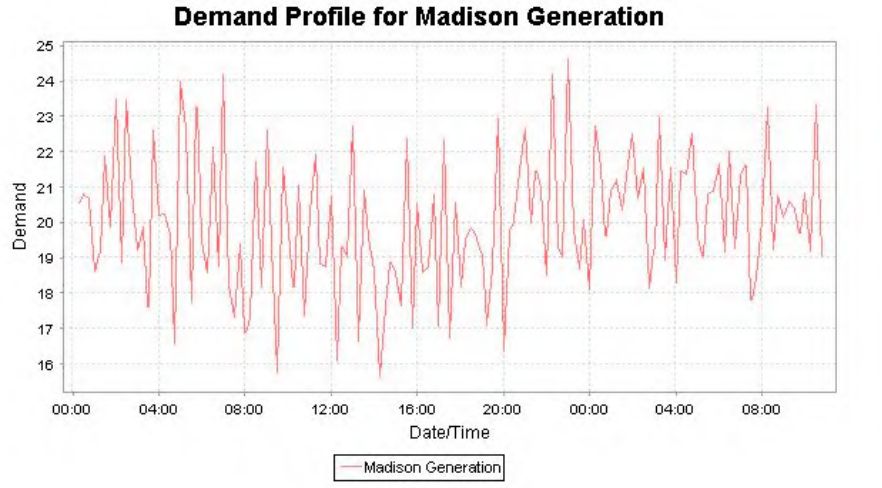
Demand Response Case Study

developed and implemented by

City of Madison with

Internet Energy Systems and Comverge, Inc.



presented at Introduction to Demand Response webinar hosted by Western Area Power Administration on May 1, 2007

Program Description

To reduce wholesale power costs and maintain current electric rates, the City of Madison offers an electric load management program. The City of Madison purchases wholesale power from two sources: Western Area Power Administration (Western) and Heartland Consumers Power District (HCPD). As the size of Madison's peak demand increases, the City is required to purchase more of the higher cost supplemental coal-generated electricity from HCPD rather than the less expensive hydro (dam) generated electricity from Western.

The City of Madison offers incentives to customers who allow the utility to load-control their water heater, central and room air conditioners, and electric furnaces. A special "dual fuel" incentive is offered to customers with an auxiliary heat source other than electric. Almost half of the utility's 3,800 electric customers participate in the program..

Design Strategy

MADISON

Dual Fuel Heating Agreement

THIS AGREEMENT, which pertains to the Consumer's facility located at

_____

(Address)

made and executed in duplicate this _____ day of _____, 20_____, by and between the City of Madison, State of South Dakota, party of the first part, hereinafter designated as "City", and _____, party of the second part, hereinafter designated as "Consumer".

Demand Management objective

Peak load shaving to reduce whole power costs.

Customer Segment Targeted: Residential

End Use Targeted:

Water heating, air conditioning, baseboard electric heat and electric "dual fuel" heating systems with automatic switchover to auxiliary sources.

Decision-making Drivers:

Madison experiences significant power cost increase from Western Area Power Administration to next wholesale power supplier alternative. When Western changed its pricing from six month averages to monthly peak demand that was even more of a price incentive for our utility to utilize load control. Its seasonal peaks are mornings in the winter and afternoons in the summer.

Implementation Tactics

Customer incentive strategy/levels

Incentives are set to attempt to achieve a 50%-50% split of system benefits between the participating customer and the utility based on the customer's actual use. Most customers "max out" on the eligible credits. Load Management Incentives are as follows and based on kilowatt hour (kWh) usage:

- Water Heater Credit - $0.00500/kWh on monthly usage between 50 kWhand 800 kWh with a maximum of $3.75 per customer.
- Air Conditioner Credit - $0.0125/kWh on monthly usage for months of July, August, September between 300 kWh and 1,200 kWh with a maximum of $11.25 per dwelling unit on 220 volt air conditioner.
- Electric Heat Credit - $0.02813/kWh on monthly usage for months of December, January, February between 1,000 kWh and 1,400 kWh with a maximum of $11.25 per dwelling unit (4 KW electric heating system required).
- Off Peak Usage Rates - $0.0287/kWh for usage that can be interrupted at the convenience of the city without advance notice to the customer.

are distributed at the utility office but no other mass marketing activities are being done. However, when load control customers move within the service territory, they receive a flyer by mailing inviting them to sign up for load control at their new location.

The flyer is available online at http://www.cityofmadisonsd.com/vertical/Sites/%7B9C1D8490-A618-44AD-9306-F4F21A6F5FC6%7D/uploads/%7B2CDC1E4A-E266-47B9-8537-DE2B4917B4F5%7D.PDF

Madison also generates public service announcements to area radio stations during peak load conditions, but it has no way to measure the effectiveness of this.

Customer enrollment/fulfilment process

Customers enroll by calling the utility and a utility staff person goes to the site to install the equipment.

Roles

Load control operation is automated based on a programmed monthly set-point projected from historical averages and weather projections. Dual Fuel accounts are the first thing turned off and the last thing restored with an average duration of 4 hours. Water heaters, heaters and air conditioners are cycled to achieve load reductions.

Since 2001, Internet Energy Systems has handled the utility's system/software/antenna design with the utility installing the load control devices at the end use. The VHF/RF pager technology allows coverage of entire service territory with two antennas.

The load control equipment installed is manufactured by Comverge, Inc.
receivers. Other low frequency plc receivers are manufactured by Brown Brevari and Zelweger and Enermet.

Results

How Measure Success

IIn 2006, Madison estimates it achieved $211,000 in power cost savings. Of this amount, $124,000 was shared with customer through bill credits with the balance going to the utility. To project power cost savings, the City of Madison uses a formula of an estimate value per end use type multiplied by the number of end uses by the length of time it was load-controlled.

Evaluation and Verification Activities

The City of Madison is considering implementing a maintenance plan to be sure the load control equipment installed is operational since its one-way communication system is otherwise unable to determine this.

Program Results to Date

Of the utility's 3,800 electric customers, 1,800 have load control equipment on a total of 3,100 end uses.

Key Lessons Learned

Service and support from trade allies is critical to success; system should be as simple and easy to use as possible with ability to scale to include integration with SCADA and automatic meter reading systems.

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Planned Program Enhancements

Considering how load management system might integrate with automatic meter reading.

To Learn More

Utility Overview and Key Contact:
Tess Nelson, City of Madison, South Dakota

(605) 256-7521, electric@cityofmadisonsd.com,
www.cityofmadisonsd.com

Our municipality is home to 6,500 people in southeastern South Dakota. They have a prosperous manufacturing center, reputable healthcare system, new schools, community center, a nationally-recognized state university and plentiful outdoor recreational activities.

Trade Allies' Key Contact and Overview:
Jim Enga, Internet Energy Systems, Inc

605-270-2285, omnipro@iw.net,
www.internetenergysystems.com

Internet Energy Systems, Inc., headquartered in Madison, South Dakota, is the result of many years of experience in the energy demand industry by the company's founders. During the last decade, the growing demand for load management solutions and the concurrent maturation of the global Internet as a safe and powerful data management "utility" resulted in the development of an Internet-based real-time energy metering and management system.

Dave Hyland, Director of Sales, Comverge, Inc.

(614) 595-7688, dhyland@comverge.com, www.comverge.com

Comverge is a leading Clean Energy company providing innovative solutions to peak challenges through Demand Response. With over 500 US utility clients and 4.5 million devices installed, Comverge "smart megawatts" technology is widespread and in use across the nation. Its "pay-for-performance" programs provide capacity that can reduce emissions, eliminate line losses, increase reliability, and defer generation & transmission acquisition. reliability.