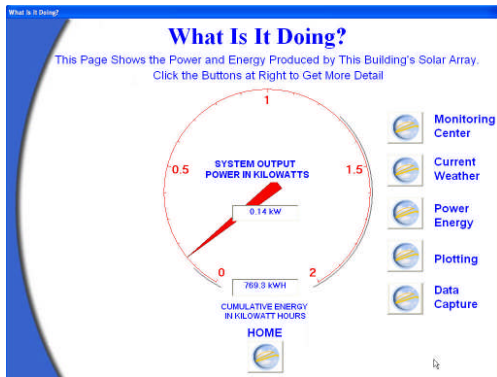
Powered By: **HELIOTRONICS**

### Project Portal for the Solar Array on Harvard's Science Center

Harvard University has been ranked by the Sierra Club as second only to Oberlin College in its top 10 environmentally aware universities. As part of their green efforts FAS CERP arranged for the installation of a 10.7 KW roof integrated solar photovoltaic solar array on their Science Center. This installation is unique in that it utilizes a roof integrated PV product from Solar Integrated Technologies. Rather than traditional solar panels installed above the roof surface, these PV cells are integrated into the roofing membrane and heat welded to the surface of the roof. While providing a relatively small fraction of the building's electricity, the system showcases the opportunity that solar energy offers.

See Also :<http://www.greencampus.harvard.edu/cerp/greentour.html>

The solar array is not visible from the ground and can only be seen from some of the building's upper floor windows. In order to gain maximum exposure Harvard chose a dual screen Heliotronics touch screen kiosk to provide the visuals. The kiosk is placed in a high traffic area where it informs students, faculty, staff and visitors about the solar array and FAS CERP.



*SunViewer™ K Display Software*

The kiosk is a dual display. The lower display is an interactive touch screen and facilitates the exploration of a variety of data, text and graphical screens. The Upper screen is an Internet based slide show that describes Harvard's FAS CERP program.

Heliotronics also provided an Internet based data display that, in addition to raising awareness, offers educational and research opportunities for faculty and students.



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*Harvard Science Center*

### Project Snapshot

Installation team: **Solar Design Associates** and **Lighthouse Electrical**

[www.solardesign.com/index.html](http://www.solardesign.com/index.html)  
<http://lighthouse-electrical.com/>

*Data Monitoring System:* **Heliotronics** Becquerel 3P™ Package with dual monitor touch screen kiosk.  
[www.heliotronics.com](http://www.heliotronics.com)

*Monitoring System Specs:* Monitors real-time PV power and energy output, system efficiency, avoided emissions, irradiance, PV module temperature, ambient temperature and wind speed

*User Interface:* Heliotronics' *SunViewer™* educational display software running on a touch screen kiosk and a *SunViewer.net™* data portal which makes performance data available to anyone over the Internet.

*PV Array:* (16) Solar Integrated Technologies roof integrated SI744G1 modules.

Inverters: 3 SMA SB 5000 US

*PV System Capacity:* 10.7 kW (grid-connected)

*PV Mounting:* Flexible thin film amorphous silicon solar cells integrated into the roofing membrane.