



## Co-op Solar Energy in Cloudy Bellingham

BY MELISSA ELKINS

### TECHNICAL SPECIFICATIONS:

#### Photovoltaic (PV) Array

126 Sharp ND-240QCJ modules  
240W each, 30,240W total  
6AC string

#### Inverters

Enphase M215-60-2LL-S22/S23  
Max output: 215W each, 27kW total  
Max output: 1A each, 72.8A total (208V 3-phase)  
Output voltage: 208V

#### Solar Subpanel

Solar array feeds six 3-pole 20A breakers  
No main breaker

**T**he Pacific Northwest: home to towering trees, majestic mountains, beautiful islands...and a lot of cloudy days. In 2013, city-data.com ranked Bellingham, Wash., as the city of over 50,000 people in the lower 48 states with the lowest number of sunny days. On average, it is sunny roughly 35 percent of the year—a good indication of why there are so many direct flights from Bellingham to various Hawaiian islands in the winter months.

You might think that would preclude us from utilizing solar energy, but think again! We may have dark and dreary stretches during nine months of the year, but that sunny 35 percent falls primarily during our long summer days—and that's when our “power” amps up.

In July 2012, the Bellingham Community Food Co-op installed a 126-panel solar array at its LEED-certified Cordata neighborhood location. At the time, it was the largest array in Whatcom County, which made it a great opportunity to be a showcase for sustainable energy. The Department of Revenue was offering helpful incentives for businesses installing solar arrays, and co-op management determined that it was a good fit, at the right time, for our organization.

The project was started due to the diligent work of one dedicated board director and co-op employee, Beau Hilty-Jones. In February 2011, Hilty-Jones began researching the benefits of installing a solar array at our Cordata location. He learned that when the store was built in 2008, the co-op thought forward and constructed the roof for a future solar installation, so no structural work was needed

to prepare for the added weight—almost 11 tons of equipment.

After Hilty-Jones brought an initial proposal to Jim Ashby, the co-op's general manager, Ashby gave the go-ahead to continue exploring our options. After consulting with several local contractors, Hilty-Jones and Ashby and Terry Parks (who was then the store manager) refined the co-op's requirements. In March 2012, Ecotech Solar was awarded the bid.

Ecotech Solar ([www.ecotechsolar.com](http://www.ecotechsolar.com)), founded in 2004, is a locally owned solar contractor. They developed a customized solar-array design to maximize our power generation, based on our building and location characteristics. Each of our panels has its own microinverter, which converts direct current (DC) generated by a single solar module to alternating current (AC) that runs most appliances. Microinverters are highly efficient and are better suited to our array than other types of inverters and optimizers because they allow energy to be shifted away from panels that are shaded to panels that are actively converting energy.

To monitor our solar power generation, we use Enlighten monitoring software, by Enphase ([enphase.com](http://enphase.com)). Unlike a lot of monitoring systems, Enlighten continuously monitors the health and performance of every solar module and microinverter in the array. Their web-based analytics can identify and alert us and Ecotech Solar if there is a deviation in performance, so we can get the problem fixed in a timely manner. In addition, we are able to display up-to-date solar generation data for our store customers on a display screen located

near our registers. (To check out what's currently being generated by our array, visit <https://enlighten.enphaseenergy.com/public/systems/KzYu97423>.)

Financial incentives played a large role in the viability of this project—the co-op was still recovering from the impact of opening a second location just as the recession hit and wanted to be cautious with its spending. At the time, the Department of Revenue was offering a 75 percent refund on sales tax paid by the solar project, and we qualified for annual incentives through the Washington Department of Revenue's Renewable Energy Advantage Program ([www.pse.com/REAP](http://www.pse.com/REAP)), which ends in 2021. We also received a federal tax credit of over \$48,000 due to the project.

All in all, with the incentives and the cost savings from internal solar generation, the system was expected to pay for itself within 10 years. Now that we have four years under our belt, we appear to be on track; as of the end of the second quarter of 2016, we were seeing a roughly 72 percent return on investment for the solar project.

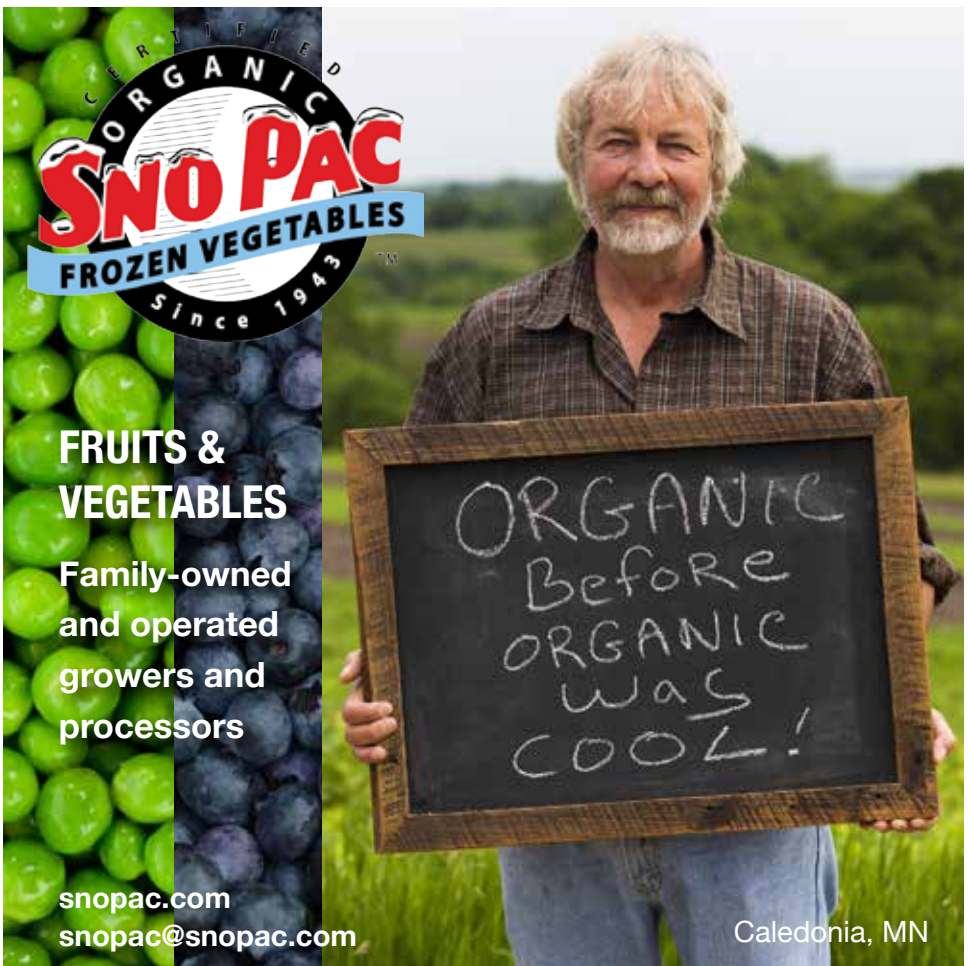
A happy side effect of the installation is the press we've received over the years. Most recently, a front-page story and photo of our array ran in *The Bellingham Herald* (Mar. 25, 2016), explaining how the solar array was a contributing factor in our co-op receiving recognition as a U.S. Green Power leader.

**What wats?**

But what about the all-important energy that it was installed to produce? In 2015, the array produced 33,900 kilowatt hours, which amounted to nearly 5 percent of our overall electricity use in the store and a savings of about \$3,500 with a carbon offset of 23.7 tons. Energy generation fluctuated over the four quarters of 2015: in the first and fourth quarters the array generated just under 5,000 kWh (2.6 percent of total electricity use) and 3,100 kWh (1.9 percent of total electricity), respectively. Spring and summer is when it really starts producing—generating nearly 14,000 kWh (8.4 percent of total electricity) in the second quarter and nearly 12,000 kWh (6.9 percent of total electricity) in the third quarter.

The solar project was a natural fit for our environmentally conscious community and for our co-op. Said Ashby, the general manager, "Thanks to the dedication and thorough research of one motivated employee—and the support of our board, management, and member-owners—our co-op was able to take a very reasonable risk that the investment in solar would pay off. And it has, in many ways—not only financially. It also has positioned us as a leader in sustainability, demonstrates that we live our values, and is enthusiastically supported by our member-owners."

Besides, it gives the residents of often-overcast Bellingham one more reason to celebrate the sunny days of summer! ☐



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