

Powerful Idaho

The Gem State is rich in renewable-energy potential | By Ken Dey

JOHAN STEINER and Seth Myer trace their interest in renewable energy to their uncles.

Steiner, a Southwestern Idaho rancher and a co-owner of Idaho Windfarms LLC, says his introduction to renewable energy took place as a teenager when he helped his great-uncle repair a windmill used for irrigation on the uncle's Midwest farm.

"It always fascinated me how a windmill could move all that water," Steiner says.

Myer, co-founder and chief technical officer of Boise-based Inovus Solar, spent the summer of his 16th year helping his uncle, an engineer, build a 13-foot-tall solar collector in his uncle's backyard, as a prototype for a family friend who wanted to start a solar-panel business.

According to the National Renewable Energy Laboratory, more solar energy falls on the earth in one hour than is used worldwide in a year, Myer says. "If we can harness that, it's an obvious solution."

Steiner and Myer are part of a new generation of Idaho entrepreneurs who are tapping the power of Mother Nature for alternative sources of electricity. These Idahoans see the potential for a 21st century economic boom driven by wind, solar, geothermal and biomass energy (energy derived from organic sources such as crops and cow manure), coupled with good old-fashioned Idaho ingenuity—the same kind of ingenuity that led to the founding of Micron Technology Inc. and Albertsons in the Gem State, and also led Idaho-based Simplot Company to invent the world's first commercially viable frozen french fries.

Like the new energy entrepreneurs, state officials recognize the ecological and economic benefits of developing renewable sources of power. "We need to get past talking about energy independence and take meaningful steps to achieve it," says Idaho Governor C.L. "Butch" Otter. "These renewable-energy opportunities will play a significant role in reaching that goal and in building a more diverse 21st century economy."

Idaho is using more than \$38 million in federal stimulus money to research and support renewable-



KEN DEY

energy projects and energy conservation, says Idaho Department of Commerce Director Don Dietrich. The money is going to endeavors ranging from placing solar collectors at Idaho schools to providing financial assistance to companies developing wind, solar, geothermal and biomass projects in designated renewable-energy economic zones.

"Forward-thinking companies and state leaders are aware of the projected worldwide demand for renewable-energy products," notes Dietrich. "It's clearly an industry that is going to enjoy a prominent place in the future economy."

Below are just a few examples of the many renewable-energy efforts taking place in the Gem State.

Wind's Picking Up

Idaho has the 13th best wind-power potential in the United States, according to the Idaho Office of Energy Resources—which Governor Otter established in 2007—with experts putting Idaho's wind potential at 10,000 to 15,000 megawatts. Yet five years ago there wasn't a single major wind farm

Left: Idaho's State Capitol is the only state capitol in the country heated by geothermal water.

Above: The Bennett Creek Windfarm began operating at the end of last year near Mountain Home.

operating in the state. Today, there are more than a dozen projects finished or planned in Idaho, with current wind-power generation at about 150 megawatts.

Exergy Development Group, which is based in Helena, Montana, and has a development office in Boise, built Idaho's first utility-grade wind farm, 10.5-megawatt Fossil Gulch, near Hagerman, in 2004. The 15-employee company, founded in 2001, has already developed one Idaho wind farm and hopes to have 14 new wind farms completed in Southern Idaho by early next year. When all of the wind farms are up and running, they should produce nearly 228 megawatts, boosting the installed wind-energy capacity of all wind farms in Idaho to a total of nearly 400 megawatts.

In addition to the Exergy projects, there are another approximately 1,547 megawatts of new wind power in advanced stages of development statewide, says Rich Rayhill, vice president of 20-employee Ridgeline Energy, which was founded in 2001 and is based in Seattle, with offices in Washington, Idaho and Oregon. Rayhill works out of the Idaho office in Boise.

He helped lead the charge to get the state Legislature to pass legislation in 2005 and 2007 to stimulate renewable-energy development.

In 2005, Idaho passed a sales-tax refund on equipment used to generate at least 25 kilowatts of electricity from renewable-energy projects. In 2007, wind-energy companies were exempted from property taxes in exchange for paying a 3 percent tax on gross annual energy earnings. This means the companies are taxed on revenue versus on property, which is less of a financial burden for a start-up company. In 2008, the exemption was extended to geothermal-electric companies.

In 2005, Rayhill says, Ridgeline Energy developed the 65-megawatt Wolverine Creek wind farm (called Goshen Phase I while it was in development) near Idaho Falls, the first of many Ridgeline projects completed, in process or planned in the state. Ridgeline's Goshen North Phase II, the company's second Idaho project, is a 90- to 130-megawatt project also near Idaho Falls that's scheduled to begin energy generation the end of next year, Rayhill says.

Idaho Windfarms, which John Steiner owns with three other partners, began operating its first two wind projects—the Bennett Creek and Hot Springs wind farms, both southeast of Boise near Mountain

Home—in December 2008. The projects share about 16 acres in a field of wheat on a 2,800-acre farm, and provide 42 megawatts, enough power for 8,800 homes. The company has six additional wind farms planned over the next two years, to bring Idaho Windfarms' total megawatt production to 162.

Steiner, who raises cattle on a 6,000-acre ranch in the shadows of the rugged Owyhee Mountains, might seem like an unlikely wind-power developer. But he says farmers and ranchers can benefit from having wind farms on their land because they receive a percentage—typically in the 2.5 to 3 percent range—of the gross revenue from electricity sales related to wind farms on their property. Confidentiality agreements preclude disclosing specific dollar amounts, he says.

"We don't change the farmers' operations," Steiner says, "but we do provide the farmer with a new source of income."

To help provide the equipment that Idaho wind-farm developers need, wind-turbine manufacturer Nordic Windpower, based in Berkeley, California, is leasing space for a turbine-assembly plant in the Southeastern Idaho town of Pocatello.

"There are currently many wind projects in Southeastern Idaho that are going to get developed, and we're in the perfect location to service those projects," says Jeff Brown, Nordic's chief operating officer.

Brown says the plant began assembling turbines in January, with the first five coming off the production line this year. Nordic hopes to be producing 100 turbines a year by 2011.

The company currently employs about 25 people and expects to provide up to 100 jobs when the facility is operating at full-production capacity late next year.

Looking to the Sun

At Inovus Solar, Myer looks to solar energy as a way to provide a renewable and reliable outdoor-lighting source. "About 4.5 percent—more than 187,000 megawatt-hours—of all electricity consumed in the U.S. is from outdoor lighting," he says.

Inovus Solar brought its SmartPole to the market last fall and has already landed major contracts from cities and companies across the United States and from as far away as Vietnam. The SmartPole uses solar film wrapped around the pole—not a bulky collector unit—to capture and store the energy. This allows the poles to maintain

Left: The SmartPole, which captures solar energy for outdoor lighting, is being purchased by cities and companies throughout the world.



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The poles also have a small onboard computer in the base that regulates usage of the self-charging batteries. On nights that follow cloudy days during which not as much sunlight can be collected, the computer dims the pole's energy-efficient LED lights to save battery power but uses a motion-control sensor to bring the lights back to full power when someone approaches on foot. The lights provide enough illumination for drivers even when dimmed, the company says.

Founded in 2007, Inovus has already grown from two to more than 20 employees. All of its manufacturing is contracted to Idaho businesses.

"We would love to see the company be a very, very large employer in Idaho and throughout the world," says Inovus Solar co-founder and CEO Clay Young. "We represent an opportunity for businesses, cities, countries and the world to save significant electricity."

Hot Stuff

Idaho's State Capitol is the only state capitol in the country heated by geothermal water—an energy option that's environmentally attractive because it involves virtually no emissions.

Geothermal power has been the building's sole heating source since 1982. Surrounding homes and businesses also benefit from Southern Idaho's substantial underground reservoir of magma-heated water, and Boise State University, several blocks south of the Capitol building, is now exploring the possibility of using geothermal energy to heat its campus.

State energy experts estimate that even with total current production in Idaho of 13 megawatts, less than 2 percent of the state's geothermal-energy potential—which comes from a broad swath of underground water ranging from Yellowstone National Park to much of Central and Southwestern Idaho—is being used.

In 2008, Boise-based U.S. Geothermal Inc. began operating a 13-megawatt geothermal-power plant in Raft River, at the site of a former U.S. Department of Energy geothermal-demonstration project, about 200 miles southeast of Boise. The company has a 25-year contract to supply Idaho Power with 13 megawatts of electricity from the Raft River plant, and it began fulfilling that contract in January 2008. The site may have the potential to produce up to 100 megawatts of power or more, says U.S. Geothermal President and CEO Daniel Kunz.

In July, the company—which received initial start-up funding in late 2003 of (CDN)\$3 million after listing on the TSX Venture Exchange (a Calgary, Alberta-based stock exchange created to provide access to growth capital for early stage companies)—announced that it had received (CDN)\$10.9 million in financing from private Canadian investors.

In addition to the Raft River plant, the company operates a 3.6-megawatt plant in northwestern Nevada's San Emidio Desert and is under a due-diligence review by the U.S. Department of Energy for a possible \$85 million loan to help fund the company's Neal Hot Springs project in Eastern Oregon. The \$106 million Neal Hot Springs project is scheduled to start producing 22 megawatts of power in late 2011.

Geothermal energy is viable as long as the rate of heat extraction doesn't exceed the rate at which the reservoir of water is heated, says Kunz, adding that water can be reinjected into the earth to be heated, as occurs with water used to heat the State Capitol. Kunz adds that the world's first geothermal-power plant, in Italy, was commissioned in the early 1900s and is still operating.

Power Engineers Inc., based in Hailey, Idaho, near Sun Valley, did the initial feasibility studies for the Raft River project, and has provided consultation and project management for geothermal, wind and solar projects around the world. Founded in 1976, it is Idaho's largest engineering company, with 22 offices nationwide that together employ 1,200 people.

"There are many projects ready to go, which makes us extraordinarily busy right now," says Kevin Wallace, the company's director of renewable-generation projects. He says that Idaho is just beginning to tap its renewable-energy capacity and that building transmission lines to get the power to market is a priority. The proposed Gateway West transmission line will be critical to the development of Idaho's renewable-energy industry, he says. The line, which would be on federal, state and private lands, is now undergoing environmental review.

Expected to be completed in 2014, the 1,150-mile line is a joint project of Idaho Power and Rocky Mountain Power. It will stretch from a substation near Glenrock, Wyoming, to a substation near Melba, Idaho, and will open up new connection opportunities for renewable-energy projects.

While underground water needs to be at least 230 to 250 degrees Fahrenheit to be

suitable for commercial electricity generation, water in the 120- to 130-degree range can be used to heat greenhouses, and water ranging from about 55 to 95 degrees can be used for aquaculture businesses. As a result, dozens of Idaho companies are using geothermal energy to grow flowers or to raise fish for consumption or aquariums.

"I've said many times that geothermal is the most underutilized resource in Idaho," says Leo Ray, owner of Fish Breeders of Idaho in Hagerman. For more than 30 years, Ray has raised warm-water fish such as catfish and tilapia, and even alligators, by placing them in tanks he fills with geothermal water, adding cold water as needed to regulate the temperature. He's now exploring the use of geothermal water to raise tropical fish such as African cichlids for pet shop, home and office aquariums, with the goal of capturing part of a lucrative U.S. market that currently relies mainly on imported fish.

Biomass Energy

Since 1979, faculty members and graduate students at the University of Idaho in Moscow have been pioneering biofuel and fuel-conservation research, including developing biodiesel blends made from vegetable oils such as canola oil and mustard-seed oil.

The college already has an international reputation for its emphasis on energy-conservation projects. It has won several first-place trophies in the Clean Snowmobile Challenge—an annual SAE (formerly known as the Society of Automotive Engineers)—sponsored event open to colleges around the world—including a win this year for best fuel economy.

Renewable-energy experts have looked to schools such as the University of Idaho, and to entrepreneurs in the state's vast agriculture industry, for research on new sources of energy such as biofuels and massive anaerobic digesters that use cow manure from Idaho's dairy industry to turn methane gas into electricity.

Paul Kjellander, administrator of the Idaho Office of Energy Resources, says the state will consider directing some of the \$38 million in stimulus money to the dairy industry for renewable-energy efforts. The Office of Energy Resources already administers a loan program to help companies in the agricultural industry and other fields develop renewable energy.

In Idaho Falls, the Center for Advanced Energy Studies—an educational and research partnership between the University of Idaho, Boise State University and Idaho State University in Pocatello and the U.S. Department of Energy's Idaho National Laboratory, located west of Idaho Falls—is exploring cost-effective production of methane gas, ethanol and other biofuels, and possibilities for the next generation of nuclear power.

"Since establishing the center four years ago, we've grown tremendously from just 12 participat-

ing students to hundreds of participating students," says Harold Blackman, the center's director. He says that traditional fuel feedstocks such as corn are too expensive to make biofuel competitive, so researchers are looking at new sources such as byproducts of wheat—the chaff and the straw—and tapping into regional wastes such as potato peels, paper pulp and woody biomass.

In addition, the center is researching organisms found in the hot springs at Yellowstone National Park that may improve the process of generating energy from biomass sources. In the biomass source of cellulose, enzymes break the cellulose down into starches and sugars, which are then used to create ethanol. The more cellulose a process can utilize,

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the more fuel it can generate from the biomass. Research is showing that the park organisms create enzymes that do an excellent job of breaking down the cellulose, allowing more of it to be used.

ON A SUNNY SUMMER EVENING, as John Steiner wraps up a tour of the Bennett Creek Windfarm, he points to two low ridgelines. Where others see nothing but sagebrush, he sees opportunity.

"That's our next project," he says. "We expect it to be completed by 2010 and to generate 60 megawatts."

The cattle rancher marvels at Idaho's potential. He admits he was cautious about getting into the wind-power industry—he wasn't sure it would pay off—but no longer.

"I think my timing was right," he says.

Dietrich, the state's Department of Commerce director, agrees that the time is right for Idaho to capitalize on its energy potential.

"We have the available land, water, clean air and plenty of smart people to develop our renewable-energy opportunities," he says. "You just can't find many other states that can match Idaho's remarkably low operating costs, highly educated workforce, unparalleled fiscal stability and reputation for ease of doing business. We expect to be a leader in renewable energy for the 21st century." ■

Writer Ken Dey lives in the Boise area.

Horizon Air (800-547-9308, www.horizonair.com) flies daily to cities throughout Idaho. For more information on renewable energy in Idaho and on doing business in Idaho in general, call 208-334-2470, or visit www.commerce.idaho.gov.