

Malosky Solar Panel

Operating Report Summary

October 2015

Malosky Stadium Solar Panel was installed in late autumn, 2008. An internet-based data collection system was added during the winter and became operational in March 2009. The Malosky array consists of 28 solar panels, each with a rating of 208 watts, for a combined electric generation capacity of **5824 watts**. The output is connected to a 5000 watt, single-phase inverter and interfaced with the campus grid.

Summary Data:

The solar array has delivered **55.2 MWh** of energy to the campus system during its 77 months of operation. For perspective, according to the U.S. Energy Information Administration (EIA), the typical U.S. home consumes 900 kWh per month. Therefore, the solar array has created enough energy to power **0.8 U.S. homes** on an ongoing basis.

Calculation: $(55.2 \times 1000 \text{ kWh}) / ((900 \text{ kWh}) (77 \text{ months})) = 0.79 \text{ homes}$

In addition, the creation of 55.2 MWh of electricity has displaced the production of **30 U.S. tons of carbon dioxide (CO₂)**. According to EIA, in 2014 the U.S. created 2043 million metric tons (tonne) of CO₂ in the production of 4093 TWh of electricity, a rate of 0.5 milli-tonnes per kWh.

Calculation: $(55.2 \times 1000 \text{ kWh})(0.0005 \text{ tonne per kWh})(1.102 \text{ US ton/tonne})$
= 30.4 US ton

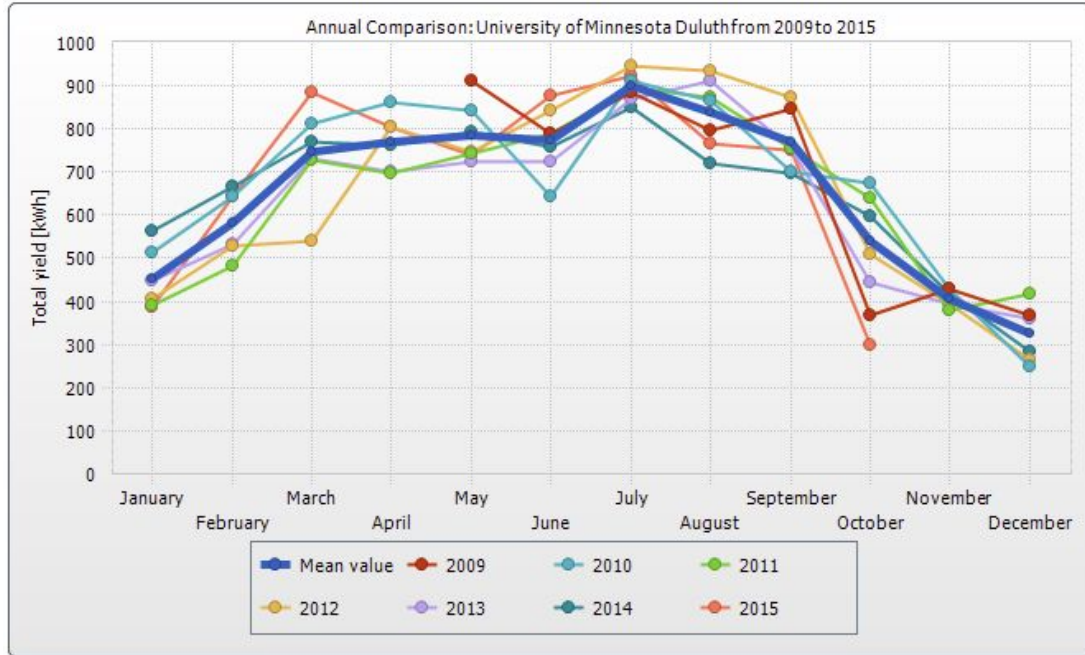
The avoided monetary cost of electric energy produced by the array, if calculated at a retail rate of \$0.08 per kWh is **\$4,417**.

The panel produces **7800 kWh per year** on average, saving **\$624 per year** in electricity expenses at the \$0.08 per kWh rate.

Graphical Data:

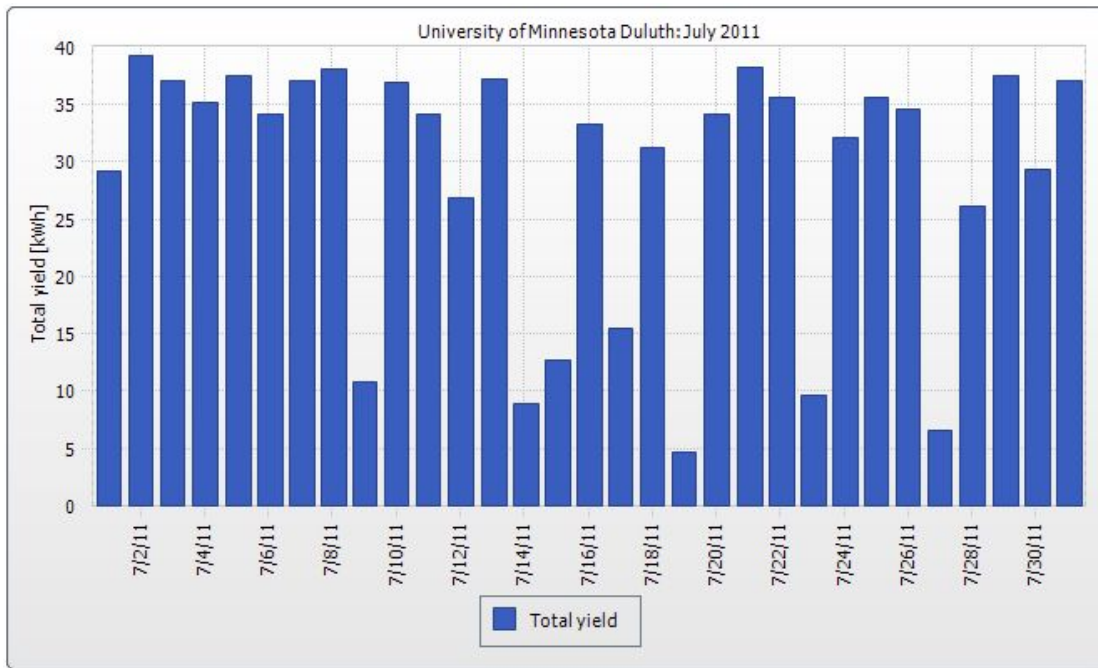
Shown below are some graphical summaries of data collected from the solar array.

Year Over Year Production of Energy, KWH:

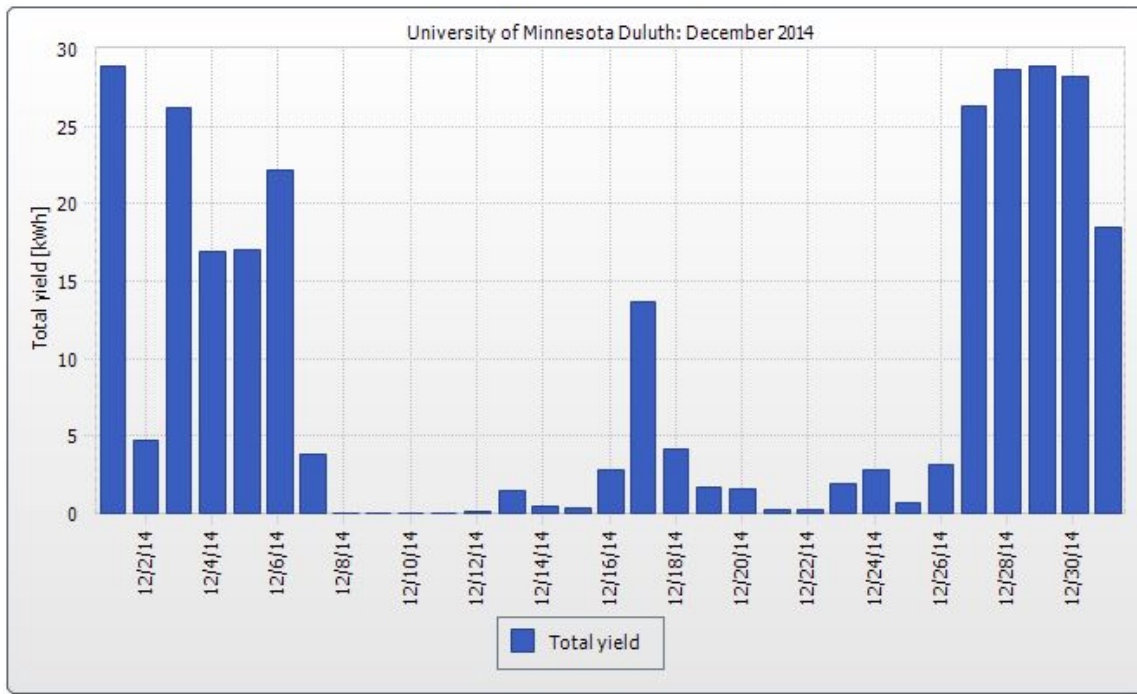


The month of July is the most productive month, while December is the least productive.

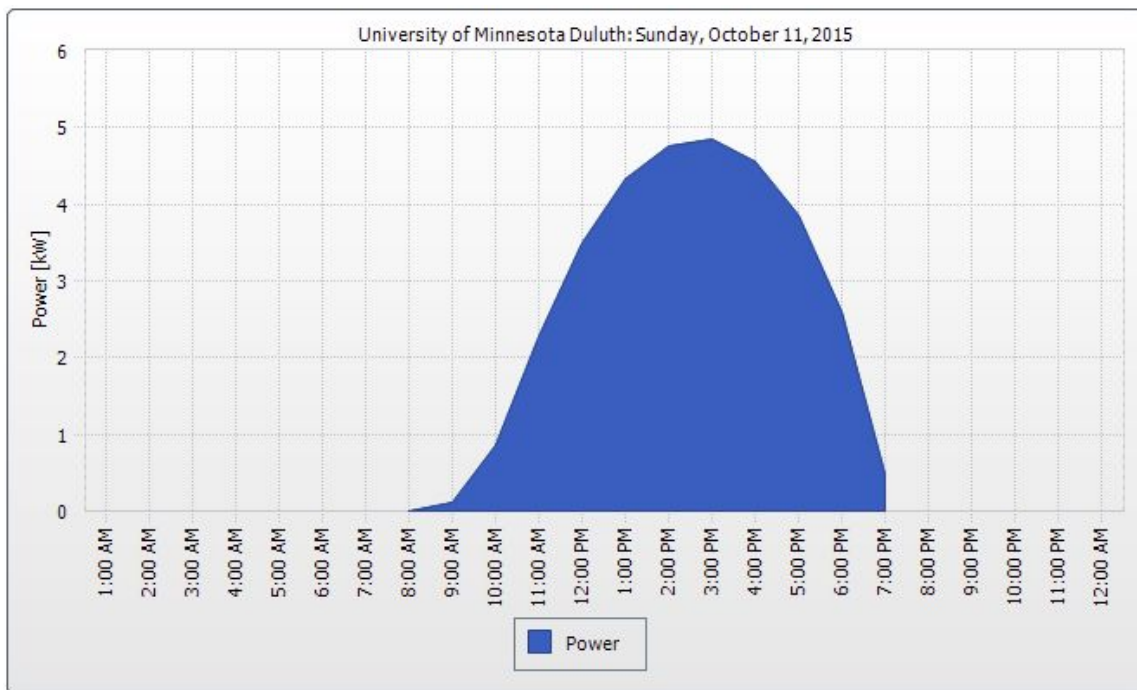
Typical Monthly Profile for July, July 2011:



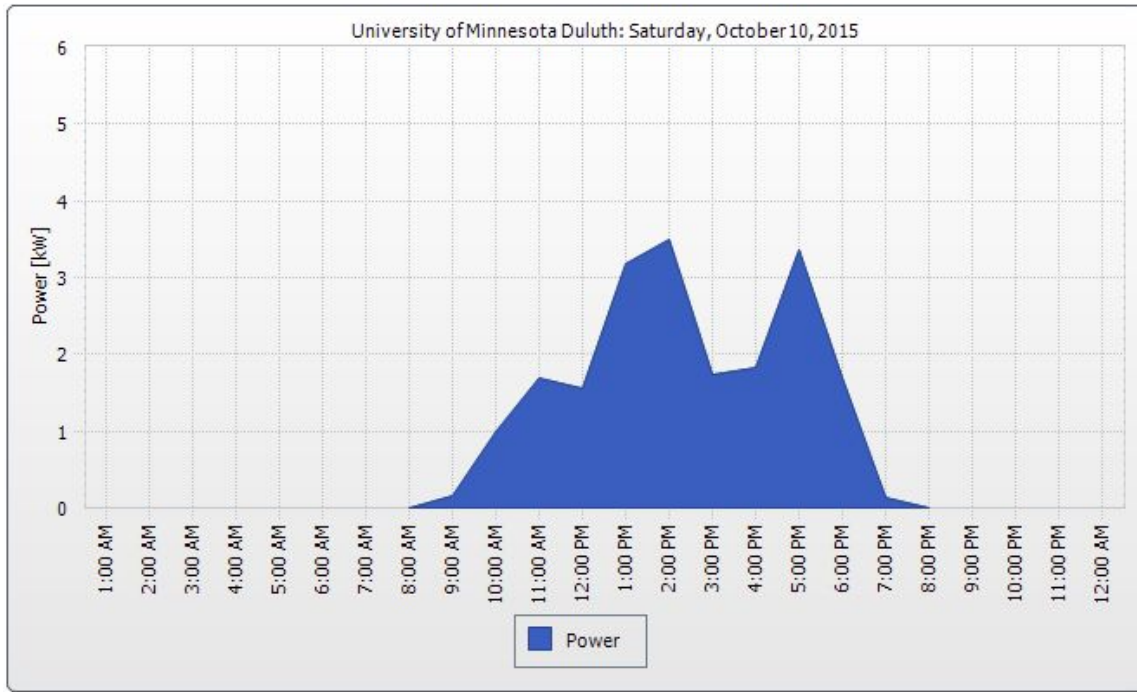
Typical Monthly Energy Profile for December, December 2014



Daily Power Profile on a sunny day, October 11, 2015:



Daily Power Profile on a sunny day with intermittent cloud cover, October 10, 2015:



Power Profile on a heavily overcast day, October 8, 2015:

