

SOLAR MEGAPHONE

AUBURN UNIVERSITY



Thermal mass tubes



BP 31605 Photovoltaic Panels used on Auburn Solar House



Concord 12 volt deep cycle battery



Light Emitting Diode (LED)



SOLAR SENSE

The heart of our home is the solar electric system. It allows us to refrigerate and cook our food, maintain comfortable temperatures and light our living area. For this reason, our solar electric strategy was carefully considered and well researched.

One of the first strategy decisions we made in this project was to use crystalline solar panels because of their high efficiency. The solar team evaluated the models on the market and selected BP 31605 polycrystalline panels for their efficiency and for their beauty as the sun moves across the facets of the crystals.

Another key strategy was to design our roof to accommodate the maximum number of panels. To do this, we changed the slope of our roof from 39 degrees, which maximizes panel output for the DC latitude, to 30 degrees. Although the panels are a bit less efficient at this slope, the increase in the number of panels more than made up for the loss in efficiency.

We made a decision to minimize the loss of collected energy by designing a highly efficient electrical system. Our panels are wired eighteen paralleled sets of two in series to create an 88 volt open circuit system. Using peak power tracking, the charge controllers regulate this voltage to an acceptable level for charging batteries. This, along with short electrical runs, cuts down on the amount of electricity lost as it moves through the system.

Inverters, which convert the direct current produced by our solar panels into the alternating current required to power most of our loads, are critical to the functioning of our solar electrical system. If they go down, the house goes down. Our strategy in this area is to make sure this doesn't happen.

THE SOLAR MEGAPHONE



We began by choosing the most efficient inverters for our system. Then, we configured the system to include two of these units, despite the fact that our system only requires one. For added safety, we packed two additional inverters.

Efficiency, economy and safety were the primary strategies for our battery system. Although there are lighter, more efficient batteries on the market, they are very expensive. Our Concorde Deep Cycle Marine batteries are cost effective and charge efficiently, even when the charge is low. This latter feature is particularly important for solar battery banks. Given our highly public location on the National Mall, we also wanted batteries that had a low risk of leakage or explosion. For added safety we encased the bank of 32 batteries in a Kevlar enclosure.

Of course, how we use the energy we produce is a major part of our overall strategy. Obviously, we want to minimize the amount of energy that we use to power our modern lifestyle. So far, energy efficient appliances and careful use of these appliances has worked for us. We are also paying close attention to the timing of daily activities that require energy and, like all of the teams on the mall, we are keeping a watchful eye on the weather channel and hurricane Libby.

Overall, our solar electrical system has behaved as expected. Now that we know a little bit more about the strengths and weaknesses of our competitors, our strategy is to make a few mistakes as possible and to fine tune the workings of our home to give us a competitive advantage. Only time will tell how well we succeed.

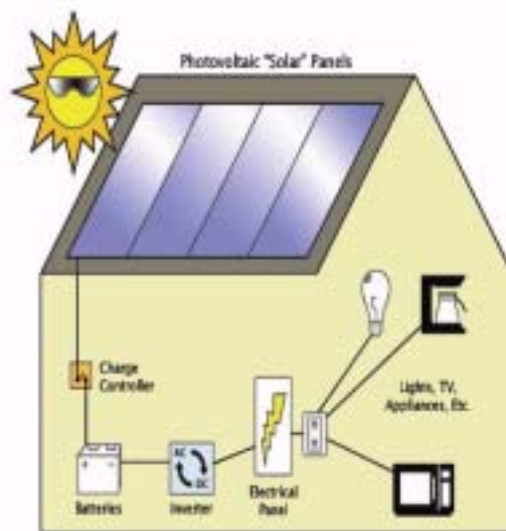


Diagram of a Typical Solar-House

These are some common phrases you may hear every now and again around the AU house:

**--What were you raised in a barn?
Shut the door!**

--We're not air conditioning the solar system.

Shut the door!

--Okay, lets keep the door open. It just looks better that way.

(yeah right, you would never hear that one!)