



## **Solar Farm at Elon University Fact Sheet**

The solar farm at Elon University is a visible, functioning demonstration of the university's commitment to sustainability. It covers nearly 15 acres of campus property leased to Loy Farm Solar LLC, a private company that owns the solar facility. Operations started in the fall of 2015. Requiring minimal tree removal and land disturbance, the site was ideally suited for a large scale solar system. Loy Farm Solar LLC took advantage of the tax incentives available for the facility.

The solar farm consists of 9,900 solar panels that generate approximately 4,500 megawatt hours of electricity each year delivered directly into the power grid. Duke Energy purchases that energy from Loy Farm Solar LLC and then sells it to regional customers, including the university. As a recognized renewable energy, this solar power is part of Duke Energy's Renewable Energy Portfolio, reducing their dependence on fossil fuels for power generation. The university does not purchase or utilize electricity directly from the farm due to state laws in place when the farm was constructed. The solar farm models responsible global citizenship and benefits Elon students by providing an opportunity to study the equipment, operation and economics of the system.

The 4,500 MWH of electricity generated by the facility is enough to power 415 average U.S. homes for a year. This amount of electricity is equivalent to 10% of Elon University's annual electricity consumption. This much electricity produced with solar, rather than fossil fuels, prevents 2,100 metric tons of carbon emissions, the equivalent of removing the annual emissions of 450 cars. The real-time production of the solar farm can be viewed on Elon University's Building Dashboard system – <http://buildingdashboard.net/elon/#/elon/solarfarm>

There is a weather station at the site that records solar irradiance among other metrics. Solar irradiance at the earth and panel is also available on the Dashboard.

### **System Details**

- Commercial operation date: October 20, 2015
- System size: 3 Megawatt (MW) DC capacity (peak performance)
- AC power rating: 2 MW AC, (peak performance)
- System is owned by Loy Farm Solar , LLC
- Suntuity on behalf of Loy Farm Solar, LLC purchased, installed and operates the system
- Designed by: Black & Veatch, Cary, NC under contract with Suntuity

The system is comprised of non-directional panels oriented to maximize the solar incidence on the panels. The panels are fixed to a ground mounted support frame with 20 panels in one string. Multiple strings are wired in series to create an array. The farm has three arrays, each wired into a separate inverter.

#### Solar panel specifics

- Manufactured by CSUN (China Sunergy Co., Nasdaq: CSUN), has over 1GW of panels in operation
- Model # CSUN 300-72P (qty. 5300) & Model # CSUN 305-72P (qty 4600)
- Polycrystalline solar cells
- 15.49% module efficiency
- 300W and 305W max power output (DC)
- 25 years linear power output warranty
- Certified to withstand wind load of 50 lbs/sf, snow load of 112 lbs/sf, 1" hail diameter at 51.2 mph impact speed
- 39" w x 77" l x 2" deep, weighs 10.8 lbs.

### Inverter specifics

- (3) Schneider Electric XC680
- Maximum output : 680kW, 60 Hz
- Peak efficiency : 98.9%
- Maximum input : 1000 Vdc; 1280 amps
- Provides grid power delivery management
- RS485/Modbus data communication standard
- 82" w x 94.5" l x 26" deep, weighs 3505 lbs

Information from the system is collected to analyze its effectiveness by collecting data measured by the inverter and a weather station installed at the site. There are two systems that are collecting data simultaneously, one is by and for the owner, the other is by and for Elon University. The owner's data is used to monitor performance and to verify meter readings with Duke Energy. They also use it to provide a graphical dashboard via a website of the overall system performance.

The University's data collection is used for research and analysis in educational studies and by staff for performance and feasibility studies. The University also displays solar farm performance data on the Lucid Building Dashboard.

### Data displayed

- Solar irradiance of the panel (W/m<sup>2</sup>)
- Solar irradiance of the earth at the farm location, (W/m<sup>2</sup>)
- Power produced, kWh