Solar Energy at WMU

By Brian Fogg

The development of solar energy is advancing on Western Michigan University's Campus.

Using Google Earth, a user can spot from a satellite surveillance center the large array of solar cells on top of Sangren Hall at Western Michigan University.

The panels on top of Sangren Hall were installed in 2013, and the 975 panels produce enough power for six homes for an entire year, according to the Sangren Hall PV Project Summary

A smaller solar project is located in the **parking lot of the Miller Auditorium** on campus.

The solar cells near Miller Auditorium have a 50 kWH solar array, but they are adjustable. The Miller Auditorium project has 216 panels and is capable of producing about one-fifth of the energy as Sangren Hall, according to the Miller PV Project Summary.

These projects were heavily funded, but the deficit has shrunk exponentially over the past few years with substantial changes in the chemistry and production of the cells, said Brad Bazuin a professor of electrical engineering at Western Michigan University.

"The Sangren Hall project was met with a 50 cent on the dollar match from the State [of Michigan] while at Miller Auditorium was funded by a $629,000 grant," said Chris Capara, a facility manager for Western Michigan University.

"The solar panels are called photovoltaic cells and are converted using something called an inverter, which converts energy in a similar process as a car alternator," Bazuin said. "They take the ultraviolet rays sent down from the sun and make them into usable energy."

"Once the energy is converted it is either used right away or sent to a lithium polymer battery," Bazuin said. "A battery is necessary because solar energy is an intermittent energy source as it isn't always producing energy."

As an intermittent energy source, the solar cells are only producing energy on sunny days, and that is a major drawback with solar energy.

"A solar farm is only producing during the day when it is sunny out, but we are always pulling energy off of the grid. We still need the backup source because storage isn't very far along as a viable option," Capara said.

Storage is a primary concern in the solar industry today, while it is possible, it isn't exactly efficient.

Solar energy is commonly used as a solar assist, Bazuin said. A solar assist is an energy grid added on to a conventional energy to work as a backup system.

"Solar assists are working. I look at Tesla, who build electric cars, and the solar panels are a charging system. If you look at how a battery operates that offers solar powered assist, that's probably more (effort and cost) than it would be for automotive. 1,400 Watts is what these cars can charge up to and that's about what a light bulb does," Bazuin said.

Despite the inefficiencies and drawbacks of solar energy, the gap between price and effectiveness keeps moving closer together. **The National Renewable Energy Laboratory's 2014 report on Photovoltaic System Pricing Trends** predicts a 75 percent drop in the price of cell system devices this decade.

Evaluating the cost has become increasingly important.

The cost of solar panels is measured in a dollars per watt ratio, or $/W. The NREL report noted that the cost of a commercial solar farm would average approximately $2.65:1 Watt. That number varies based on the time of the year and day, and five years ago that would have cost roughly $8 per Watt, according to the NREL's report.

Getting the price to go down is critical in the process of becoming consumer friendly.

"Once it [solar energy] gets to $2 per Watt I think it's [switching to solar] going to be an easy decision to make, but that would be counting the subsidies," Capara said.

Capara said that even without subsidies that we are only a few years away.

“From everything that I have seen, I think a dollar per Watt is the point where solar is going to truly become competitive with traditional energy sources,” Capara said.