Load Management: Balancing supply and demand

New strategies benefit the cooperative membership

As you likely know, Dairyland Power Cooperative is Jump River Electric Cooperative's wholesale power supplier, providing our cooperative with the energy required to meet the needs of your homes and businesses. Dairyland and Jump River Electric Cooperative also collaborate on strategies to best increase efficiencies and decrease costs for the benefit of our members and the environment.

Traditionally, Dairyland's Load Management Program functioned primarily to reduce energy consumption during periods of peak demand, mainly as a way to reliably meet member energy needs while curbing costs. In essence, that original goal still stands: Load Management remains a tool used to balance the demand for electricity with the ability to generate or economically purchase electricity. Dairyland and its member cooperatives save money by deferring the need to construct additional power plants or purchase expensive power during periods of high demand.

Controlling for capacity and energy/economics

The difference today is that Dairyland relies on load management resources for more than peak load reduction since joining the Midcontinent Independent System Operator (MISO) as a transmission-owning member in June 2010. Load Management is now also used as an economic tool to reduce wholesale energy costs, to the benefit of cooperative members.

Prior to joining MISO, Dairyland produced power from its own generating facilities or purchased energy directly from a neighboring utility to provide the needed electricity for its member cooperative, such as JREC. By joining MISO, Dairyland's generation resources are now offered into the wholesale energy market and are therefore affected by the energy used and produced across the region. All generation is dispatched into the MISO market for regional requirements, and sold to MISO based on market prices. Similarly, all of Dairyland's load requirements are purchased from MISO at market prices.

Dairyland now needs to plan differently and make changes in both operating its power plants and marketing the energy. Simply put, Dairyland cannot just dispatch power from, for example, its facility in Genoa, Wis., anymore to fulfill direct needs.

Therefore, if the current or projected day-ahead market price to purchase energy is too high, Dairyland may now implement load control as a way to mitigate the need to buy high-priced power. A price threshold, on which to base the decision to implement load management or buy power in an inhospitable market, is set to ensure a reasonable number of control events each season.

***What* is "economic control" and *why* do we do it when we do?**

As we mentioned earlier, load management based on economics is another tool used to reduce overall energy costs for Dairyland, and therefore for the member-consumer. It utilizes the control of certain appliances (residential water heaters, air conditioners, interruptible heating systems, dairy water heaters) during one time of day, usually to be restored at a later time of day when energy prices are more favorable.

Because economic-based load control typically involves that shifting of energy use from one time frame to another, the value of that control event depends on hourly energy prices. System Operations staff take into consideration both the "avoided cost" of removing certain loads during the control period and the "incurred cost" of bringing the controlled appliances back on during the restoral period.

To ensure the Load Management program is doing its job most effectively, results of various control techniques are continually analyzed. Analysis of historical energy prices consistently indicates that control

periods with the greatest opportunity for energy cost savings occur during the evening when hourly energy prices decline quickly. This period of economic control may include a few hours that are generally considered "off peak." Not unlike diversifying or spreading one's financial risk in the stock market, economic control is simply about shifting load from a less advantageous pricing period to one with an increased chance for gains.

How does the Load Management Program work?
Through Jump River Electric Cooperative's wholesale power supplier, Dairyland Power Cooperative, we have long participated in an energy—and money—saving program called load management. The program traditionally offers benefits to cooperative members who agree to electric use control during times of peak demand or high energy prices, or during system problems such as a generator outage.

Dairyland estimates the load management program reduces its system peak by approximately 70 megawatts (MW) in the summer and 140 MW in the winter...the equivalent size of a small power plant. It has done so by reducing total demand during peak use hours—generally between 3 and 9 p.m.—when people are commonly at home running washers, dryers, dishwashers, air conditioners, heaters and so on.

For example, your air conditioning unit might be cycled on and off at 15 minute intervals for a few hours on a day load management was utilized, if you are a program participant. Home comfort is not diminished, but the energy and financial savings aggregated through participation across the Dairyland membership is significant.

Did you know? The item most often controlled for economic purposes is water heaters.

Watt's that?
Load is the measure of demand placed by consumers on an electric system at any given time. Load varies due to the time of day and year.
Peak load: The greatest amount of electricity used during a time period by energy consumers in a utility's system.
Peak demand: The maximum amounts of electricity used by utility customers at any given time during the year. The peak is used to measure the amount of electric transmission, distribution and generating capacity required to meet that maximum demand.

About MISO
MISO ensures reliable operation of and equal access to high-voltage power lines in 15 U.S. states and the Canadian province of Manitoba. MISO manages one of the world's largest energy markets. As a Regional Transmission Organization, MISO assures consumers of unbiased regional grid management. The non-profit organization is governed by an independent Board of Directors, and is headquartered in Carmel, Ind., with operations centers in Carmel and St. Paul, Minn. For more information, go to www.misoenergy.org.