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WLRA Spring Conference Summary

Santa Fe, New Mexico

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The Western Load Research Association (WLRA) Spring 2002 conference included presentations by vendors and consultants, presentations by utility employees, and a roundtable discussion. The WLRA meeting includes a diversity of topics, from the theoretical to the applied. Current developments in the industry, including conservation efforts, restructuring, integrated resource planning (IRP), and the focus on information about customers have all combined to make load research more important as a discipline.

Herb Rooney and Roberta Kitting of Public Service Company of New Mexico (PNM) hosted the conference. WLRA Co-Chair Mark Martinez of Southern California Edison (SCE) prepared the agenda, and Craig Williamson of Primen (author of this summary) was recruited as the other co-chair for this meeting (Rob Anderson from ENMAX corporation had stepped down since the last meeting).

Keynote: The Role of Load Research

Gerard Ortiz, Director of Market Services at PNM, opened the conference with a welcome and a look at where load research fits into the big picture at PNM and in our industry. Ortiz discussed where load research has been, where it is today, and where it might go in the future. This presentation provided a useful context for load research from the point of view of those outside our discipline.

Some highlights from Ortiz's presentation:

- At PNM, restructuring in particular has had an impact on load researchers. The load research group was charged with developing rules for the settlement process, metering, and data sharing/transfer. But after a flurry of activity, restructuring in New Mexico was put on hold for at least five years.
- Market research consistently shows that utility customers want more information about their own energy use, which is adding to the need for load research and load data collection.
- Ortiz believes that load research is underappreciated in the energy industry. This is in part because no one else at utilities really understands what we do. He thanked us, saying "I'm glad you do what you do, so that I don't have to figure it out and do it!"

The Western Load Research Association (WLRA) was formed in response to mandates in the Public Utilities Regulatory Policies Act (PURPA) in the late 1970s to help utility companies put load research programs into place. The group has since been meeting once or twice a year, in locations across the western U.S. and Canada. The spring 2002 meeting of the WLRA was held April 17 to April 19 in Santa Fe NM. This *Primen Perspective* is a summary of the meeting's presentations.

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A summary of the WLRA presentations

- Dave Hanna of Regional Economic Research (RER) discussed his benchmarking study on load research in North America and covered the state of the industry in load research. Included were discussions of load research staffing and software, load researchers' role in distribution system planning, and tricks of the trade for load researchers.

- Craig Williamson's presentation analyzed the intricate interrelationship between weather, load, energy price, and profitability of utility customers, and how that relationship impacts various types of energy companies.

- Stuart McMenamin of RER used his work with load profiling for the Electric Reliability Council of Texas (ERCOT) to discuss sample design, including seasonal use and recommendations for stratification.

- Roger Wright of RLW Analytics presented an approach to key account analysis and demonstrated his Visualize-IT™ software.

- Kathy Smith of ABB presented data on validation and editing. Smith pointed out that with settlement and reconciliation to support competition, the world of metering, data collection, validation, and editing has changed.

- Susan McNicoll of Pacific Gas & Electric (PG&E) highlighted the California experience, covering demand reduction progams, voluntary load reduction, and next steps.

- Afsin Afshari of Silicon Energy described a system for short-term forecasting in which users start with almost no information. Then, via recursion, they adjust the models based on actual data collected over time. The discussion included a quick-convergence approach and potential applications.

- Jackie Ortega and Linda Rawlings of PG&E discussed the logistical nightmare of keeping the integrity of load research samples in a deregulated environment. Regulatory and legislative uncertainty and suggestions for similar situations highlighted the presentation.

- A team from PNM discussed the metering setup and data analysis needed for using onsite generators as a distributed generation resource. The power wholesaler providing the resource has recruited PNM customers with existing onsite generators and intends to aggregate them in other service areas.

- Derek Glatz described load profiling at ERCOT and the impact that load profiling has on the settlement process in Texas. The discussion included ERCOT's method for profile development and how load profiling affects settlement.

Load Research Benchmarking

Dave Hanna of RER presented "A Load Research Survey of North America." The objectives of the survey were to identify standard practices, find out what current objectives and near-term plans for load research projects are, and look at the impacts of industry changes.

Hanna described the approach RER is taking with this study, which is to contact a handful of utilities for in-depth interviews and then use those results to develop a comprehensive survey instrument to use for a large sample. He contacted 17 investor-owned utilities (IOUs) and 5 publicly owned utilities for interviews. Although this didn't represent a statistically valid random sample with high accuracy, the results were interesting.

Load research staffing

The first area Hanna covered was load research staffing. The results include:

- Load researchers have an average tenure of about 10 years at IOUs and about 7 years at public utilities.
- Educational backgrounds are varied: most have engineering, mathematical/statistical, economics, or business degrees, with a smattering of other subjects (including, interestingly, music).
- At IOUs, the average load research staff is about 5.5 full-time, plus 0.5 part-time employees. Public utilities have about 1.5 full-time and 1 part-time employees.
- About half of IOU load researchers and all the public power load researchers are encouraged to attend industry load research conferences. About one quarter of both groups are encouraged to publish or give presentations.

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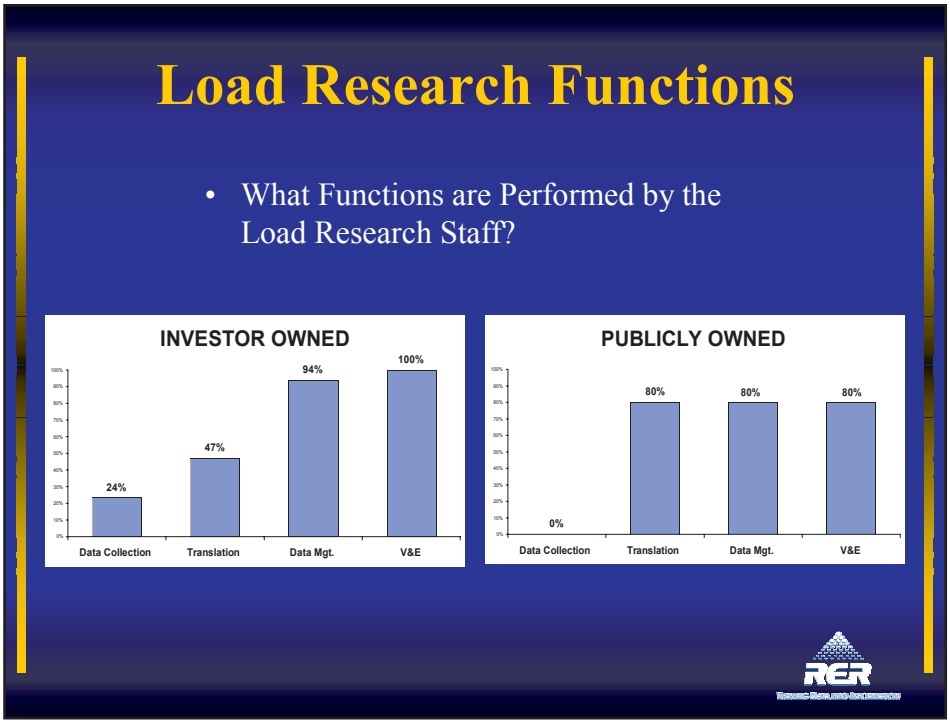
The difference between what the IOU and public utility load research groups have responsibility for is shown in **Figure 1.**

Load research software

Among the findings about the software used by load researchers, the survey shows that:

- 80% of IOUs and 40% of public utilities use MV-90™ for translation.
- IOUs are much more likely to use SAS and LodeStar™ for storage, editing, and analysis, whereas public utilities tend to use MV-90 or "other."
- Excel, SAS, and Access are the most common secondary analysis systems, with a few researchers using MBSS™ and LodeStar.

Figure 1. Comparison of IOU and publicly owned utility functions



Distribution system planning

Attendees discussed the use of load data collection for distribution system planning. Load researchers are almost never involved in the planning and analysis of load data related to distribution system planning, which is unfortunate.

The consensus was that we could add value here but that we are generally excluded from everything except the data collection. The group also concluded that this is because of the engineering background of distribution people, who aren't comfortable with sampling and estimation.

Sampling

Stratified sampling based on consumption and demand values is used fairly consistently and most sampling is for rate class estimation. About 85% of load data are collected for 15-minute intervals. Samples are usually in the field continuously and are in place from one to seven years, with an average of three years between replacements.

Data loss is mostly due either to human error or meter failure, with an average of 93% of intervals successfully collected. Less than 5% of data are edited. Data collection of ancillary information about metered sites, including demographics and appliances, is becoming less common.

Data loss is mostly due either to human error or meter failure.

What do respondents need?

The survey respondents say that their software needs are generally met with existing products, although funds are not always available for purchases. Industry training is described as good at the low and the high end — through the Association of Edison Illuminating Companies (AEIC) Load Research Committee courses — but missing for the middle.

People need training on "tricks of the trade" and how to use specific tools to deal with data problems. About 32% also say they see outsourcing of some load research functions in the future.

The respondents find value in networking with others, both directly and through websites, but load researchers don't often visit industry websites — they just haven't got the time.

Hanna closed with the key finding of the survey: the workload for load researchers is increasing, but staffing is staying level or even decreasing. Hanna is planning to solicit responses to a more detailed web-based survey, designed using the feedback from the initial interviews and input from groups like the WLRA.

It's been several years since anyone has done a survey of load research organizations. The initial results presented here give a sense of the state of load research practice. We look forward to hearing about the results of the comprehensive survey.

Weather Response and Profitability

Craig Williamson of Primen discussed the relationship between weather and the profitability of energy customers. We looked at this relationship from the point of view of four types of energy companies operating in different environments.

The energy industry tends to understand the relationship between weather and load well enough: weather-sensitive loads change according to differences in weather and other loads that aren't weather-sensitive don't change with weather. Of course, most customers have a mix of these two types of loads, though one usually dominates.

Weather sensitivity

As a result, we describe some customers as weather-sensitive and others as not. In fact, a customer's degree of weather sensitivity can change how weather affects that customer's profitability. Other issues that affect this relationship include pricing and cost allocation, the regulatory environment, and wholesale price volatility.

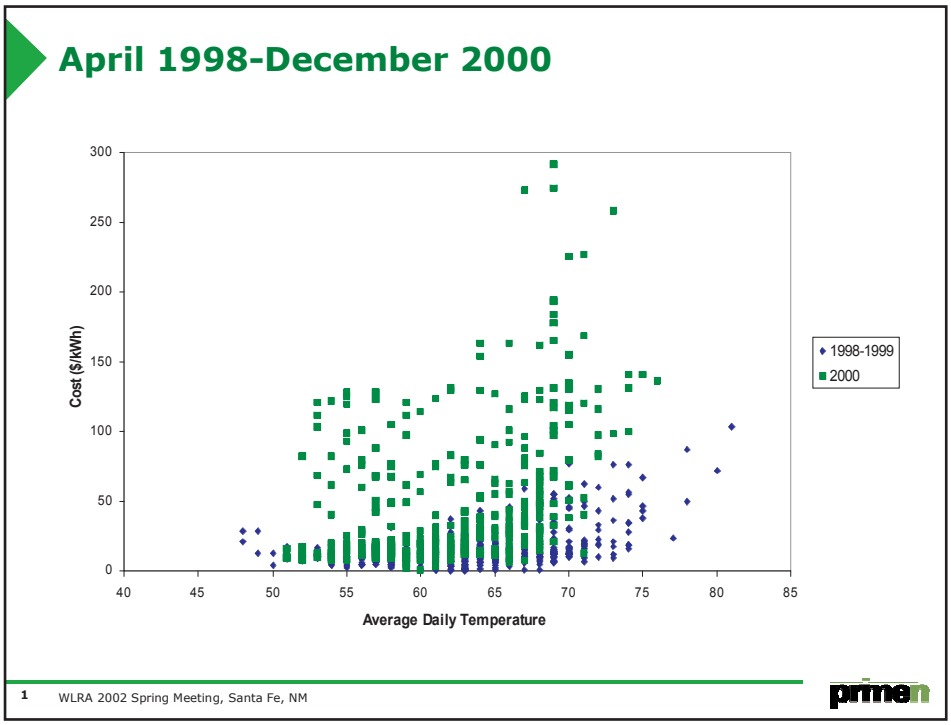
A customer's degree of weather sensitivity can change how weather affects that customer's profitability.

In the old, regulated, vertically integrated utility world, the "Lake Wobegon" adage applies — energy companies are most profitable when all the winters are colder than average and all the summers are warmer than average. As long as everything is stable, this holds true. Increased revenue from higher sales is not offset by corresponding increases in costs. But what about other situations?

In an environment where wholesale prices fluctuate, traditional economic theory says that as demand (load) increases, wholesale price goes up. And more extreme weather, defined as colder winters and warmer summers, causes load to increase and prices to go up. When wholesale price increases and the retail price to the customer is fixed, profitability suffers.

A study of publicly available weather, price, and load data from Southern California for 1998 to1999 shows that when there was enough supply, this relationship held. During 2000, however, when there were supply shortages, this relationship collapsed as prices fluctuated wildly (see **Figure 2**).

Figure 2. Weather response and profitability



How price depends on weather

We used the data to develop a model of how price is dependent on weather. The model included a time-lag component, as well as variables for season, day type, and weather (as cooling degree days). The results supported the basic economic model described above.

The results supported the basic economic model.

For a traditional utility, allocation of fixed and variable costs has a huge impact on what happens in extreme or mild weather. If it's done right, profitability is stable. This is not the norm, however, so usually mild weather lowers profitability and extreme weather raises it. And for residential and small commercial customers, loading the fixed costs into the energy charge exacerbates this effect.

For a competitive supplier under deregulation, the skewed distribution of supply price usually results in such high costs that there's too much revenue lost to recover during the lower-cost milder weather.

The default provider can also be hard hit by this, especially considering that their rates are usually set using regulated rules, with some discount applied. The delivery company can usually hedge, as long as delivery is charged either per kW of demand or as a flat fee, based on equipment.

But what can we do about this? Pricing is the most effective way to reduce risk. But customers aren't interested in complex pricing and seem unwilling to pay to reduce risk. If we can ever resolve this "disconnect," we can probably make deregulation work.

Lessons for Load Research Design

Stuart McMenamin of RER used his work with load profiling for the Electric Reliability Council of Texas (ERCOT) as a vehicle to discuss sample design in his presentation "Sample Design Lessons from Profiling Data Analysis."

McMenamin first summarized the nine profile segments for the ERCOT market and explained how the segmentation criteria were developed, followed by a discussion of the differences between segmentation for load profiling, stratification in sample design, and domains analysis after data are collected.

The point of segmentation is to group customers with similar load shapes, but possibly different energy use, into segments for use in settlement and reconciliation. Stratification of samples is done to reduce the variance of estimates and optimally allocate sample points, but not to provide results for individual strata. Domains analysis is a *post hoc* method to estimate parameters based on subgroups not included in the original sample design.

Seasonal use

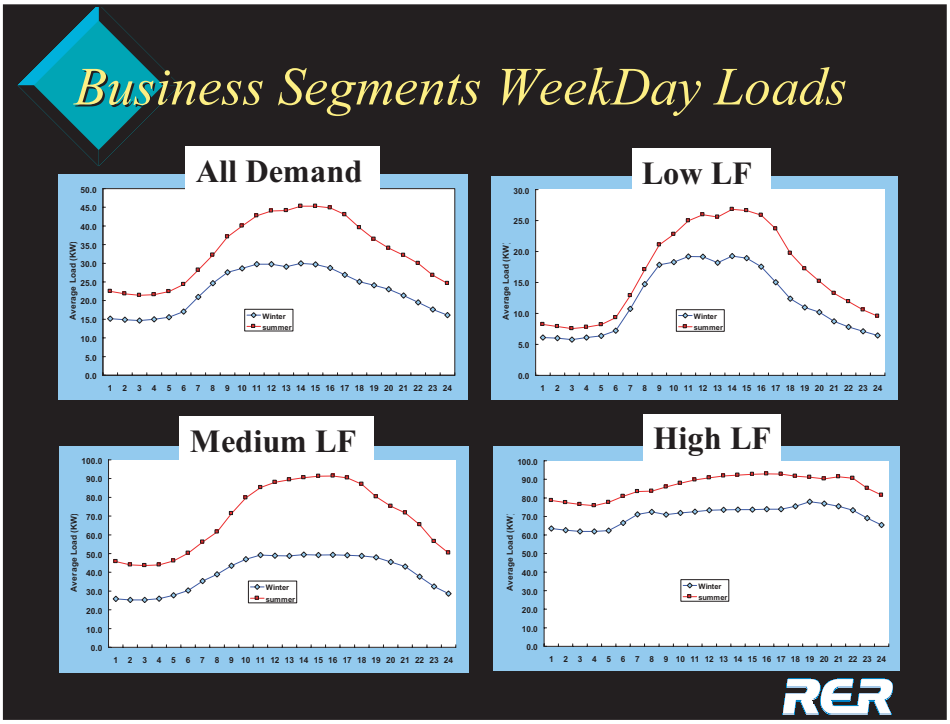
McMenamin talked about the value of segmentation and stratification based on seasonal use, especially in areas where several different heating fuels are commonly used or where there are customers both with and without air conditioning, both of which are true in parts of Texas.

McMenamin compared the three business demand segments with the overall business average load, shown here in **Figure 3**. He noted how different these shapes are, illustrating the benefit of segmenting by load factor. He also compared standard deviations, correlations, and error ratios for stratification by size and stratification by load factor.

McMenamin concluded that for designing samples to support profiling, segmentation must match the intended profile segments and zones. This type of sampling differs from traditional load research sampling in that the target for estimation is the hourly fractions of monthly use, not the absolute level of hourly demands. He also noted that precision requirements for load profiling have not been established.

For designing samples to support profiling, segmentation must match the intended profile segments and zones.

Figure 3. Summer and winter weekday loads



Recommendations for stratification

McMenamin gave the following recommendations for stratification:

- Stratify residential groups by seasonal usage patterns or ratios.
- Stratify business groups without demand meters based on seasonal patterns.
- Stratify business groups with demand meters by size and load factor.

These recommendations apply both to traditional load research sample designs and designs to support load profiling.

Status Reports: Tales from the Trenches

Status reports by utility attendees are a unique and useful part of the WLRA meetings. Representatives of each participating utility give a summary of their load research program and highlight issues or activities at their company.

Some highlights of the status reports were:

- **Southern California Edison (SCE).** Consumption is up significantly this year over last, probably due in part to weather and in part to behavior (concern about supply is wearing off).
- **Public Service of New Mexico (PNM).** Competition in New Mexico was delayed as of last year. Life is a lot easier for the load researchers as a result.
- **Modesto Irrigation District (MID).** After "losing" the load research function last year, Mary Gingrich is again involved in load research and was able to join us at this meeting.
- **NorthWestern Energy.** On February 3, NorthWestern Energy formally acquired what was left of Montana Power Company. NorthWestern Corporation is made up of Expanets, a networked communications provider; Cornerstone Propane; Blue Dot, a nationwide network of HVAC and plumbing professionals; and NorthWestern Energy.
- **Arizona Public Service (APS).** APS's load research group is finding that load data are increasingly important for supporting activities on the energy trading floor.
- **Pacific Gas & Electric (PG&E).** After declaring bankruptcy on April 6, 2001, PG&E, with $25.1 billion in assets and $10.2 billion in operating revenue, submitted a reorganization plan in September. In spite of this, life goes on unabated in load research.
- **Electric Reliability Council of Texas (ERCOT).** ERCOT handles the load profiling for all of the Texas market that has been opened up to competition. Its work includes estimating profiles using a modeled (adjusted static) method for 5.8 million customers.

Key Account Analysis System

Roger Wright of RLW Analytics presented an approach to key account analysis that came out of a proposal RLW prepared for the Sacramento Municipal Utility District (SMUD). SMUD wanted a system with advanced capabilities that ended up being too expensive.

A "renegade, regressive approach".

Wright analyzed why the system would have been so costly. He specifically identified real-time access of several different SMUD databases, rate calculation, flexible demand-shifting scenarios, user-friendliness, and both canned and flexible reporting capabilities as requirements that put the cost out of reach.

"Why not rethink these specifications," asked Wright, "and come up with something that would provide most of the benefit at a tiny faction of the cost?" He proposed a "renegade, regressive approach" — not trying for real-time access and using more canned report formats. He suggested that RLW's Visualize-IT™ software, along with a rate calculation engine, could be used to provide much of what SMUD wanted.

He then went on to show what it might look like from a user perspective, in what Wright admitted was basically a product demonstration of Visualize-IT. The group had some fun trying to guess what had caused some of the anomalies in the load shapes shown, including equipment failures, atypical schedules, and odd customer behavior.

Data Validation for a Changing Industry

A newcomer to the WLRA and to load research, Kathy Smith of ABB gave a presentation on data validation and editing. Her background is on the metering side of ABB, but she has been involved in working groups for metering, validation, and editing in several states. ABB got involved to ensure that no competitors were inappropriately working to set metering standards that would preclude use of ABB's meters.

Smith explained that with settlement and reconciliation to support competition, the world of metering, data collection, validation, and editing has changed. Much more load data are collected, companies operate in a production environment with tight time frames, and it's no longer just the local utility that's involved — other entities, too, are doing different aspects of this work.

Everyone agrees in principal on the goals. First, we need to provide data that accurately reflects usage. We must identify problems quickly, understand data quality, and above all, be consistent. Smith talked about some typical interval validation checks, as well as other considerations not specific to individual intervals but which can affect the load data. She also cross-referenced the validation checks with the possible sources of problems.

We must identify problems quickly, understand data quality, and above all, be consistent.

According to Smith, a good validation system is one that identifies potential problems, detects possible energy diversion, supports dispute resolution processes, and avoids flagging irregular-usage customers unnecessarily.

Automating the validation process as much as possible will help achieve these goals. Also important are careful equipment selection, transaction history management, and comprehensive reporting.

It was useful to get this information from the representative of a meter manufacturer — a perspective we're not always aware of.

2001: The California Energy Crisis Odyssey

Susan McNicoll of PG&E gave an entertaining and thought-provoking walk through 2001 in the California energy world. She began with the background of deregulation in the Golden State, including the well-publicized rolling blackouts and utility distribution company (UDC) debt accumulation.

The first quarter of 2001 brought "doom and gloom" predictions and drastic actions. After the governor declared a state of emergency, rolling outages began, the Department of

Water Resources issued bids for long-term supply contracts, the California Energy Commission (CEC) predicted a 5,000 MW shortfall in supply, and the governor ordered an acceleration in the generation permit process.

How to reduce demand?

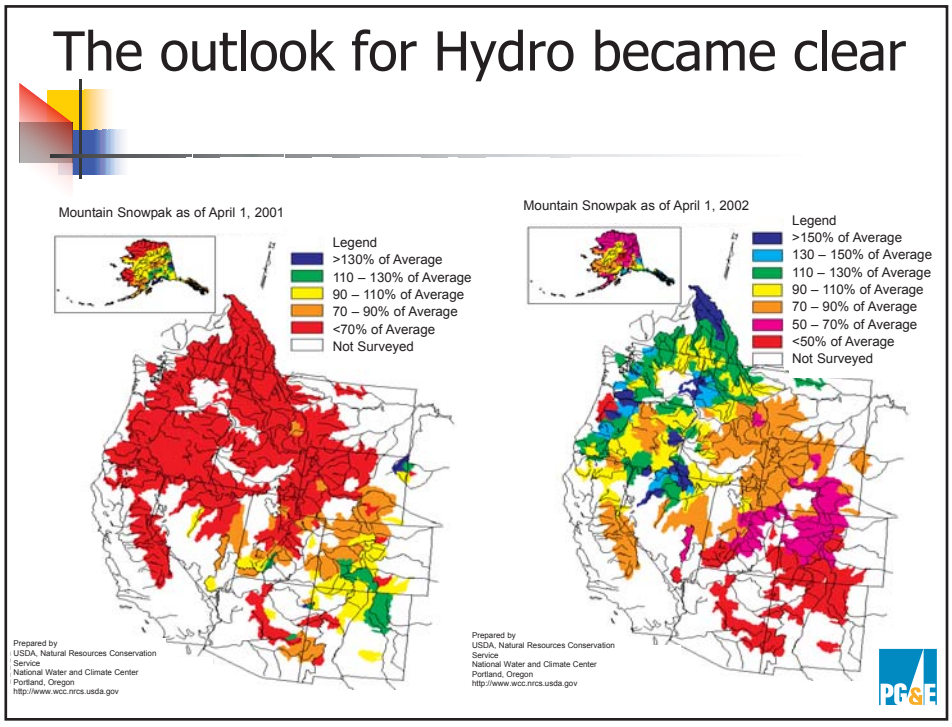
The cause of this situation was mainly a supply shortage (note the lower than normal snowpack in **Figure 4**). Yet the most effective way to deal with the shortage in the near term was to reduce demand. But how?

The state and the utilities used various methods to try to reduce demand. An unprecedented media campaign asked for voluntary conservation. New load management and energy efficiency programs were quickly designed and implemented. Surcharges were put in place, with the most severe punitive charges assessed during peak times and on high users.

And a new rebate program, called the "20-20" rebate, was implemented by executive order. In this program, any customers who reduced their consumption in 2001's four summer months by at least 20% compared to the same period in 2000 got a 20% reduction in their bill.

The most effective way to deal with the shortage in the near term was to reduce demand.

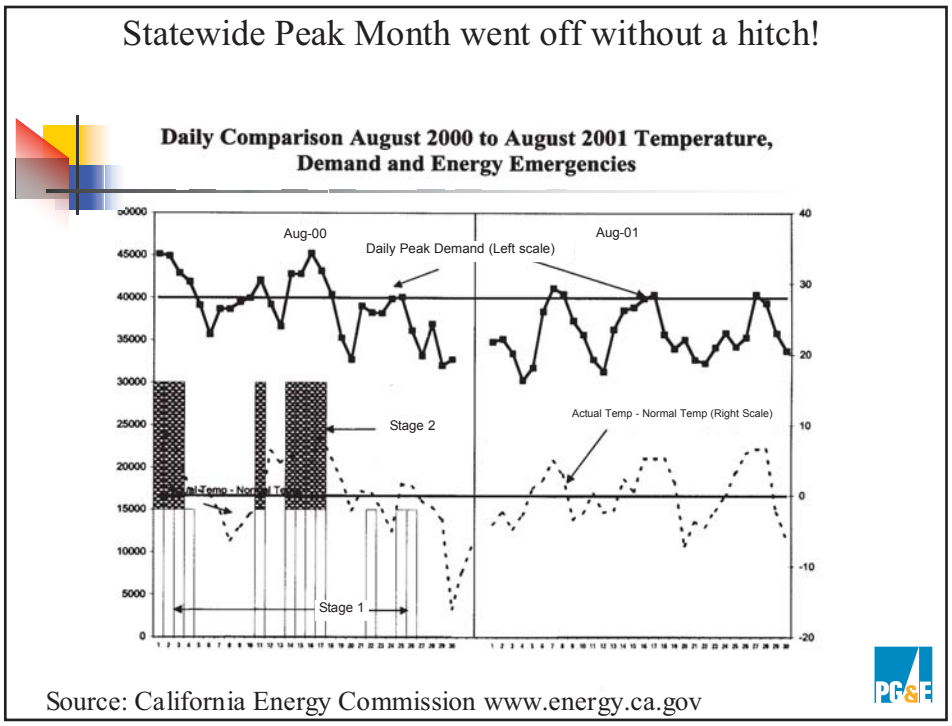
Figure 4. Mountain snowpack



And then…almost nothing happened. May 31, 2001 was the last stage 3 alert, and there were only two more stage 2 alerts during the rest of the year. The weather for the summer was close to normal and, although economic growth had slowed in the state, the economics were still positive.

Although there was a reduction in power plant outages from 2000 to 2001, most effective was demand reduction. There was about a 14% drop in the June peak between the two years and a 6% to 7% drop in the August peak (see **Figure 5**).

Figure 5. Statewide peak month



Voluntary load reduction

The demand reduction efforts resulted in a 6.7% drop in annual energy use and an average 10% drop in summer peak demand on a weather-normalized basis. 70% of the overall load reduction, or about 2,616 MW, was attributed to voluntary load reduction. 692 MW, or 18% of the overall load reduction, was due to energy efficiency and load management incentive programs.

In all, annual energy was reduced by over 16,000 GWh from 2000 to 2001, adjusted for weather and economic growth. These savings were spread proportionally over all customer segments, with the exception of agriculture.

Next steps

McNicoll concluded with some observations and a look at the next steps. PG&E will continue to monitor the persistence of the demand reductions closely. Rate increases and fear of blackouts were the two main reasons for customer conservation efforts, and these may no longer be seen as immediate threats.

The company will be walking a delicate balance: it doesn't want to encourage fear of blackouts but does want to avoid customer complacency. PG&E would also like to emphasize energy efficiency over conservation and hopes for a sustainable new generation market.

Rate increases and fear of blackouts were the two main reasons for customer conservation efforts.

Short-Term Load Forecasting

In the most technical of the presentations, Afshin Afshari from Silicon Energy described a system for short-term forecasting. This method allows users to start with almost no information and then, via a recursive approach, to adjust the models based on actual data collected as time goes by.

The initial static load model involves a constant term, and terms for both heating degree-days (HDD) and cooling degree-days (CDD). Start-up values for the model parameters for each hour are generated using a building load-modeling tool. Then once a day, each set of parameters is adjusted to take into account the hourly load data collected that day.

Quick convergence

This is done using a least-squares recursive estimation algorithm. It's critical that this approach converge quickly, with little or no chance for non-convergence, since the goal is to have the algorithm run every day without any human intervention. Afshari included a graph showing the convergence of the parameter estimate for the constant term for all 24 hours for weekdays (see **Figure 6)**.

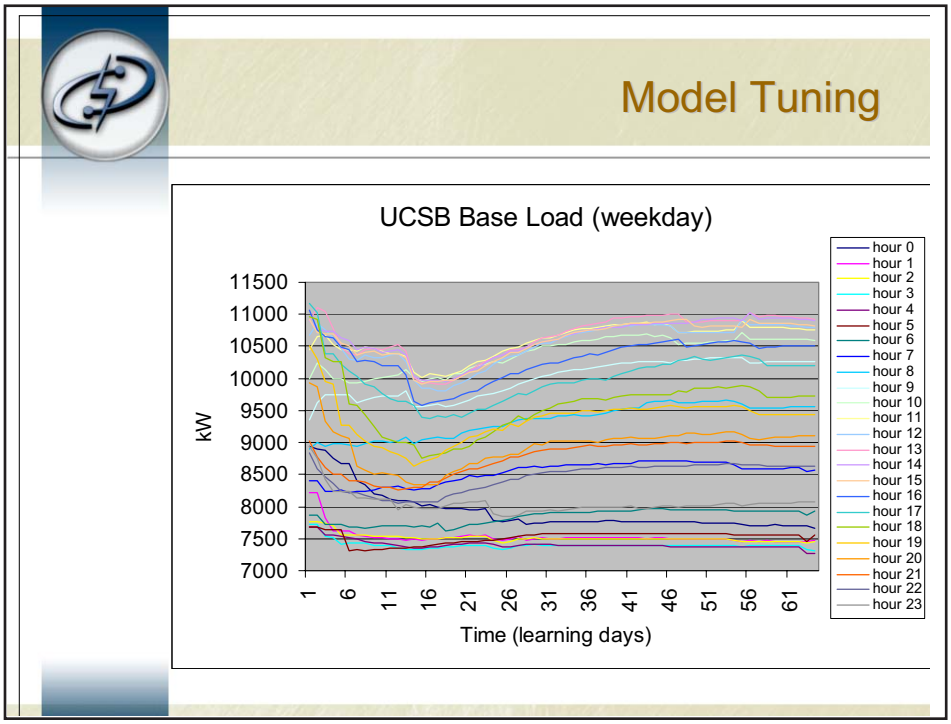
Potential applications

Afshari described four potential applications of this method.

- **Procurement.** Utility customers can better predict their own load shape, allowing them to negotiate a more advantageous power purchase agreement. This requires the opportunity and inclination to do so, which may not exist in the marketplace right now.
- **Efficiency diagnostic.** A customer can detect atypical loads and alarms can be triggered. This might allow a customer to detect unusual and wasteful events, such as inadvertently leaving a chiller on all night.
- **Load management.** A customer or a utility could use the information from this short-term forecast to predict the benefit of a load curtailment before the event and to estimate the savings after the event.

- **Utility distribution analysis.** A utility company could build a short-term forecast for regions or systems using this approach, possibly applied to substation loads.

Figure 6. Model tuning



Maintaining the Integrity of Load Research Sample Sites During Deregulation

This talk was a tag team discussion by Linda Rawlings and Jackie Ortega of PG&E. Rawlings and Ortega opened with some background, explaining that PG&E's load research samples, which are also used for dynamic load profiling, include both bundled service customers — served by the utility distribution companies (UDCs) — and direct access customers — served by energy service providers (ESPs).

One of the strengths of the WLRA is the range of topics presented. This talk focused on the very real operational problems that can arise with load data collection. Those heading into competitive supply situations would do well to heed these warnings and suggestions.

Regulatory and legislative uncertainty

With the beginning of deregulation in California, the load research group was able to keep up with the changes in the field. Redundant metering, with two sockets for meters at some sites, and automated tracking systems, helped manage the information through the

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changes. But by 2001, the problems increased and the group was struggling to get the data it needed to produce results.

There were field issues, including competition for internal resources, which led to delays in installation and repair, and consequently missing data. The field resources needed by the load research group's field operations staff were taxed by increases in customer-requested work, by the impact of a new real-time metering program, and by new and existing load management programs and tariff options. Adding to the struggle was regulatory and legislative uncertainty.

The PG&E load research group is trying to work with internal and external partners to clearly identify load research sites and make sure that the equipment stays in place and the integrity of the data remains intact.

Suggestions for similar situations

Rawlings and Ortega gave the group some suggestions for dealing with situations like this:

- Be open to change.
- Be aware that if it can happen, it will happen.
- Enjoy the challenges.
- Appreciate that you can make a difference.
- Try to keep a sense of humor.

They closed by noting that in spite of the events in California, deregulation is probably not over yet.

What Flavor Are Those Electrons?

This presentation was good to have on the agenda — something a little removed from the usual load research talks. And judging by the questions asked and by the discussion, most of the group was pleased. It's also something others may face soon.

A team from PNM, including David Eubank from contracts, Al Houghton from the meter shop, and Herb Rooney of load research shared the story of how a power wholesaler is using aggregation of customer-owned generators as a power supply option and what PNM had to do to enable the project. This may have been the hottest topic of the conference, considering the number of questions and length of the discussion it generated.

▸ This [metering of customer-owned generators for aggregation] may have been the hottest topic of the conference. ◂

A distributed resource

An unnamed power wholesaler has signed a contract with PNM to supply at least 10 MW of "distributed resource." This wholesaler has recruited PNM customers with existing onsite generators, ranging in size from 250 kW to 4 MW, and intends to aggregate them.

(For more information about aggregating and dispatching distributed resources, see Primen's forthcoming Distributed Energy *Strategic Report* on aggregating distributed energy, available to subscribers only).

Eubank described how unlike any other contract and metering situation this project was. In many cases, the existing generators were for backup only and so were not directly connected to the distribution system. There were questions to be resolved surrounding logistics, financials, and regulation, including issues related to safety, metering, customer education, and control area operations.

This was unlike any other contract and metering situation.

The metering challenge

Houghton then discussed the physical metering of one of these facilities with onsite generation. The metering challenge was designing a package to meet these specific needs, choose the appropriate equipment, program it correctly, and train personnel to install it.

The solutions that the meter engineers developed were to standardize the metering package for this type of setup, creating an approach to correctly meter any onsite generation facility. Standardizing the equipment and the programming made training simpler and minimized the likelihood of problems.

The metering must measure:

- The energy provided to the customer by PNM
- The energy used by the customer that is generated onsite by the customer
- The energy generated onsite by the customer and supplied to the grid

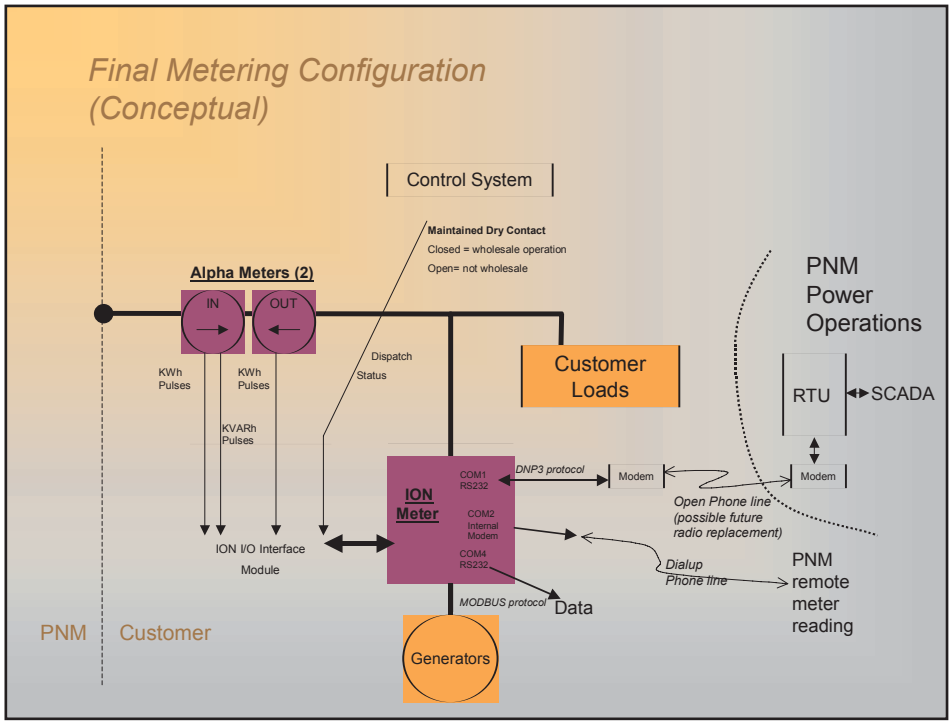
The existing metering was not capable of measuring all of these components. **Figure 7** shows the new metering configuration.

Customer bill accuracy

Rooney reminded us that for a utility, the customer's bill must be correct so the data supporting the bill must be right. The key variable in this process is whether, at any given time, the generator is being used as a distributed resource for wholesale supply or by the customer to offset load. To make matters more complex, the status of the generator can change often and the billing process needs to adjust accordingly.

After a careful analysis of the situation, PNM chose to have the load research group develop methods to bill this type of customer instead of investing in complex and expensive billing software. Five-minute interval data are collected for all the meters involved and then aggregated in one of two ways, depending on the status of the generator.

Figure 7. Final metering configuration



New metering and communication systems

Initially, the status was determined according to an ASCII text file sent from the aggregator, showing the start and stop times. When the new metering and communication software is installed, the ASCII file won't be needed anymore. And with the new system in place, the information about status will be recorded for each interval.

There are pros and cons for both the preliminary approach and the final approach used. The preliminary approach had the advantage of simplicity, with less likelihood of errors from programming or setup of the meters. But because of the need for the text file, there was a manual part of the process that could easily cause problems.

The final approach, using new metering and communication systems, eliminates these problems and allows the load research group to produce all the information needed for billing from the data. Still, the metering and programming for this approach is much more complex, which could result in errors.

Load Research for ERCOT's Settlement Process

Derek Glatz of ERCOT gave an overview of restructuring and load profiling at ERCOT. It's important for us to understand how things are done in Texas. If Texas can avoid the problems of California, the industry will look to ERCOT as a model of how to make restructuring and load profiling work.

Glatz reviewed a timeline of restructuring in Texas, and then described load profiling for settlement and reconciliation. The Load Profile Working Group is a collection of people from all stakeholder organizations that work with the ERCOT load profiling group to develop the methods for load profiling.

The profiles determine the load obligations of the suppliers and so have an impact on the market settlement process.

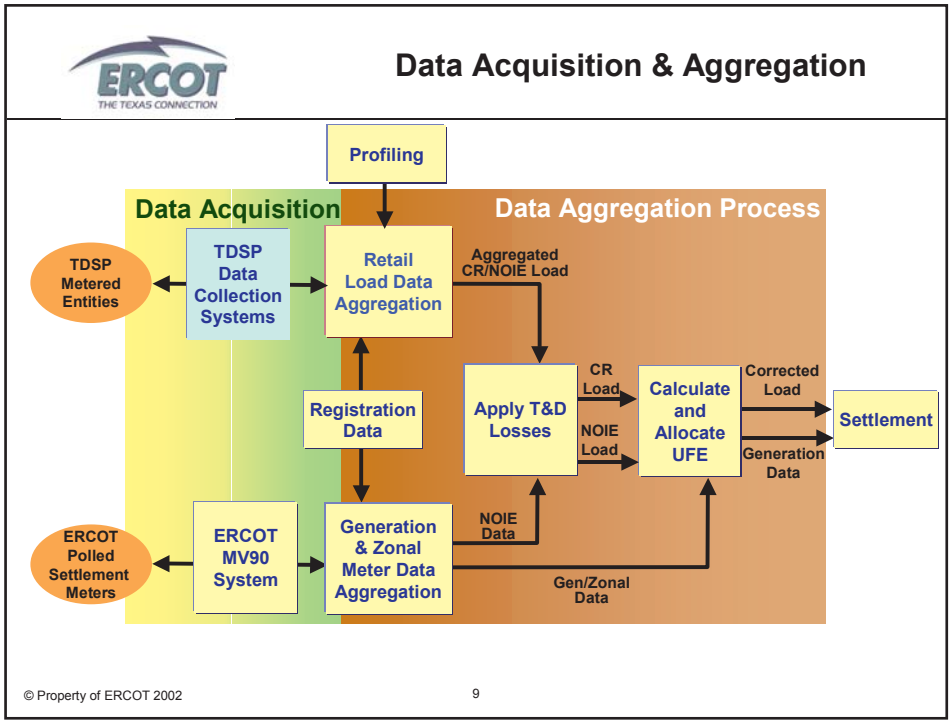
ERCOT's method for profile development

ERCOT uses an adjusted static method for profile development. They used historical (static) load research from across the state to develop models, which are then applied (adjusted) to current conditions such as weather. The profiles developed through this process determine the load obligations of the suppliers and so have an impact on the market settlement process.

The three separate settlements in Texas are the initial settlement at 17 days past the settlement day, a final settlement at 59 days, and a "true up" settlement 180 days after the original settlement day.

Figure 8 shows the data flow and some of the software used for settlement at ERCOT. The process uses data from generation sources, interval data recorders (IDRs), monthly billing data, and modeled load profiles.

Figure 8. Data acquisition & aggregation



How load profiling affects settlement

The load profiling process affects settlement as follows:

- Allocates direct charges
- Allocates market assignable charges
- Determines how much unaccounted-for energy (UFE) will be assigned to the market
- Allocates that UFE to the market
- Allocates losses to the market

As a result, accurate profiling is critical to ensuring a properly performing fair market.

Accurate profiling is critical to ensuring a properly performing fair market.

Glatz described developing profile models and generating the profiles from the models. Weather and models based on day type were developed for nine profile segments and eight climate zones, based on historical load data from 1993 to 1999. The sample included 2,131 residential sites and 5,765 business sites.

The models take weather, calendar, and sunrise/sunset data as inputs, and first estimate daily kWh, then hourly fractions of each day, and then 15-minute interval fractions of the hours.

Glatz also identified several issues related to load profiling. There's been no direct validation of existing profiles because there's no ongoing load research program at ERCOT. Starting such a program, and covering the entire ERCOT region, will be very expensive and will depend on cooperation from the transmission and distribution service providers (TDSPs). There are also issues with making more load profiles available to the market.

Many of these issues were discussed at a workshop in Texas, held a few days after the WLRA meeting. We look forward to a follow-up report from Derek at the fall meeting.

Upcoming Meetings

Portland General Electric has agreed to host the WLRA fall meeting, to be held in Portland OR, September 11 to September 13. A pre-conference workshop for September 10 to present "tools and tricks" of load data processing is planned. In addition:

- Claude Godin of ITRON agreed to present a half day of information on how to use MV-90 and we hope to get someone from LodeStar to present for the other half of the day.
- Andy Evancho of Tacoma Public Utilities has graciously agreed to work with the public power groups in the Northwest to recruit additional attendees for this meeting.

- Craig Williamson of Primen will continue in the role of WLRA co-chair, and Susan McNicoll of PG&E was elected as the other co-chair.
- Looking further into the future, Derek Glatz of ERCOT agreed to host the spring 2003 WLRA meeting in Austin TX.

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.