

Case Study: Micro-hydro Project

History repeats itself at Crown Hill Farm

In the 1920s and 30s, Damien and Zephirine Mochettaz sold wood from their Crown Hill Farm acreage to McMinnville Water & Light. At the time, the utility operated a wood-fired boiler to generate steam when there wasn't enough water in Baker Creek to turn the utility's turbine to generate electricity for the city.

Today, the Mochettaz's daughter and grandson are once again supplying McMinnville Water & Light. But this time, they are generating electricity on-site and putting it directly into the utility's power grid.



Crown Hill Farms, located six miles outside McMinnville, has been in the Mochettaz-Gunderman family since 1920. Today, Lucien Gunderman, left, and his mother, Juliette Gunderman, run the farm.

"It looks like history is repeating," said Juliette Gunderman, the Mochettaz's daughter.

On November 1, 2002, Juliette and her son, Lucien Gunderman, "flipped the switch" on their small-scale hydro project. It is the state's only licensed hydro plant in the past 20 years. The maximum output for the system is 25 kilowatts. The power produced flows directly into the McMinnville Water & Light grid.

Water sources for the hydro power plant come from several artesian springs that run year around and collected rain runoff from approximately 175 of the 720-acre farm.



One of the holding ponds at Crown Hill Farms.

The farm, located six miles west of McMinnville, gets an average of 46 to 50 inches of rain per year. The Gundermans dug several small collection ponds and installed 5,000 feet of cross slope ditching, and pipeline to divert water to two reservoir ponds that supply water to the project. The water then runs into Baker Creek that borders the Gunderman's property and eventually into the Yamhill River.



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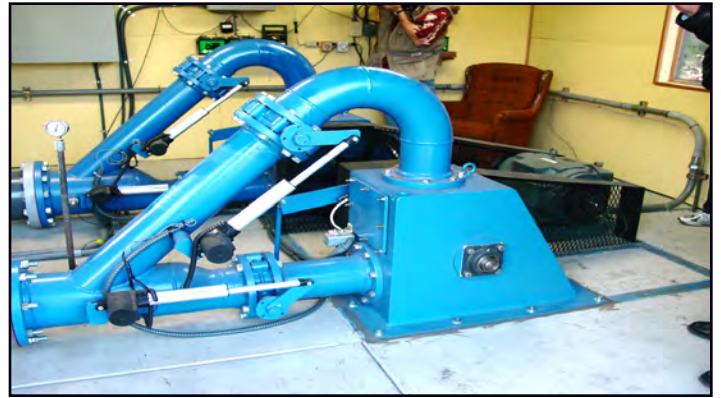
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Getting started

Lucien Gunderman, who has helped his mother run the farm since his father's death in a farm tractor accident in 1979, has wanted to install a hydro project for many years. Lucien first heard about another Yamhill County farm family in the Portland General Electric service area who had started to build a hydro project on Panther Creek 20 years ago, but had never seen the completed project. When he saw one of the sons, in early 2000, he asked him if they were still generating power with their hydro project. They were.



Rain runoff and water from artesian springs power the twin generators at Crown Hill Farm.

A visit to their hydro project at about the time of the 2000 energy crisis prompted the Gundermans to hire an engineer and pursue their dream of installing a micro hydro project at Crown Hill Farm in earnest. The engineer saw promise in the project.

The next step was to secure the blessing of McMinnville Water & Light. However, no one in the utility's service area had ever built a micro hydroelectric project in the utility's 113 years. The utility was reluctant for other reasons, too. When utility customers produce their own electricity from solar, wind or water, a "net metering" agreement is made. The customers use their own power and utility power. In the Gunderman's case, however, their turbines were located too far from the electric meter near their home and barn for them to net meter directly. McMinnville Water & Light was hesitant to apply net metering guidelines to a situation that didn't technically qualify.

After several meetings with the Gundermans, the McMinnville Water & Light Commissioners, and staff, the utility made the decision to let the project continue and even donated \$5,500 in meters, a new transformer and other supplies. Wes Thomas, Key Accounts Manager with McMinnville Water & Light, said that the utility's practice is to encourage distributed generation projects, those that generate power located close to where electricity is used (for example, a home or business). They also want to ensure the customer succeeds and has a reasonable payback period on their investment.

"Several people have told us that they would not have had the determination and/or patience to deal with all of the agencies and their rules, regulations, restrictions and timetables," said Lucien.



Water tumbles down into Baker Creek after it generates electricity. It is aerated before it enters the creek.

It took nearly 18 months and 12 public agencies to review and approve the project. The price was another hurdle — approximately \$100,000.

"We knew it would be a challenge," said Juliette. "But, Lucien was very determined."

Technology

The hydro project incorporates the latest technology and automated features. A small 14 by 16-foot powerhouse holds a

twin turbine, single generator system that has numerous customized features unique to the Crown Hill Farm application. The system also has a small four-foot water wheel incorporated into the design that actually generates power for on-site usage.

The system has six fail-safe controls that will automatically shut down the generation system when necessary. These controls protect the equipment and ensure that no power will flow into the local power lines when they are being repaired by utility workers.

The system monitors the levels of the reservoirs and the temperature of the water to protect the fish. If the water is too warm, it can't be run through the turbines and introduced into Baker Creek. The water that leaves the turbines is slowed to alleviate erosion and eliminate water turbulence when it merges with Baker Creek. The water is also aerated through a series of diversion bars to facilitate fish habitat in Baker Creek.

The generator is wired directly into the McMinnville Water & Light transmission lines. The utility and Gundermans signed an agreement a few months before the hydro project went on line. It seemed appropriate since Crown Hill Farm was the utility's first rural electric customer on Baker Creek Road.

"This project would not have been possible if not for the cooperation of the McMinnville Water & Light Commission and the staff of the utility," said Lucien.

Tax credit

The system is expected to pay for itself in 18.5 years. The Gundermans got some financial assistance from the state Business Energy Tax Credit Program managed by the Oregon Office of Energy. The Tax Credit Program is an incentive program for businesses that invest in renewable resource energy generation projects like Crown Hill Farms and energy conservation projects. More information on the Tax Credit Program is available at the Office of Energy Web site: www.energy.state.or.us/bus/tax/taxcdt.htm

Approximately \$65,000 of the \$100,000 project was eligible for the tax credit program. The Gundermans receive a tax credit for 35 percent of their eligible costs or \$22,750. The tax credit is taken over a five-year period: 10 percent the first two years and then 5 percent for the next three years.

"As you know, these types of projects are very costly and the return is taken over many years," said Lucien Gunderman. "The Oregon Energy Tax Credit was certainly a positive step towards the completion of our hydro project."

Gunderman sees some other factors that will help make the project more cost effective: depreciation and utility rate increases. "It is sad to say that we are looking forward to rate increases, but, every increase in electric rates gives our hydro project a shorter payback period," Lucien said.

In addition, the Gunderman's hydro project is exempt from property tax. Oregon's property tax exemption states that the added value to any property from the installation of a qualifying renewable energy system will not be included in the assessment of the property's value for property tax purposes. Qualifying renewables



The Gundermans installed and covered over 5,000 feet of pipelines on their property. After a year, the area is difficult to find.

include solar, geothermal, wind, water, fuel cell or methane gas systems for the purpose of heating, cooling or generating electricity.

Benefits

The Gundermans see many benefits of their hydro project. The major one is supplying electrical power. Another important benefit for the Gundermans is that their project is a renewable resource and does not deplete any natural resources. The two main lakes were already in existence, too, and needed no structural changes.

“Lucien and Juliette’s investment in local clean energy reflects both their patriotism and good stewardship,” said Christopher Dymond with the Oregon Office of Energy.

The diversion ponds supply additional wildlife habitat. The project adds cold, aerated water to Baker Creek that enhances fish habitat.

One of the main pipelines also incorporates irrigation risers that will add efficiency to summer irrigation because of the larger supply line with more pressure. The large lake has been used for irrigation purposes since 1954.

The project better controls runoff water into lakes and the new diversion ponds reduce erosion, sedimentation and water damage to drainage ditches and Baker Creek.

The equipment used for the project has a long life and is expected to perform for a century or more with little maintenance.

Hard working

The hydro project has kept both of the hard working Gundermans busy the past few years. They have continued their farm operations: A 250-head cow/calf operation, sheep, 400 tons of hay per year, a wood/pellet/gas stove business, a small u-cut wood cutting operation and egg delivery service. The family owns and manages several rental homes in addition. Juliette does the bookkeeping for the farm and rentals.

In 2000, the McMinnville Jaycees named Lucien “Outstanding Young Farmer of the Year.” The Yamhill County Commission selected Crown Hill Farm for the cover of their Economic Development Guide and the Yamhill County Livestock Association chose the Gundermans as Outstanding Livestockmen of 1999. The Oregon Farm Bureau wrote of the Gunderman’s conservation efforts in the spring of 2001 with pictures of the Gundermans and their farm in the Oregon Farm Bureau Magazine “Oregon Agriculture.”

Lucien and Juliette Gunderman have recently established a permanent conservation easement on their 720-acre Crown Hill Farm property. This easement protects the land from future subdivision, limits timber cutting, provides for continued agriculture use, and seeks to enhance and maintain water quality in the watershed.

“This project was not started, or completed, simply as a means of making money,” said Lucien Gunderman. “It was a dream, that has become reality, that we feel is good for ourselves and the general public, and is a completely environmentally friendly installation. There were many sleepless nights, many ideas, and a lot of just plain hard work to bring this hydro plant to fruition, but all in all, we are pleased with the final product, and proud of our accomplishment with it as a whole.”

Damien and Zephirine Mochettaz, as well as Lucien’s father and Juliette’s husband, Victor, would have been proud, too. The mother-son team has cared for Crown Hill Farm for today and for days to come by generating electricity with a renewable energy resource.