



## Neppel Energy, LLC Armstrong, IA

In June 2004, Paul Neppel installed a 1.5 MW NEG Micon wind turbine just west of Armstrong on a section of the 2800-acre farm he operates with his son. Neppel sells his power directly to Alliant Energy, and the \$1.6 million project was one of the first utility-scale turbines in Iowa to be brought online by a private landowner.



### Technical Specifications

1.5-MW NEG Micon  
NM72C wind turbine  
70-meter tubular tower

**Project Cost:** \$1,626,810

**AERLP:** \$250,000

**Loan Term:** 15 yrs.

**Lender:** Bank Midwest,  
Armstrong, IA

**Lender Share:** \$974,310

**USDA Grant:** \$402,500

**Annual Ave. O & M Cost:** \$3,300

**Installation Date:** September 2004

### Project History

Neppel says he first became inspired by the success of two wind turbines installed by the nearby Spirit Lake School District in 1993 and 2001, respectively. He became more serious about investing in his own turbine

when the electricity bills on his farm began to approach \$200,000 per year. Neppel says that about two-thirds of the nearly 2,000,000 kWh of electricity his farm consumes each year stems from the cooperatively-owned confinement hog operation on his land that houses around 12,000 sows and feeder pigs. Additional energy use arises from a variety of sources, including three households, 1500 head of cattle, grain driers and outbuildings.

Based on a professional wind assessment and a desire to offset his own electricity use for which he paid \$.12 per kWh, Neppel initially planned for a 750 kW turbine. When he discovered that Alliant would not net-meter on a turbine that big, he decided to aim for a turbine twice as large to make the most of the avoided-cost rate of \$.0315 per kWh that Alliant offered to pay.

Neppel hired a private contractor to install the turbine. He says the process went very smoothly, but when they tried to bring the turbine online they discovered that the manufacturer had sent the wrong generator hub. NEG replaced the part two months later and compensated Neppel for the lost production.

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### Project Performance

Date	Actual Production (kWh)	Production Value (\$)	Production Tax Credit (\$)	Total Value (\$)
08/1/04 - 07/31/05	4,831,763	150,710	89,388	240,098
08/1/05 - 07/31/06	5,227,971	163,017	99,331	262,348
08/1/06 - 07/31/07	5,309,491	167,727	103,535	271,262
08/1/07 - 07/31/08	4,739,000	149,278	97,150	246,428
<b>totals</b>	<b>20,108,225</b>	<b>630,732</b>	<b>389,404</b>	<b>1,020,136</b>
<b>avg.</b>	<b>5,027,056</b>	<b>157,683</b>	<b>97,351</b>	<b>255,034</b>

## System Performance

In its first four years, the turbine generated an average of 5,027,056 kWh annually, earning Neppel an average of \$157,000 in sales each year. A federal production tax credit of \$0.019 to \$0.021 per kWh gave him an additional estimated \$97,000 annually and will continue to generate credits for the first ten years of operation. All told, Neppel recouped well over half of the initial cost of the turbine in just four years.

Neppel also benefited from a \$402,500 USDA Rural Development Renewable Energy grant, as well as from a 15-year, no-interest loan of \$250,000 through the Iowa Energy Center's Alternate Energy Revolving Loan Program. Neppel says the combination of all these financial incentives made his project feasible.

"By fitting these [funding] pieces together, I figured out that I could make this thing fly," Neppel says. He adds that owning the turbine himself allows him to capture the production tax credit "without which the whole project would flunk and be costly to me," and that hiring a professional grant writer to land the USDA grant was money well spent.

## Operation and Maintenance

Neppel's purchase price included a five-year contract with NEG (now Vestas Wind Systems) for regular maintenance and a full replacement-cost warranty. He has been pleased with the service support, much of which can be done remotely via a computer link to the company in Minnesota.

The turbine was struck by lightning shortly after installation, and improper wiring caused blade heaters

to fail in its first winter, resulting in ice buildup and downtime that Neppel estimates cost 250,000 kWh of production. In 2008 the turbine was down 25 days due to mechanical failure of the hydraulic system. The repair was covered under warranty and insurance covered part of the loss in production. That same year, the turbine was again struck by lightning, damaging one of the blades which has since been repaired.

Of larger concern to Neppel have been insurance and property tax costs. He says he's worked hard with three different insurance companies to reduce his insurance fees from \$16,700 to \$5,000, a rate he is now satisfied with. He also spent considerable time rectifying a mistaken property tax assessment for which he was overcharged more than \$16,000 in the first two years.

## Overall Satisfaction

Neppel says the turbine which has generated "a nice, positive cash flow," and he's excited by its strong performance. He's now considering additional turbines, but not just because of the financial prospects. He also feels good that his turbine produces enough energy for about 450 typical Iowa homes, and he'd like to make the most of the wind resources he has available.

"I've very pleased with the turbine, and I think I'm doing the right thing for the people who come after me," Neppel says. "We who own land have a natural resource that we should take advantage of. If there was oil down there you'd pump it and sell it – to me wind energy just makes sense."

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 \$1 million) at zero percent 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](http://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.

