COMPLIMENTARY COPY

Conference Summaries

Highlights of the AEIC Load Research and WLRA Fall Conferences

Ingrid Rohmund, Vice President, Primen
Craig Williamson, Principal, Primen

Although many Primen Energy Use subscribers like to participate in industry conferences, it is often difficult for them to do so. To document the valuable information presented at these events, this Primen Prospective includes highlights of two load research conferences held in 2002: the Association of Edison Illuminating Companies (AEIC) Annual Load Research Conference, held in Las Vegas, NV in July, and the Western Load Research Association (WLRA) Fall Meeting, held in Portland, OR in September.

This Perspective highlights selected presentations from the AEIC Load Research Conference, held in Las Vegas on July 22-24, 2002 and the WLRA fall meeting, held in Portland on September 11-13, 2002. We have combined these two events, since their content sometimes overlaps, and we wanted to give a broader overview of industry trends and issues: Overall, the load research function and practitioners are alive and well. The pace and level of activity seem to have stabilized after the fervor of activity required to establish load profiling systems for settlements. Work on the design and implementation of profiling systems has subsided, and practitioners have moved back to "business as usual," doing cost-of-service studies, profile production, and supporting internal clients.

AEIC 2002 Load Research Conference

Clay Scott, Oklahoma Gas & Electric and Chair of the AEIC Load Research Committee, introduced the Association of Edison Illuminating Companies Load Research Committee (for information, see www.aeic.org/load_research/) and the conference, which was organized into three categories.

Applications of load data. Several presentations addressed the application of load research information:

▸ Marvin Rowe described Pepco's approach for allocating unaccounted for energy (UFE).

▸ A "Team of Four," including representatives of RLW Analytics and two electric cooperatives from Virginia, compared their efforts to an attempt to get 13 clocks working together.

▸ Carl Raish of Tampa Electric talked about expanding load research data.

Benchmarking. Several consultants described recent studies and surveys that benchmark various aspects of load research activity:

▶ Dave Hanna of RER summarized a national load research survey.

▶ Craig Williamson of Primen described the results of a load profiling benchmarking study.

▶ Mimi Goldberg of Xenergy reported on demand response baseline standards.

▶ Rich Michelfelder of Quantum Consulting presented a national benchmark study on residential direct load control.

Consolidation. This is the notion of doing more with less, such as using statistical techniques to leverage data or avoiding expensive metering by using existing data. Three presentations focused on this topic:

▶ Joe Thomas of Alabama Power talked about load research on a "shoestring."

▶ Roberta Laccetti of National Grid USA offered insights about working through a merger and reorganization.

▶ Ted Wright of DTE Energy described the migration from a mainframe to a client-server environment for a load research system.

Highlights from each of these three topical categories follow.

Applications of load data

Settlement and the allocation of UFE

Marvin Rowe, Load Research Analyst at Potomac Electric Power Company (Pepco), which serves Washington, D.C. and the surrounding Maryland area, described Pepco's approach for dealing with unaccounted-for energy (UFE). Rowe noted that all Pepco customers have had choice of electric providers available since January 2001. The two-settlement market entails a bottom-up approach for settlement processing. The day-after market uses remote interrogation for 30% of the load, with the remaining 70% of the load estimation is based on historical usage data.

UFE is the difference between the metered load at the zone level and the estimated load from the load profiling and settlement system. Overall for 2001, the total UFE was –0.02%. However, the monthly UFE varied from –2.11% to 1.82%.

There are several causes of UFE, including profile estimation error, loss factor estimation error, billing errors, metering error, and theft. Although most of these affect profiled customers and interval-metered customers equally, profile estimation error affects only profiled customers. Because of this, Pepco assigns UFE to the two groups differently. Currently, about 95% of the UFE is assigned to profiled customers, and 5% is assigned to interval-metered customers. Pepco would like to move toward an 80%/20% split.

Lessons from profiling analysis for load research sample design

Stuart McMenamin from RER reviewed several issues related to sample design. These include profile segments and domains of study, load research data, target values, domains of study, and sample statistics. McMenamin reached several conclusions on sample design for profiling:

▸ For samples to support load profiling, the domains of study should be the profile segments and zones. The target variable should be hourly fractions of monthly energy use. All hours and day types should be considered, but high load (high price) hours should be weighted more heavily. In contrast to load research samples, precision requirements have not been established.

▸ Sample designs that estimate hourly demand levels accurately will also estimate fractions well. (Relative precision for levels determines relative precision for fractions.)

▸ Stratification should include residential class by seasonal patterns, business non-demand by seasonal patterns, and business demand by kWh size and load factor.

▸ If moderate kWh size stratification is used, then estimate levels and ratios using ratio estimators or modeling approaches.

McMenamin asserted that these recommendations also apply to standard load research designs as well. They will result in more efficient samples, meaning improved accuracy for a given cost.

Preparing for transition: Is it possible to get 13 clocks to chime at the same time?

Erin Puryear, Regulatory Analyst from Old Dominion Electric Cooperative (ODEC), Renee Barr, Senior Account Representative from Northern Virginia Electric Cooperative (NVEC), and Curt Puckett, President and Tim Hennessey, Vice President, both from RLW Analytics, described a current project to collect load research data for ODEC's 12-member system. ODEC is coordinating and facilitating the project for its members as part of efforts to prepare for deregulation.

ODEC's approach to load profiling uses dynamic modeling that incorporates weather modeling components. ODEC will adjust the class profiles developed from the indigenous load research sample using regression techniques to predict the load on the current day as a function of the current weather. They begin with a relatively simple construct (e.g., residential, commercial and industrial), which will allow profiling to evolve with the maturation of the load research program.

Sample design was a major issue. Samples needed to be large enough to insure geographic representation and to engage each individual cooperative. However, they did not have historical load data available to guide the sample design. And, the amount, quality, and completeness of information available varied considerably among cooperatives. Ultimately, the total sample size was 2,812 and the number of sample points per cooperative ranged from 91 for Prince George Electric Cooperative to 761 for NVEC.

The project team described the challenge of coordinating the 13 organizations (ODEC and 12 member systems-hence the "13 clocks"), including project communication, metering, billing data availability, data collection and processing. Based on hindsight, they would have chosen to centralize data collection, pushed much harder to ensure sample selection, provided MV-90 training up front, and been more careful about all of the identification fields,

> ▸ **Sample designs that estimate hourly demand levels accurately will also estimate fractions well.** ◂◂

which were sometimes duplicated among the cooperatives. Dealing with the cooperatives is best summed up by Puryear's comment "sample selection was treated as sample suggestion."

As of July, the team had successfully collected and analyzed the data for one of the cooperatives and was optimistic about the remaining 11 organizations.

Expansion and weather normalization

Carl Raish, Load Research Administrator at Tampa Electric, gave a presentation summarizing his paper "Expanding Load Research Data to the Output-to-Line Level." The method covered three basic areas, including overlapping samples, loss adjustments, and weather normalization.

Raish described how Tampa Electric combines results from two overlapping samples. At any given time, there are two half-sized load research samples in the field, and the sample estimates are based on both samples using a weighted average. Raish reviewed the variance formulas needed for calculating the precision of the estimates.

Raish then moved on to the method Tampa Electric uses to estimate transformer losses at each voltage delivery level. This involves using the voltage of each class of customers and system loading to adjust the measured loads to the "output-to-line" level. He then adjusts the output-to-line loads so that the total matches the known retail system demand. Raish's paper includes tables showing the changes to allocation factors resulting from these adjustments.

Finally, the output-to-line loads are adjusted to a normal weather year using a fairly standard hourly load model. Raish develops a model for each class based on the heat build-up and the day type, using a piecewise linear regression. The resulting normal-weather load can be used for planning and forecasting.

Benchmarking surveys

Load profiling benchmarking

Craig Williamson, Principal at Primen, provided preliminary results from Primen's Load Profiling Benchmarking survey. The purpose of this survey is to characterize the status of load profiling practice, and to give those in the profiling area a sense of how their operations compare with others. Primen received responses from 18 organizations, representing 17 jurisdictions with electric customer choice. A detailed report of results is available to Primen subscribers as a Load Profiling Forum Technical Brief.[1]

Load research survey

Dave Hanna, Project Manager from RER, presented partial, preliminary results from RER's Load Research Survey of North America at the AEIC conference, and final results at the WLRA conference. The survey explored four main areas: current objectives of load research projects, planned activities, current standard practices, and industry change. Results were split between investor-owned utilities (IOUs) and public power entities. A few highlights of results:

- IOU load research organizations had an average of four full-time and two part-time employees, and public load research organizations had about one of each. Load research staff averaged eight to nine years' experience, with about 40% having a master's degree and 25% having a bachelor's degree.

> ▸ **Sample selection was treated as sample suggestion.** ◂◂

▶ For data collection and translation, about 90% of all utilities use ITRON's MV-90. One of the biggest differences between the IOUs and the public entities is in the software used for analysis. Public entities are much more likely to use MV-90 for data analysis (60%), data editing (75%), and data storage (80%). IOUs use LodeStar more often for these functions (50%, 40%, and 45%). These two products dominate the market for off-the-shelf load research software. Many utilities of both types also use SAS to analyze data.

▶ The primary objectives of load metering projects are cost of service and rate design, with special billing, load information service, and retail settlement not far behind. About 80% of IOUs report that they were required to do load research by regulation, with only about 30% of the public utilities so required.

▶ Sampling practice is another area in which public utilities and private utilities differ. IOUs reported leaving samples in place from 3 to 7 years; public utilities reported leaving them in place from 4 to 12 years. Across the industry, stratification was most often by annual use, with many also using seasonal and peak month use, and demand often used for business classes.

▶ About 70% of IOUs and 60% of public utilities use the more accurate but more complex ratio expansion for estimating class loads. The remainder use mean-per-unit estimation.

RER plans to distribute the final report on its website (www.rer.com).

Demand response baseline standards

Mimi Goldberg, Vice President of Analytic Services at Xenergy, provided a summary of a report reviewing methods for calculating baseline load shapes for demand response programs. This work is sponsored by the California Energy Commission (CEC), which hopes to establish protocols for baseline calculation. Using actual load data, she compared the performance of many baseline calculation methods using the following characteristics:

▶ Practical — inexpensive, easy to use and understand

▶ Fair — limits gaming, approximately unbiased, appropriate to load

▶ Reliable — low variance, verifiable

▶ Availability — ability to be predetermined (desirable only for some participants)

Goldberg compared nine data selection methods, seven weather adjustment methods, and seven load comparison adjustment methods. Using all combinations of these, she calculated statistics to judge reliability and fairness using actual load data.

"No single method will always work well," concluded Goldberg. This said, a simple average with additive adjustment to the last two hours before the curtailment is a method that can work well in most cases. In general, weather adjustments do not provide more than a small improvement over averages with additive adjustments. Goldberg noted that there are cases where this approach will fail, such as when a shift is sent home early in anticipation of a curtailment, so some flexibility is crucial.

▶ **No single method will always work well**. ◀◀

The report is available on the CEC website at http://www.energy.ca.gov/demandresponse/documents/2002-08-02_XENERGY_REPORT.PDF.

Survey of residential direct load control customers

Rich Michelfelder, President, Quantum Consulting, provided results from a survey of direct load control (DLC) customers. DLC started in the 1980s as a result of the energy crisis. In the 1990s, DLC was one of many DSM options. It is now a regulatory requirement in some states. DLC's largest use is still air conditioning, although some utilities also control water heating, pool pumps, and space heating. A total of 600 customers responded to the survey, of which 210 were current or past program participants. Michelfelder offered survey results and analysis on program design, targeting customers, and customer preferences, including the following insights into building the optimal program:

▸ Target larger homes in older developments that have more occupants home during the day.

▸ For recruiting, use stamped card stock, as well as mail inserts, since participants enroll to reduce their bills and save energy. Telephone follow-up also helps.

▸ For enrollment and installation, reduce the number of contact points, schedule the installation during the initial signup, and follow up by phone after installation is complete.

▸ Compensate customers on a per-interruption basis, use bill credits, and highlight the incentive on bills.

▸ As for the technology itself, keep it simple. Although new technology is interesting, it is not always a selling point. Consider adaptive control algorithms.

▸ To promote retention, remind participants of their savings to date, follow up after periods with many curtailments, and "use the program to ensure that you continue to have the program" (that is, make sure that you really do have some interruptions to remind people they are on the program).

Consolidation

Load research on a shoestring

Joe Thomas, Senior Engineer from Alabama Power, presented an entertaining and energetic presentation about load research. He emphasized the need to do more with less, to create relationships with external clients, to use technology, to balance internal resources and external consultants, and to build a load research team with diverse skills and personalities. Thomas also pointed out that it is critical for load researchers to understand and communicate how valuable they are to their organizations — and what they contribute to the bottom line. Finally, he gave suggestions for how to get by on a shoestring and what assets are critical for success.

Thomas also presented this information at the Primen 2002 Energy Use Outlook in October. The presentation (along with all those given at Energy Use Outlook) is available to subscribers. You can find links to the presentations in the Primen Perspective "Energy Use Outlook 2002" on the Energy Use home page. (my.primen.com/Applications/EU/Community/research/reports/perspective/abstracts/Outlook2002.asp)

▸ **It is critical for load researchers to understand and communicate how valuable they are to their organizations.** ◂◂

Optimizing systems following mergers

Roberta Laccetti, National Grid's Load Data Services Manager, provided an update on the National Grid organization and described the challenges involved with the merger with Niagara Mohawk. National Grid engaged ITRON to review the load research processes at the two companies and to recommend quick fixes and longer-term improvements. The conclusions from the review process are:

▸ Existing systems support business needs but are not scalable.

▸ Some efficiencies could be gained by upgrading and combining systems.

▸ Costs and benefits of improvements still need to be quantified.

▸ The New York system and environment has not been reviewed to determine whether further consolidation is desirable.

▸ IT/business planning is underway to adopt many of the ITRON recommendations.

▸ Data warehousing alternatives are being explored.

Load research within a client-server environment

Ted Wright, Analyst, DTE Energy, described his company's migration from a mainframe environment to a client-server environment. The transition was prompted somewhat by the changes that resulted from the merger with Michigan Consolidated Gas, but mainly by the failure of the mainframe. Wright has written a paper that describes DTE's experience, which is available at www.loadresearchonline.com.

Wright described the changed landscape, the key ingredients for the new architecture, and the phases of conversion. He summarized key benefits that have been realized as a result of the migration to the client-server environment. These include faster processing, fewer manual tasks, improvement in data quality, more efficient use of data resources, and better data presentation. In short, the overall benefit is that more time can now be spent on load research.

Wright also identified a few things that he would have done differently. He would have spent more time looking forward and less time looking back, he would have spent more time on design, and he would have picked software tools based on capabilities rather than what those in the load research group knew well.

Current challenges include integrating billing data, completing the construction phase (general cleanup of applications), and supporting model development. Looking ahead, Wright hopes DTE Energy will be able to take action to be more state of the art. He identified full data integration, improved data-quality control, more web-based applications, and more graphics as objectives for the future.

Those interested in interface design might want to consider Wright's comment about this the final result: "The more the thing looks like a video game, the better." It's a sign of the times.

▸ **The more the thing looks like a video game, the better.** ◂◂

WLRA Fall Conference

This section summarizes presentations unique to the 2002 Fall Western Load Research conference. Featured presentations address demand response and related utility programs, and specific applications of load research data. Also included is a discussion of efforts to quantify the conservation efforts in California.

Demand response. Three presentations addressed programs that give utility customers economic incentives to shift their electricity usage. Two of these were on demand response programs, and one on a time-of-use program:

▸ Meghan Jonee-Guinn from Portland General Electric (PGE) described her utility's demand buy-back program.

▸ Mark Martinez shared some preliminary results from Southern California Edison's (SCE) small-commercial smart thermostat program.

▸ Eric Englert from Puget Sound Energy (PSE) gave an overview of PSE's residential time-of-use rates, followed by a summary of results.

Transformer sizing. Herb Rooney from Public Service Company of New Mexico (PNM) presented the results of his group's efforts to help PNM appropriately size distribution transformers

California conservation. Susan McNicoll from Pacific Gas & Electric (PG&E) gave an overview of the efforts to measure the contribution of recent conservation efforts in California.

Demand buy-back at PGE

Portland General Electric offers its customers the opportunity to reduce demand during high-price periods or tightening supply. Meghan Jonee-Guinn, Load Research Analyst, began her presentation with a history of innovative load control and pricing programs at PGE, ranging from traditional load management to real-time pricing. She then focused on the current demand buy-back program.

Background

The justification for demand buy-back is based on several factors, including:

▸ The increase in energy use in the Pacific Northwest without a corresponding increase in supply

▸ Low rainfall and snowpack in the area

▸ Price instability across the country

The program

The PGE program includes three types of demand response events. A next-day event is called by 5 pm on the day before the event, and the curtailment can last between 4 and 24 hours. A multi-day event is called 3 days in advance of the event, and the curtailment can last anywhere from 3 days to several weeks. A term event, called several weeks in advance, can last for several months and be in effect for up to 7 days a week.

To qualify, customers must be within PGE's service territory, have a signed agreement in place, commit to a minimum load reduction of 250 kW per meter, and complete a load reduction capability test. PGE does not require the customer to take the load down for this test — it can be based on a low production day or a maintenance day.

The baseline for calculating load reduction is usually the average of the 14 previous week-days (or weekend days, if the event is on a weekend).

Anytime an event is called, each participating customer can log on to the website and decide to curtail or not, based on the times and offered prices. If customers choose to curtail, they must reduce their load by at least 90% of whatever they commit to. If they do, they receive a check for the actual load reduction multiplied by the market price, less the rate schedule energy. If they do not, PGE may refuse to accept future offers from that customer. If they do not reduce for a multi-day or term event, the customer must pay PGE a penalty calculated as the Mid-C firm, on-peak price plus 5%.

Promoting the program

Jonee-Guinn mentioned several things that helped PGE promote the program to customers, and a few lessons learned. She reported that allowing the customers to use a regularly scheduled maintenance or low production day to establish load reduction capability really helped. Educating the customers about the program was a real challenge — PGE had to get beyond the confusion of customers wondering why they would be paid not to use electricity, and explain both the importance of and the methods for calculating the baseline.

Results

Meghan shared the results of the program to date. From the first day of operations, July 1, 2000, through September 2002, there have been

▸ 26 enrolled customers

▸ 122 next day events for 2,952 hours

▸ 183 days of extended events for 448 hours,

▸ A total of 315,225 MWh curtailed, with a demand reduction of 175 MW

▸ 400 MW of potential reduction available if all curtailed their maximum

▸ $48 million paid to customers

> ▸ **Allowing the customers to use a regularly scheduled maintenance or low production day to establish load reduction capability really helped.** ◂◂

Demand response and small commercial customers

Southern California Edison (SCE) is investigating demand response by small commercial businesses in its service territory. Mark Martinez, Manager of Load Control Programs at SCE, described SCE's efforts to install 5,000 smart thermostats at these businesses, and evaluate the effect using data from the summer of 2002.

The program

The SCE Energy$mart Thermostat℠ program was mandated by the California Public Utilities Commission (CPUC) in early 2001. Initial estimates were that 5,000 thermostats could provide about 4 MW of peak demand savings. Carrier Corporation has been installing the thermostats, and Silicon Energy provided the hardware, software, and website for the program. The summer of 2002 was a test period for the program.

Small commercial customers under 200 kW, with annual consumption less than 1,000,000 kWh, are eligible. Agricultural, government, and chain accounts are not eligible, nor is any customer already participating in an existing SCE load reduction program.

SCE installs a new programmable digital thermostat, and programs it for the customer based on the business operating schedule and the customer's preference for temperature setpoints. SCE signals the thermostat to increase the setpoint by some offset (from 0°F to 4°F).

Customer benefits

Customers are paid an incentive of up to $300 to participate. The program also can help the customers save on energy use overall, not just during curtailment events. And the customer gets to keep the new thermostat at the end of the program.
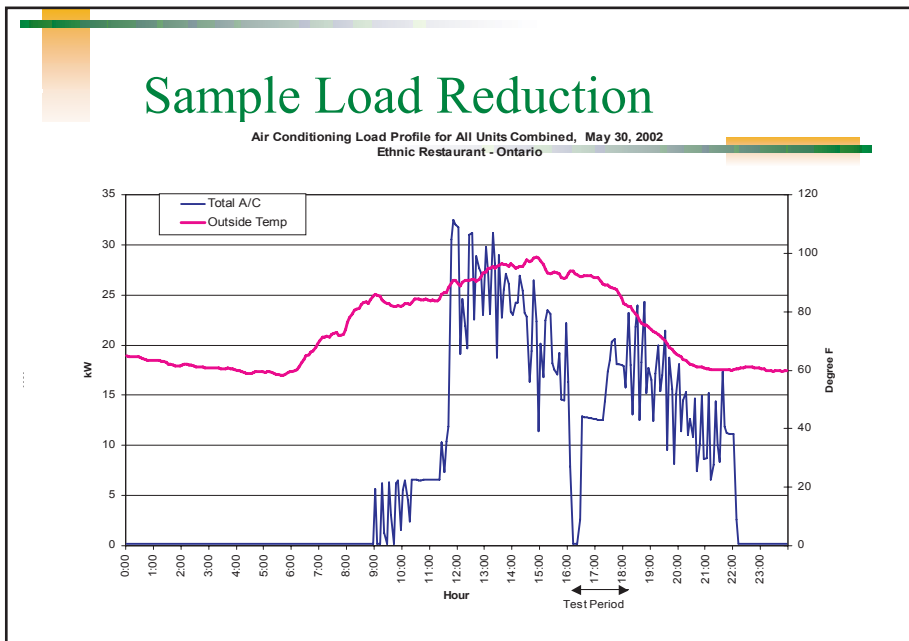
The customer can override the curtailment, but there are penalties — $5 is deducted from the incentive payment each time the customer overrides. Martinez discovered that about 5% of the customers always override — even when the temperature setpoint change is zero.

▶ **About 5% of the customers always override — even when the temperature setpoint change is zero.** ◀◀

Savings measurement

SCE looked at two sets of measurements to evaluate the savings from this program. At all sites, the thermostat recorded the temperature in the air returns across time, and at some sites, SCE installed interval meters. Martinez shared several examples of graphs showing the effect of curtailment both on the load and on the return air temperature. The effect of a curtailment on May 30th at a restaurant in Ontario, California, is shown in figures 1 and 2. **Figure 1** shows the effect on the load, compared with the outdoor air temperature curve, and **Figure 2** shows the temperatures on the four air returns. This customer chose to override the setpoint change on only one unit (unit 4) part way through the curtailment, at 15:30. Notice the sharp increase in the load at that time.
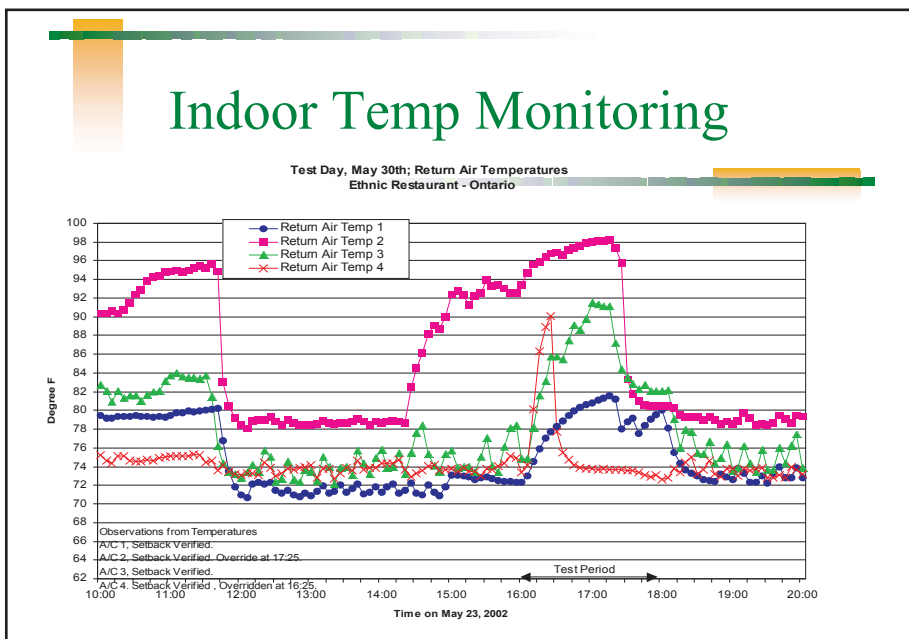
Figure 1.

Sample Load Reduction

Air Conditioning Load Profile for All Units Combined, May 30, 2002
Ethnic Restaurant - Ontario

After the initial drop, the load jumps up when the setpoint change for one thermostat was overridden.

Figure 2.

Indoor Temp Monitoring

Test Day, May 30th; Return Air Temperatures
Ethnic Restaurant - Ontario

The return air temperatures reflect the thermostat setpoint changes. Note that unit 4 drops after the override.

Key lessons learned

Martinez said SCE has learned several lessons during this process.

▸ Marketing is key — direct mail did not work very well, but personal contacts (using retired SCE personnel hired on a contract basis) worked much better for recruitment. Ethnicity of business owners can also be an issue.

▸ Infrastructure has to be established for each new type of program.

▸ "There's a lot of bad junk out there." Martinez had to reject 30% of the sites due to customer equipment that was in bad shape.

▸ Communication with customers is key — make sure they understand the incentives and the penalties.

Residential time-of-use (TOU) pricing

Eric Englert, Project Manager at Puget Sound Energy (PSE), presented information on PSE's residential TOU pricing program. The automated meter reading (AMR) system at PSE has enabled PSE to provide a residential TOU rate option to its customers. Englert reported that the rate has been surprisingly popular with customers, with over 300,000 customers on the program. (Primen note: In November, PSE ended this pilot program, and no longer offers this TOU rate. After July 2002, when a one dollar surcharge was added to the rate and the differential changed, many customers started paying more on the TOU rate than they would have on the fixed rate. The resulting political outcry caused PSE to cancel the pilot. The results Englert presented are still valid, but should now be considered in a different context. Primen is releasing a report analyzing the PSE TOU situation in December 2002.)

The rate consists of four pricing periods — morning peak, mid-day, evening peak, and off peak. PSE calls the morning and evening peaks "expensive," the mid-day period "economy," and the off-peak period "real bargain." The rate is designed to be revenue-neutral at a class level if the customers do not change their usage patterns. Each customer in the program can access a summary of his or her own usage information via the Internet.

PSE surveyed the TOU customers twice, in April and July of 2001. Ninety-one percent (91%) claimed that they had take action to alter energy use, including shifting load, reducing usage, and buying more energy-efficient equipment. Eighty-eight percent (88%) said they were totally satisfied with the program.

Measurement of effects

Englert reported on results of the program, based on comparisons with a control group of non-participating customers, but with access to the same information. He also mentioned some comparisons to each customer's prior usage on a weather-normalized basis. PSE found two effects on consumption for the TOU pricing customers. They did shift some of their load into lower-priced periods. But they also reduced their total consumption. **Figure 3** shows estimates of the percent change for each period.

▸ **Each customer can access a summary of his or her own usage information via the Internet.** ◂◂

Figure 3.

Load Shift Impacts by Pricing Blocks
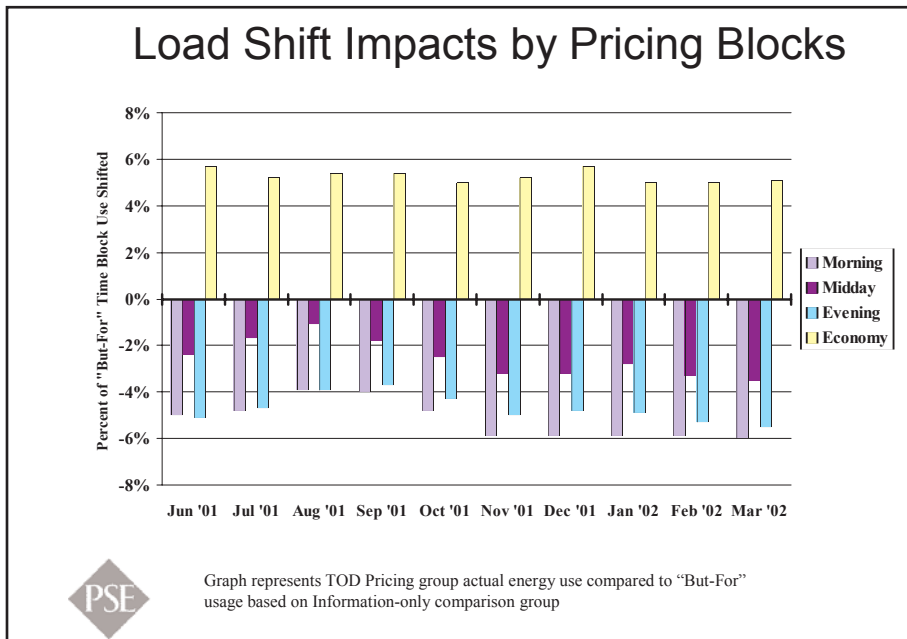
Note that energy use is shifted out of the midday period as well as out of the high-priced morning and evening periods.

Residential transformer sizing

Herb Rooney, Analysis and Forecasting Manager at Public Service Company of New Mexico (PNM), described and summarized the results of a study he performed to estimate the size of transformers needed to serve groups of homes. The standards department at PNM needed this information for homes both with and without air conditioning (AC).

Rooney combined square footage data from the county, housing type (single family vs mobile home) data from the PNM customer information system (CIS) and the county, and PNM load data to identify the characteristics of the home.

Using re-sampling methods, PNM estimated the coincidence factors for 100 samples of groups of customers of various sizes, from 2 customers up to 40 customers. Rooney did this for those with and without AC, and for single family and mobile homes. He calculated the mean values for all of these samples, and then calculated average coincidence factors based on the means.

Figure 4 shows the coincidence factors as a function of the number of homes. The biggest decrease in coincidence corresponds to the first few increases in the number of homes in the group.

Because PNM only has existing homes in their load research sample, there are very few new homes. To rectify this, they have selected and installed a random sample of 30 new homes that are energy efficient and have AC. They will analyze the data from these customers to refine their estimates.

Figure 4.

Coincidence Factors

WITHOUT Refrigerative AC
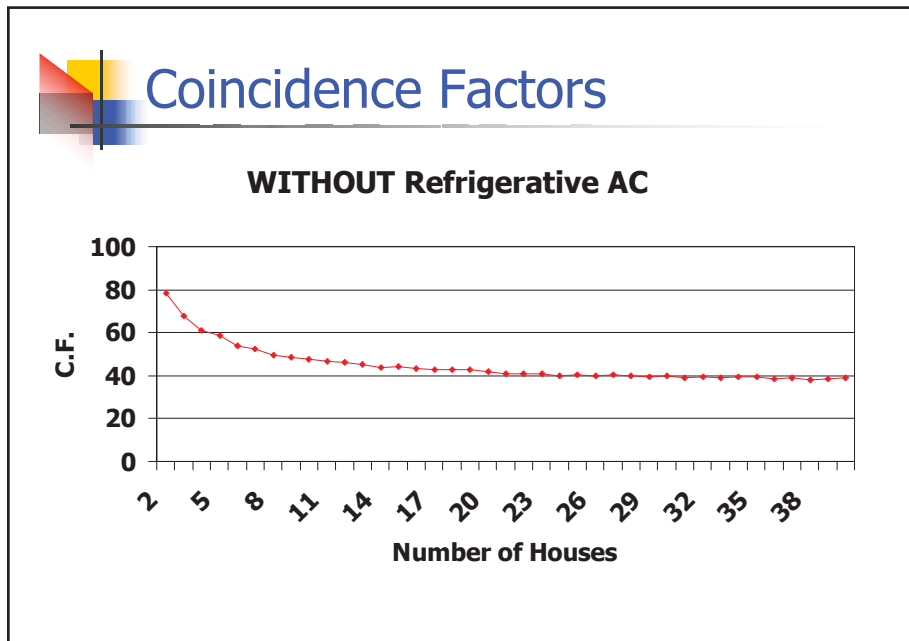
After increasing the number of homes beyond about 10, the decrease in coincidence is very small.

California conservation

Susan McNicoll, Energy Research Manager at Pacific Gas & Electric (PG&E), updated her presentation from the Spring WLRA conference on conservation behavior by electric customers in California.

2001 reduction efforts

The well-publicized campaign to reduce energy use and system demand in California in 2001 was a success. Annual energy in California was down 6.7% on the year, and down 10% during summer months. Estimates of voluntary load reduction were about 2,616 MW, or 70% of the total reduction. Almost 90% of people in the state claimed they had done something to voluntarily reduce energy use.

But how much of that conservation will continue into the future?

Concerns

McNicoll believes there is reason for concern about whether people will continue to conserve. Only 10% of the 20-20 program customers qualified for rebates in all four summer months. And it appears that the state is experiencing a rebound of about 50% of the 2001 conservation effort. Although acknowledging the rebound is politically unpopular, it is very important for forecasters and policymakers to accurately account for both the original conservation and the rebound effect.

Figure 5 shows the average residential customer energy consumption from the dynamic load profiles (DLPs) by month for 2000, 2001, and the first 7 months of 2002. This graph reflects actual weather. **Figure 6** shows the same data, adjusted to normal weather. The 2002 line is much closer to the 2000 line than the 2001 line.
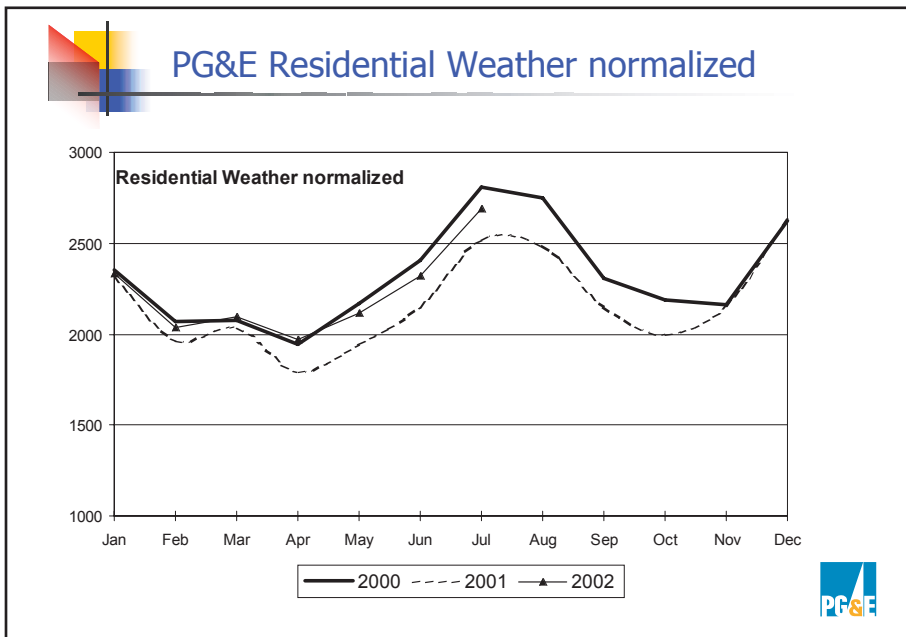
▶ **It appears that the state is experiencing a rebound of about 50% of the 2001 conservation effort.** ◀◀

Figure 5.

PG&E Residential DLPs

The Dynamic Load Profiles Of The Average Residential
Customers: PG&E, 2000-2002
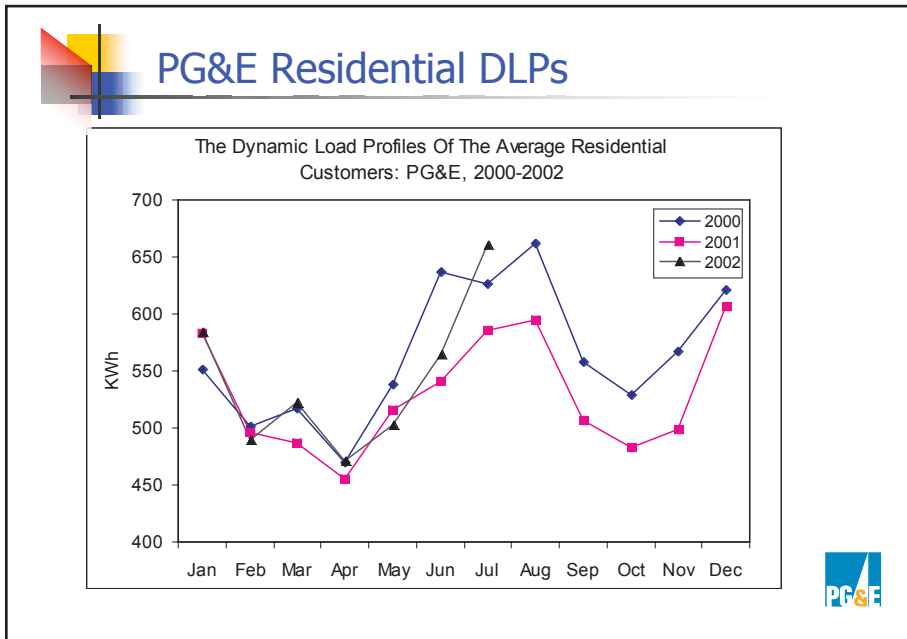
Note the increase in July 2002 consumption.

Figure 6.

PG&E Residential Weather normalized

Residential Weather normalized

Note how much higher consumption is in 2002 than it was in 2001. This shows the rebound effect.

Notes

1. Craig Williamson, "Benchmarking the Load Profiling Process," Primen LPF Technical Brief, EU-LPF-03-01 (October 2002).

You can reach Ingrid Rohmund at irohmund@primen.com or 760.943.1532.

For more information, contact Craig Williamson: 303.545.0100 x 42 or cwilliamson@primen.com. You can also contact Craig Williamson if you have questions about Primen's Energy Use Strategic Service.

For more information about the WLRA and future meetings, contact co-chairs Susan McNicoll: 415.973.7404 or sem4@pge.com or Craig Williamson, or check their website at www.wlra.net. For more information about the AEIC load research committee, check their website at www.aeic.org/load_research/.