

Growing Demand

“By working together, electric cooperatives continue to forge a power supply network second to none.”

by Brenda Kleinjan

ELECTRIC COOPERATIVES IN SOUTH DAKOTA AND western Minnesota, through their power suppliers, are gearing up to add hundreds of megawatts of electric generation capacity in the coming years.

Every two years, cooperatives, through their power suppliers, conduct surveys to analyze the future electricity needs of the cooperative. As the information is gathered and reviewed, it is used to make long-range decisions about building generation resources and other infrastructure to deliver energy back to the individual co-op member.

As the electric cooperatives expand their power base, they have also committed to having a diverse mix of generation sources. Basin Electric's members, at the 2005 annual meeting, passed a resolution requiring that 10 percent of the capacity required to meet members' needs must be from renewable resources by 2010. Currently, Basin Electric has 8 percent of that capacity coming from renewable resources.

In future years, Basin Electric Power Cooperative plans to meet an anticipated 1,300 megawatts of growth within its nine-state territory. In 2006 alone, Basin Electric brought 167-megawatts of new generating capacity on line and construction plans are progressing for the Wyoming-based Dry Fork Station, a 422-MW power plant near Gillette. The plant's proposed capacity was initially planned to be at 250 MW when it was announced in December 2004. By summer of 2005 increasing member load forecasts had justified a capacity increase to 422-MW.

“These new generators are helping cooperatives meet the increasing demand for reliable, cost-competitive electricity by our member-consumers,” said Jeff Nelson, general manager of East River Electric Power Cooperative in Madison, S.D. East River Electric delivers power through its 2,600-mile transmission system to 21 electric distribution systems in eastern South Dakota and western Minnesota.

Basin Electric plans additional growth by expanding some of its current resources, while other generation growth may take place close to home. Basin Electric's next big power plant, NextGen, may possibly grace the South Dakota landscape, though

an exact location has yet to be determined. One sites also being looked at is in North Dakota.

One possibility considered for the NextGen plant would be for it to utilize new Integrated Gasification Combined Cycle technology being developed by GE Energy. The IGCC converts coal to natural gas and burns the gas to make steam to turn the turbines. The result is a highly efficient plant with extremely low emissions of sulfur, mercury, particulates and nitrogen oxide. The generator would also be designed to allow for the future capture of carbon dioxide. Basin Electric is currently evaluating technology options and should be making a decision in early 2007.

New winter peak set

Wherever the new power plant is built, it is clear cooperatives will need the extra “juice” as below zero temperatures across Basin Electric's nine-state service territory in late November resulted in a new winter peak.

A cooperative's peak – or peak demand – is when the greatest demand is placed on an electric system.

According to Dave Raatz, Basin Electric's manager of marketing and power supply planning, the new peak surpasses last winter's peak.

“We expect that as the cold weather settles in, load levels will increase even more,” Raatz said. “This is another indication of the load growth happening in Basin's territory.”

The winter peak comes on the heels of an all-time high peak set during the extreme heat in July. In July, the more than 1.8-million people who receive power from electric cooperatives in Basin Electric's service territory used more than 1,944 megawatts. Additional electricity used by local cooperatives came from federal hydroelectric dams.

Demand Continues to Grow

At Christmas, many families un-wrap new power tools, perhaps a Nintendo Wii or a Sony PlayStation3 or perhaps it was a new dishwasher or a whirlpool bathtub – all of which raise the

electricity needs of the household. Forty years ago, it would have been hard to imagine these types of power needs and the demand these devices would put on the then-fledgling electric cooperatives.

Consider this: in 1965, the typical residential electric usage of a member of Codington-Clark Electric Cooperative member was 665-kilowatt hours a month. By 2005, the typical member at the eastern South Dakota cooperative was using nearly triple that amount of electricity: 1,809 kwh.

Similar transitions have taken place with farm operations.

“Think about it,” said Gene Ward, Codington-Clark’s general manager, “once upon a time, the farmer milked his cows by hand and used one of the kids to turn the crank on the cream separator. Today’s modern dairy farmer uses electricity to power the milkers, cool the bulk tanks, ventilate the parlor, clean the barn, aerate the grain bins and a whole lot more.”

“By working together, electric cooperatives continue to forge a power supply network second to none that’s capable of not only meeting members’ current needs, but their projected power needs far into the future.”

Collectively, South Dakota’s electric cooperatives saw an average annual 2.77 percent increase in their electric load needs from Basin Electric’s resources from 1971 to 1975. From 2000-2005, that annual load demand rose to 3.44 percent.

The energy needs of the eight distribution cooperatives served by Rushmore Electric Power Cooperative in western South Dakota continue to grow.

“When I started out here in 1985, when you put a service into a home, a 60-100 amp service was normal. Now houses typically going with 200 amp services and the bigger ones are going in at 600 amps. You see a lot more stuff going into a home than you used to,” said Vic Simmons, general manager of Rushmore Electric. Simmons noted that in the Rapid City area individual homes’ electricity needs have grown.

Simmons noted that while cooperatives are working together to build new generation resources, the cooperatives are also building new distribution and power lines and substations to meet that growth.

“I came here in 1985. I can think of one new substation we built in the first 15 years. We’ve built five in the last five years,” Simmons said.

And, all that growth is just part of the electric load served by Basin Electric, which was created in the 1960s to provide that power. The consumer-owned, regional cooperative headquartered in Bismarck generates and transmits electricity to 120 member rural electric systems in nine states: Colorado, Iowa, Minnesota, Montana, Nebraska, New Mexico, North Dakota, South Dakota and Wyoming. These member systems distribute electricity to about 1.8 million consumers.

“All these things take money. It’s going to affect rates. We hope to minimize it, but it is going to affect rates,” Simmons said, noting that each cooperative’s board works diligently to balance those needs.

Opposite: This artist’s rendition shows what the Dry Fork Station should look like upon completion. The 422-megawatt plant will be located near Gillette, Wyo. **Cover:** Electric cooperatives are reaching to the future to meet our energy needs. *Photo courtesy Basin Today.*

Renewable Energy In 2006

THIRD WIND FARM SERVES CO-OPS

The newest and largest wind farm in the Dakotas, with 33 wind turbines, began generating renewable energy for cooperative members in early 2006. The 49.5-megawatt Wilton Wind Energy Center in North Dakota is the third facility constructed by FPL Energy for Basin Electric Power Cooperative and its members in the northern plains. Basin Electric also purchases the output from two wind farms in North Dakota and one near Highmore, S.D. Basin Electric resources now include more than 135 megawatts of wind energy.

CAPTURING WASTE HEAT

A new environmentally friendly technology – generators that produce electricity without burning any fuel – was unveiled this fall in the Dakotas. Four heat recovery generators were installed in 2006 at pumping stations along the Northern Border Pipeline. Each unit captures pipeline compressor exhaust heat and generates approximately 5.5-MW of continuous electricity, enough to serve 4,000 average homes. The units are located near Wetonka, Clark and Estelline in South Dakota and St. Anthony, N.D.

MANURE INTO POWER

Cooperatives also helped a Milbank dairy connect its anaerobic-digester-fueled generator to the grid in late August. The Midwest Dairy Institute installed an anaerobic digester at its 1,400-head facility – the first animal waste-fueled generator at an animal confinement operation in South Dakota. Biogas fuels the dairy’s 375-kilowatt generator, capable of supplying enough electricity for more than 250 average homes.

SMALL WIND PROJECTS

Cooperatives are also supporting the development of small wind projects. Central Electric Cooperative in Mitchell, S.D., connected the Oak Lane Hutterite Colony’s two small wind turbines – with a rated output of 160 kilowatts – to its power lines near Alexandria early this year. Basin Electric is now purchasing the output from 19 small consumer-owned generators in the region, which produce renewable energy for cooperative members.

GROTON PEAKING PLANT

Basin Electric also completed this summer a new \$69 million peaking plant five miles south of Groton to serve load growth and enhance electric grid reliability in the region. The new 95-MW natural gas-fired Groton Generation Station is able to serve more than 70,000 average homes, and a second unit is planned for the site.

OTHER PROJECTS IN THE WORKS

Cooperative staff are also working with developers of several other proposed renewable projects involving biogases from dairies, landfills and other waste materials.

In addition, Basin Electric is conducting a feasibility study toward developing a high-efficiency and low-emissions coal plant, possibly in South Dakota.

RENEWABLE ENERGY GOAL

Basin Electric cooperatives agreed to set a renewable energy goal of meeting 10 percent of the members’ demand for electricity from renewable resources by 2010. Basin Electric’s power supply currently boasts approximately 8 percent of its generation resources provided by renewable projects.

When electric cooperatives in South Dakota and western Minnesota add the renewable resources from Basin Electric with the power supply coming from long-standing contract for federal hydropower, more than a third of the power supply comes from naturally renewing resources.

Compiled by T.W. Schoening, East River Electric Power Cooperative