Does Solar Power Have a Future?

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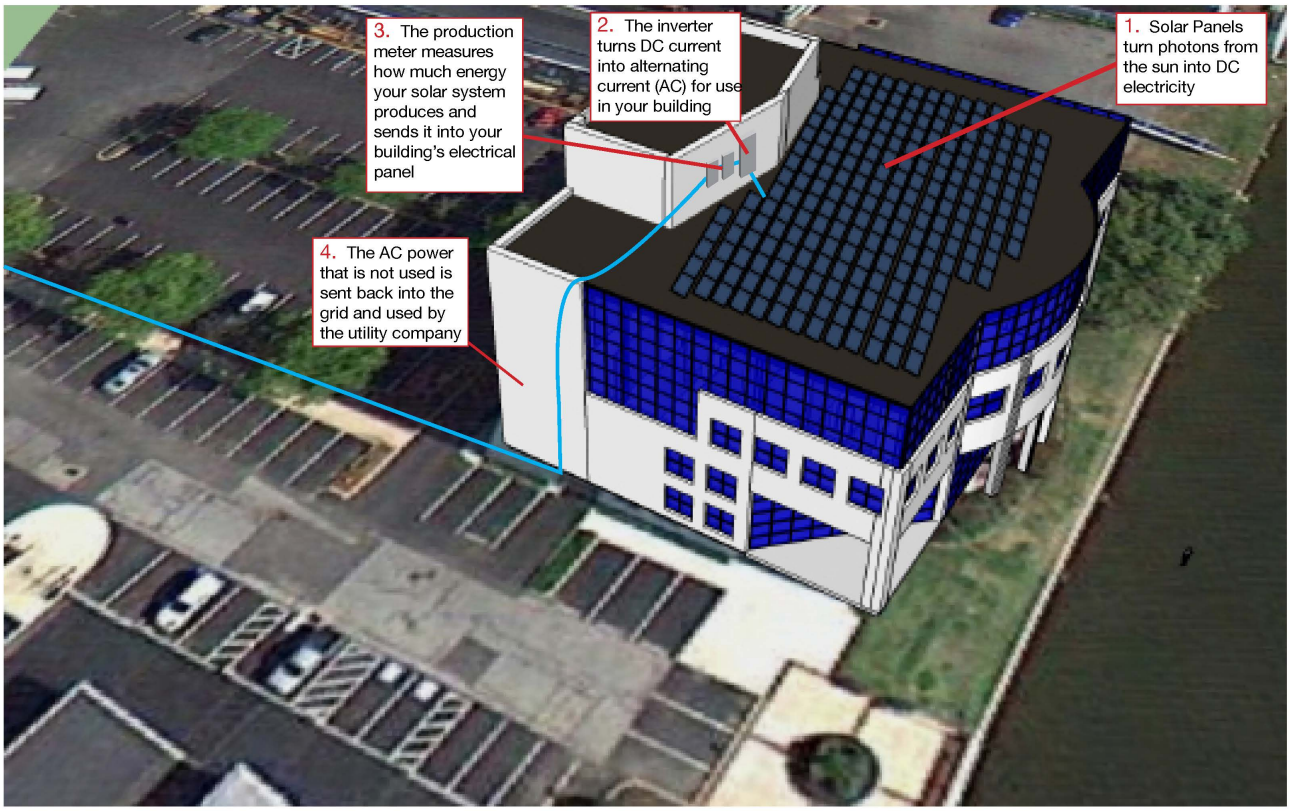
Can you imagine challenging MacGyver to build a contraption to run your electrical meter backwards? He certainly wouldn't select the **solar** option. Instead, he would gather 2 different size magnets, an old AC adaptor, distilled water, black tape, plastic wrap, a plastic cup and a knife. But this potpourri of MacGyver's hardware favorites will get you 5 to 10 in the big house!

At our corporate offices at 110 South Poplar Street in Wilmington, Delaware we have a 42.8kW **solar array** on the **roof** of our building. On August 9, 2014, I witnessed our utility meter spin backward as we were generating more power then our building was using. And yes, it was a Saturday and yes the **HVAC** is turned down a notch and yes there are no lights on but, the meter ran backwards for almost 5 hours. The result is less money paid to the utility company. But the concept of a meter running backwards involves complicated engineering, inverters, and maybe even a flux capacitor! I will simplify the process with not only words but with a picture as well.



Solar electric power begins with the **solar panel.** Each solar panel receives energy from the sun as photons. What is a photon?

"A quantum of electromagnetic radiation, regarded as a particle with zero rest mass and charge, unit spin, and energy equal to the product of the frequency of the radiation and the Planck constant."

So no more questions! The solar panels are able to harvest these photons and convert them into electricity. **Solar panels** can typically convert less then 20% of the energy they receive into actual electricity. Which means you need more **solar panels** to make up the inefficiency of the panels. The **solar panels** then convert the sun's energy into DC voltage.

The DC voltage output of the solar array needs to be converted into 60 Hz AC 120v power. This is what the inverter does. It takes the **solar array's** DC power and transforms it into your building and utility grid's 120V AC, 60 Hz electricity. The inverter is typically mounted close to your electric panel either on the inside or outside wall.

The 120V AC power leaving the inverter is then connected directly to a dedicated breaker in your building's main **electric panel.** This ties in the **solar electricity** to all of your building's electrical loads and to the entire utility grid. Essentially your system is always a part of the utility grid. The utility company is really like a big electrical savings bank from which you can deposit solar credits during the day and withdraw them at night. This works for the summer and winter months, because if you continually deposit excess solar kWh **(kilowatt-hours)** in the summer, they are available for your use in the winter when you can start withdrawing them. Or your utility bills in the longer day summer months will offer a savings in utility cost that you can then apply in the winter. And it is not only legal but in addition to utility savings you get to sell SRECS. According to Wikipedia,

"***Solar Renewable Energy Certificates (SRECs)*** *or* ***Solar Renewable Energy Credits*** *are a form of Renewable Energy Certificate or "Green tag". SRECs exist in states that have Renewable Portfolio Standard (RPS) legislation with specific requirements for solar energy, usually referred to as a "solar carve-out". The additional income received from selling SRECs increases the economic value of a solar investment and assists with the financing of solar technology. SRECs represent the environmental attributes from a solar facility, and are produced each time a solar system produces one thousand Kilowatt-hours (KWh) of production. For every 1000 kilowatt-hours of electricity produced by an eligible solar facility, one SREC is awarded. In order for a solar facility to be credited with that SREC, the system must be certified and registered."*

The EDiS **solar array** was put in service on December 4, 2009 and as of July 31, 2014 we have produced 255,862 kWh or 255.8 SRECs worth approximately $11,662. In addition, EDiS and the tenants of Riverwalk have saved $28,866 in **electricity costs** from the utility.

Does solar power have a future? As energy inefficient as they currently are, they still have many advantages. They are quiet, clean, and the major annual maintenance needed only requires a bucket of Windex and a squeegee! Utilities, State Governments, the ill-fated U.S. Energy Department loan guarantee program and other Federal Government subsidies continue to prop up this industry. Without these subsidies the **solar industry** is toast…no pun intended. But if an efficiency breakthrough is discovered that triples the efficiency with a lower cost panel the

industry could stand-alone. Today, the highest efficiency ever achieved on a **solar panel** was 43%. Don't even ask how much that panel cost to produce! EDiS, through our initiative of Plan, Build and Operate (PBO), analyzes the “all of the above” approach when it comes to energy. In addition to **solar arrays,** we have built **geothermal HVAC systems**, state of the art energy management systems, passive **solar options**, outdoor light harvesting and have Silver and Gold LEED project experience. More importantly, we challenge every project to exceed current codes on energy efficiency to boost the all-important operating savings of the building once completed.

I still wonder why two different size magnets are needed…

Contact us