Making the most of Wind

A new Bergey 10 kilowatt wind turbine is viewed through a window in Dan Southwell's shop on Highway 51. Southwell recently started powering his machine shop and home with wind power because he wanted to lower his utility bills and do his part to "go green." The turbine cost him $61,000 for a complete installation, but he also received a 30 percent tax credit on his investment because he is using it to power his business. - News-Record photo by Nathan Payne

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A 10-year-old Tommie Butler listened intently to the voice as it cut in and out on his aunt and uncle's radio.

It was Thursday. The one day of the week that he and his brother would catch the train from Clearmont and ride it to the ranch near Buffalo.

Once they were there, they would take their seats around the radio with their four cousins and someone would switch on the power.

He'll always remember the name of that program: "I Love a Mystery."

But the real mystery for a 10-year-old was how the wind played a part in bringing a simple wooden box to life.

Now, Butler is 74 and his life is much more complicated, thanks to advancements that began in rural areas around Gillette in the 1940s and 1950s with the connection of rural homes to the power grid. Those changes turned everything that was electrical from a luxury to a necessity.

"We didn't need the radio, but it was nice," Butler said.

It started with a little six-volt wind generator that would only power the radio or a dozen lights for about a day. Personal wind power technology now has the capability to power an entire home and business.

As electrical rates continue to go up and environmental awareness kicks in, another change is occurring. In this cultural switch, wind power is becoming less a luxury and more of a necessity.

Modern wind generators

Three people in the county recently have supplemented their home energy consumption with modern personal wind generators.

Dan Southwell, 70, owns a metal fabrication business east of Gillette on Highway 51. He recently erected a new wind generator to power his shop and his home.

His turbine sticks up from the hillside west of T&T Guns and Ammo east of town near Wyodak.

Southwell, who worked for PacifiCorp for 11 years prior to opening his machine shop in 2001, thought it was time to do his part to conserve natural resources.

Now he considers himself kind of like a competitor of the power company. Realistically, it's more like a supplier for the energy giant. His wind generator feeds power back into the power company's electrical grid while he draws power from the grid at the same time.

He uses a "net meter" that measures how much power he generates versus how much he uses and the meter displays the balance. He's paid a rate similar to the power company's rate for any power he produces for the company over what he uses.

In June 2008, his bill ran at about $130. After three weeks of operating his wind generator this June, his bill came in at $24 — $16 of which was the basic fee from the power company.

In July, he expects a bill of only $16.

For four years, he researched ways that he could cut down his power bill. He looked at solar panels and other wind generators before finally selecting the Bergey WindPower turbine, which cost him about $61,000 for the complete installation.

He had some setbacks in the permitting process through the county, but he attributed that to being one of the first people to install a turbine.

Most of the issues stemmed from building regulations for the towers, said Phillip Giffen, county engineering and services manager. The regulations require an engineered design to certain specifications.

Tall towers also need Federal Aviation Administration approval, which can take time.

Southwell's turbine is capable of delivering about 10 kilowatts an hour at peak efficiency, but he's seen it reach up to 11 kilowatts during one of the windiest days. On average, his shop uses about 100 to 125 kilowatt-hours a day.

Because Southwell is using wind power for a commercial purpose, he was able to get a tax credit equal to 30 percent of his investment — reducing the cost of installation to about $42,700.

The turbine itself came with a five-year warranty and is supposed to be maintenance free. It uses mechanical systems that keep it safe from high winds and is made with weather resistant materials, Southwell said.

"They've come a long way," he said.

Power supplement

But Southwell wasn't the first to install a modern wind generator in Campbell County.

Paul Anderson has had his for more than a year on his property east of Gillette on Echeta Road.

Anderson originally had a 1.8 kilowatt charger, but he has since upgraded to 2.4 kilowatts, which provides 100 to 550 kilowatt hours a month.

He had originally heard about the wind generator from his brother who is a vendor of renewable energy products.

"I've always liked trying new stuff," Anderson said. "When it comes to clean power, you don't hear about it around

here."

His charger sits atop a 30-foot tower between his home and Interstate 90. He could have gone with a higher tower in order to get more wind efficiency, but the cost goes up exponentially.

The smaller charger cost him about $15,000, but it has saved him money on his electric bill. He also qualified for a tax credit, which translated to about $1 for every kilowatt he produces.

But the amount of power he produces isn't enough to fully power his home, which uses much more energy for electric heat in the winter.

He's often questioned about the basics: How much does it cost? How much does it produce?

He answers, but explains that the value of the machine is more than just monetary.

"It's something that's basically renewable, and it's going to last forever," Anderson said.

Utility perspectives

While three people have installed wind generators in the county, eight others use wind chargers in the region administered by Powder River Energy Corp. None of those homes are "off the grid," said Doreen Shaar, PRECorp spokeswoman.

Most homes use about 1,200 kilowatt-hours a month, but most residential wind chargers have only 40 percent generating capacity during optimal wind conditions. They usually only deliver about 1,040 kilowatt-hours a month — which means they are still paying for 160 kilowatt-hours each month from the power company.

At the rates now, the average bill for 1,200 kilowatt-hours equates to about $58.80 plus a $16 base charge.

The power company has policies that allow them to incorporate the individual suppliers into the system.

The savings that is made from contributing to the grid works on a monthly basis. The company balances the amount of energy put into the grid with how much is used. Any overage is credited onto the next month's bill.

"The people we have seen have been realistic about their expectations. They know it will have a six- to 10-year payback," Schaar said.

With the wind power supplement, the savings are about $60 a month. In terms of the savings, it can take between six and 20 years to pay back the initial investment in the wind charger depending on the amount of power produced.

People who have gotten the most out of their wind chargers have been those who also have made improvements to make their homes more energy efficient, she said.

"We don't discourage people from doing it," Schaar said. "If they have questions, we prefer them to come to us."

None of the new wind generators are located within the Gillette city limits, although others could be in the future. The city has received several requests from residents for information regarding wind chargers.

Zoning regulations prohibit any significant structure that is not specifically mentioned in the regulations from being allowed within city limits. But an overhaul of the zoning regulations is in progress. They could include specific regulations regarding wind turbines, said Community Development Director Katie Allen.

Smaller wind generators that do not need a separate tower from the house possibly could be allowed now, but the city has not seen any of them, Allen said.

City workers need to get a better understanding of the technology before they can make a recommendation to the Gillette City Council regarding larger wind turbines and whether to allow them within the city.

"We just don't have enough knowledge ourselves," Allen said.

Not-so-new technology

Like Butler, Bernice Hoffman was a 10-year-old girl when her brother, Cecle Cook, first installed a wind charger on their old family ranch on Collins Road north of Gillette.

The small turbine charged a little six-volt battery, which ran the lights in the house. It was too small to have run other amenities such as an electric iron or a refrigerator.

It was a luxury, plain and simple.

But both her brother and her father, John Cook, were proud of the little bit of energy it would produce.

“Dad always thought there were better ways than he was used to doing, so he was always looking for something better,” the 83-year-old said. “It was more of an experimental project than anything useful.”

Later, her sister, Donna Jean Phoenix, would have a 32-volt wind charger on their ranch. But as soon as the rural electrical lines came in, the usefulness of the old chargers came to an end.

Still, the old wind chargers have a mystique that has lived on.

Byron Oedekoven, who now lives just up the road from the Cook Ranch, has an old 32-volt Winco brand generator that lays on a pallet outside his garage.

While he was growing up, Oedekoven’s family used a similar wind generator, but it was 110 volts and it was a different brand.

He bought the 32-volt at an auction in Montana after he recognized it amid other pieces of machinery.

“I got it with the idea to rewire the motor,” Oedekoven said. “It’s practical and cost efficient.”

Oedekoven has experimented with other clean technology such as solar panels to power water pumps for his cattle, but the cost and size of those aren’t where they need to be yet, he said.

Perhaps taking a lesson from history will be more advantageous rather than waiting for the latest innovation, he thought.

While the 32-volt charger wouldn’t compare to Southwell’s new one, the goal is still the same. To use the Wyoming’s greatest natural resource.

The wind.

Ways to use the wind

While the first wind chargers first came to rural areas around Gillette sometime in the 1930s, windmills have deeper roots. Here’s a breakdown of some common misconceptions:

Windmill

Use: A windmill in Wyoming is traditionally a wind-powered water pump used in the modern day to water livestock.

Description: Typically, no larger than 30 feet tall. Have multiple blades of varying sizes. Usually last from 45 to 50 years.

Counterparts: Electric water pumps, solar powered pumps

Cost: $1,700 (modern)

Wyoming history: Windmills go as far back as the first homesteaders who had to build windmills to pump their only source of water for their livestock and their homes, said Robert Henning, registrar at the Rockpile Museum.

Modern value: “It’s still the primary water source for cattle ranching,” said Ken Mitts, owner of Mitts Waterwell service. Mitts services 250 windmills in the area, and has done so since 1979. “Economically, it’s still the cheapest way to pump water.”

Wind generator/charger

Use: To generate electricity for home use on an individual basis

Description: Tower height can range from 30 feet to 140 feet. Usually, has three blades, but some only require two blades and are reminiscent of an airplane prop. The blades are usually longer and more slender than a windmill's blades.

Counterparts: Fossil fuel power plants, solar panels

Cost: From $10,000 to $70,000 (Source www.awea.org)

Wyoming history: First wind generators were brought to the area in the 1930s and were used into the 1950s when rural electrical association lines came into being. The first generators did not provide much power, and could only charge six-volt and 32-volt batteries.

Modern value: Wind generators are starting to make a comeback amid government incentives to switch to wind power and to help cut electrical consumption on the electrical grid.

Commercial Wind Turbine

Use: To generate electricity for use commercially by power companies.

Description: Tower height can range from 170 to 300 feet with turbines that are 100 to 130 feet long.

Counterparts: Coal and nuclear power.

Cost: About $2 million per megawatt of generating capacity

History: In Wyoming, the first government project regarding commercial wind power started in the 1978 in Medicine Bow with the construction of a 198-foot tower, said David Roberts, former editor of the Medicine Bow Post. From there it led to the first commercial windmills installed in Wyoming.

Modern value: The first commercial wind facilities are starting to reach a point where they could become a reality in southern Campbell County. The federal government and other states are pushing for wind-powered facilities to help reduce carbon in the environment.

MARKET ANALYSIS

The American Wind Energy Association recently produced a market analysis on "small wind" energy. Here are some of its findings: - Market growth — The market grew 78 percent in 2008 for wind turbines with capacities under 100 kW.

- Growth factors — Increased investment, manufacturing volume increases, electricity rate increases, public awareness.

- Projected growth — 30 percent in the next five years attributed to the 30 percent federal tax credit.

- Number of manufacturers worldwide: 219

- Number of manufacturers in U.S.: 66

Net FYI: www.awea.org

Wind facts

World's largest wind generator

Location: British Crown Estate, Britain

Produces: 7.5 megawatts

Diameter: 492 feet

Second largest: Enercon E-126, Emden, Germany, diameter: 413 feet

Tallest in U.S.

Where: Texas

Name: Snyder Wind Project

Height: 345 feet

Number of turbines: 421

Produces: 3 megawatts each

Largest Wind Farm in the world

Where: Texas

Name: Horse Hollow Wind Energy Center

Capacity: 735 megawatts

Number of turbines: 421

Acres: 47,000

SOURCE: www.metaefficient.com