



Clarion-Goldfield School District Clarion, IA

Technical Specifications

50 kW Atlantic-Orient 15/50

100 ft. lattice tower

Project Cost: \$141,000

AERLP: \$55,000

Loan Term: 4.5 yrs.

Lender: Security Savings Bank,
Clarion, IA

Lender Share: \$55,000

Grant: US Dept. of Energy

Grant Amt: \$26,000

Est. Payback: 14 yrs.

Installation Date: June 2002

Project History

The Clarion-Goldfield School District began producing electricity from a 50 kW Atlantic-Orient wind turbine on June 17, 2002. They connected the turbine to their high school primarily as an educational resource, but also in hopes that it would pave the way to a larger turbine in the future.

The district originally wanted to install a 750 kW turbine capable of powering all district facilities. This desire arose when district superintendent Robert Olson learned about a successful wind energy project at the Spirit Lake School district, and the plan was supported by a year's worth of anemometer data collected at Clarion during 1996.

But Mid-American Energy would not allow the district to consolidate their utility meters, causing them to scale down to the smaller turbine. Even then, Mid-American refused to sign a net-metering agreement and fought the issue for four years before finally reaching a settlement.

Consultants estimated the Atlantic-Orient turbine would generate 150,000 kWh of electricity each year. With the district's electricity rate at about \$0.06 per kWh in 2002, they expected an annual energy savings of over \$9000.

System Performance

Olson says the turbine performed very well when operational, but adds that an electro-mechanical defect left it inactive about half the time, and he estimates it generated only about \$3500 per year. The problem began in June 2003 and resulted from a faulty contact in the turbine's tip-braking system that often prevented the turbine from starting up once stopped.

Atlantic-Orient filed for bankruptcy just three months after installing the turbine, and Olson says they reneged on their warranty coverage and provided little assistance after this point. Olson notes that the company provided excellent support during construction, but only after the district waited eighteen months for the turbine components to arrive.

The company also failed to establish a data link to the high school. This left the district without precise production data and without real-time data for classroom use. Olson says high school science classes still found a few creative ways to use the turbine, such as calculating the linear velocity of the blade tips.



Operation and Maintenance

The district spent more than \$5000 trying to fix the tip brakes, mainly with their own staff using money from their general fund. For a time they found maintenance support from a nearby company, but Olson says the growing wind industry in the area left them too busy to offer much assistance. Eventually a wind consultant simply bolted the tip brakes to the blades to allow the turbine to run.

Disabling the tip brakes may have contributed to the turbine's hub brakes becoming excessively worn. In early December 2006, the hub brakes failed in high winds and the turbine spun wildly for a week, according to Olson. Eventually the turbine became unstable, and on December 12 the entire tower sheared at the base and fell on nearby power lines.

Overall Satisfaction

Olson cites the net-metering conflict as the most frustrating part of their experience, but he also regrets accepting a grant from the U.S. Department of Energy. The grant, secured by the Iowa Department of Natural Resources, netted \$26,000 for installation costs but forced the district to use an American manufacturer. For turbines in the 50 kW range, Olson says Atlantic-Orient "was the only game in town" at the time.

The company has since reorganized as Entegri Wind, and in the summer of 2007 the district used their insurance settlement to install an updated version of their original turbine. Olson says he's been assured that the tip brakes have been redesigned and that the turbine will benefit from other advances in technology.

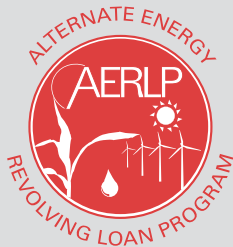
Furthermore, Entegri installed the new turbine at no cost and will provide maintenance support for \$1000 per year, including full warranty coverage for the first three years. They've also guaranteed the turbine will produce at least 105,000 kWh annually and will pay the difference in utility charges in any year it fails to do so.

The district upgraded to a tubular tower mounted on the existing concrete pad. Olson believes the new tower will not only be sturdier, but has helped public relations by giving the turbine a new look.

"The community was supportive about replacing the turbine," says Olson, "but they weren't necessarily supportive of the same exact turbine."

Olson says that low-interest financing has helped the district weather its ups and downs.

"The Iowa Energy Center's Alternate Energy zero-percent interest loan, together with the Iowa Energy Bank's help securing a loan through a local bank at less than six percent interest, provided total funding with less than three percent interest," he says.



The Iowa Energy Center's Alternate Energy Revolving Loan Program (AERLP) plays a supporting role in stimulating renewable energy development within the state. Since its inception in 1996, the AERLP has supported numerous wind, biomass, solar, hydro, and hybrid projects.

Successful applicants receive a low-interest loan from a combination of Energy Center and lender funds. The Energy Center provides loan funds equal to 50% of the projects financed cost (up to \$250,000) at 0% interest. Matching financing must be obtained from a lender of the applicant's

choice. The maximum loan term for the Energy Center's funds is 20 years.

The lending institutions are responsible for financially qualifying the borrower, while the energy center assists in technically qualifying the borrower. By partnering with expertise from lending institutions the Energy Center is able to cost-effectively process the loans in a timely manner and maximize the impact of the loan program.

Eligibility

The AERLP is open to all individuals and groups who want to build renewable energy production facilities in Iowa. Utilities that are not required to be rate-regulated are not eligible. AERLP loan funds may not be used to refinance an existing loan or be applied to existing alternate energy facilities.

Application Deadlines

January 31
April 30
July 31
October 31

For more information

Contact the Iowa Energy Center,
(515) 294-8819
www.energy.iastate.edu

The Iowa Energy Center is dedicated to improving Iowa's energy efficiency and use of renewable energy through research, demonstration, and education.

