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**Demand Side
Management
Option/Risk
Evaluator**

August 2010

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Letter from the Chair



Carol White, AESP Chair

A True Paradox - The Utility as Energy Efficiency Program Administrator

The World Dictionary defines a paradox as “a person or thing exhibiting apparently contradictory characteristics.” In many areas, electric and gas utility companies are asked to implement energy efficiency programs in order to manage and reduce the level and volatility of energy costs while also supporting climate change mitigation efforts and local economic development initiatives. Utility companies are often asked to take on this responsibility because they are high visibility corporations and touch nearly everyone in their service territory. One of the most daunting challenges utility companies face today is to generate revenue through energy sales and delivery, while taking significant measures to help customers reduce their usage. This is a true paradox.

This month's edition of *Strategies* focuses on pricing and demand response (DR). However, the topic of “pricing” goes well beyond rate design that supports DR and energy efficiency programs. Pricing, or more broadly, ratemaking, is a tool that can be used to align utility interests with public policy objectives to address the desire for investor-owned utility companies to actively take steps to reduce their sales; actions that are counter to the utility's fiduciary responsibility to its shareholders. Decoupling in combination with an effective performance-based shareholder incentive mechanism can remedy this paradox.

Traditional utility ratemaking quantifies what the cost of doing business is, or should be, for a particular utility company and then builds rates to provide the utility with a defined revenue level that takes into account those costs, the return allowed by regulators, and sales volumes. If revenue falls below projections because of energy efficiency program efforts, the utility can suffer unintended consequences. Additionally, lower than expected revenues can jeopardize a utility's ability to fund needed capital improvement projects.

Jurisdictions that recognize this difficulty are taking steps to better align the regulatory model to be more synchronous with public policy objectives. These jurisdictions are instituting policies and practices that adopt revenue decoupling mechanisms and eliminate the disincentive to pursue energy efficiency investments.¹ However, these decoupling measures eliminate the disincentive without recognizing that investor-owned utilities have a fiduciary responsibility to provide a return to their shareholders. To counter this critical issue, performance-based financial incentives are often developed based on a utility's ability to deliver measurable energy efficiency program results.

Upcoming Events

Brown Bags

August 12, 2010
The intersection of DSM and Smart Grid: How can evaluation and market research help?

August 26, 2010
FERC's National Action Plan for Demand Response: What It Means for Utilities, Customers, & Providers

September 9, 2010
Who Gets the Credit: A Framework for Determining Causality & Attribution for Energy Efficiency & Renewable Programs

If you would like to organize a Brown Bag, please contact Kisha Gresham at kisha@aesp.org.

AESP Training Courses

October 4, 2010
Principles of Demand Response
Portland, OR

October 4, 2010
Introduction to the Principles of EM&V

Aligning public policy goals and utility business objectives can be complex, and if not carefully planned, can have unexpected and unwanted results. However, the effort is definitely worthwhile and can lead to better outcomes for consumers and investors alike.

¹Revenue decoupling mechanisms do not address shortfalls in funding required for capital improvement projects. Capital adjustment mechanisms are a viable approach to address this shortfall.



Meg Matt

MEMBERSHIP MANIA!

By: Meg Matt, AESP

If you are anything like me, it is tough to keep pace with the overwhelming changes that go on in the energy industry every day. New policies...New technologies...New people...

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Notes: Membership drive ends December 15, 2010. Target gift cards are distributed monthly. The \$250 gift card drawing and award of iPad will occur on December 16, 2010. Winners will be notified by phone or email. New memberships must be paid in full to receive gifts. Terms are subject to change without notice.

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Headlines

Stimulus News

"DOE Announces More Than \$76 Million for Advanced Energy Efficient Building Technologies and Commercial Building Training Programs"

"City Uses Stimulus Funds, Grants to Further Conservation, Save Taxpayer Dollars"

"City Gets Funding to Make Upgrades"

October 6-7, 2010
Overview of DSM
Portland, OR

October 6-7, 2010
E2 - Level II DSM:
Evaluation & Economics
Portland, OR

If you would like to schedule an onsite training please contact Suzanne Jones at (480) 704-5900 or suzanne@aesp.org. For more information about the AESP Institute, click [here](#).

Conferences

October 4-7, 2010
Bridging the Gap
between Demand
Response and Energy
Efficiency: Policies,
Technologies and the
Smart Grid
Portland, OR

January 17-21, 2011
AESP's 21st National
Conference & Expo
Orlando, FL

May 16-19, 2011
AESP's Spring
Conference: Program
Implementation and
Marketing
Atlanta, GA



AESP is a member-based association dedicated to improving the delivery and implementation of energy efficiency, energy management and distributed renewable resources. AESP provides professional development programs,

Industry News

"Utilities Face the Decision Point of Big Shifts - to Gas, Renewables and Efficiency"
"As Temperatures Soar, KCP&L's Summer Option for Air Conditioners Kicks In"
"Delaware Utilities: State Removes Decoupling Mandate for PSC"
"New Report: U.S. Electric Utilities Must Embrace Clean Energy, Energy Efficiency"
"Consumers Getting More Attention in Smart Grid"
"PG&E to Invest in Solar Firm"
"EPA Launches ENERGY STAR for Data Centers"

AESP News

Featured Article

Updates from AESP, Local Chapters, Topic Committees and Members
AESP Welcomes...
News Releases and Announcements

Stimulus News

The following executive summaries of current news items were written for Strategies after being compiled from various news sources.

DOE Announces More Than \$76 Million for Advanced Energy Efficient Building Technologies and Commercial Building Training Programs

U.S. Energy Secretary Steven Chu has announced more than \$76 million in American Recovery and Reinvestment Act awards to support 58 advanced energy efficient building technology projects and training programs for commercial building equipment technicians, building operators, and energy auditors. The projects will help boost the energy efficiency and cost effectiveness of U.S. buildings, while also supporting programs to train workers to maintain and run new and existing buildings, to devise and implement best practices that reduce greenhouse gas emissions, and to establish a green workforce with technical expertise to lower energy costs for consumers. Nearly \$70 million will be committed to 45 advanced energy efficient building technology projects, which will be leveraged with over \$31.4 million in funding from private industry, for a total project value of roughly \$100 million. Fourteen initiatives will involve improving the energy efficiency of residential and commercial buildings via technology advances in windows and envelope components, while five projects will concentrate on enhancing the capability to model complex interactions between building elements, including climate, envelope heat and moisture transfer, internal heat gains, lighting power, heating, ventilation, and air conditioning (HVAC) gear, controls, thermal and visual comfort, and energy costs. Ten projects will emphasize dramatic efficiency upgrades to HVAC systems and pursue technologies that are applicable to both air conditioning and refrigeration. Boosting the efficiency of water heating equipment and reducing miscellaneous electric loads will be the focus of four projects.

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From "DOE Announces More Than \$76 Million for Advanced Energy Efficient Building Technologies and Commercial Building Training Programs"
U.S. Department of Energy (06/17/10)

City Uses Stimulus Funds, Grants to Further Conservation, Save Taxpayer Dollars

Grand Junction, Colo., is looking to use the methane gas produced by its wastewater treatment plant to fuel city vehicles, which would clean up the city's air and save money on taxes, according to wastewater services manager Dan Tonello. The city already uses a small amount of the methane to heat the plant—just 20,000 cubic feet of the estimated 120,000—but the vast majority is sent off into the atmosphere and represents a missed opportunity, he says. Tonello says he believes Grand Junction is the only municipality planning to use the fuel for vehicles, while others like Renton, Wash., use it for public gas utilities that sell it to residents for home heating. Treating the gas to make it usable would cost about \$1.50 a gallon, and using it for vehicles would produce more savings than giving it to a public utility, Tonello says. It could reduce use of gasoline by 140,000 gallons a year and cut carbon emissions by 3 million pounds, he added. The city needs funding for the equipment to treat the methane and is seeking funding of around \$2 million, which could come from an EPA Showplace Communities grant.

practitioners, and promotes the transfer of knowledge and experience.

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From "City Uses Stimulus Funds, Grants to Further Conservation, Save Taxpayer Dollars"
Grand Junction Free Press (07/09/10) Sullivan, Sharon

City Gets Funding to Make Upgrades

Van Buren, Ark., has received \$498,123 in stimulus funding from the U.S. Department of Energy to be used for making municipal buildings more energy efficient. While some of the buildings being retrofitted are quite old, such as the late 19th century King Opera House, even those built in the 1970s are inefficient and need some work, according to Mayor Bob Freeman. He added that he was surprised the government provided enough funding to fix all of the problems it listed in its grant application. The state overall received \$6.2 million, and Van Buren is one of four receiving the biggest portion of that funding. The city will have to match 22 percent of the funds, or about \$140,625. Freeman said the city may receive another round of stimulus money to replace traffic light bulbs with LED bulbs, which have saved the city \$80 per light at one intersection on Arkansas 59.

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From "City Gets Funding to Make Upgrades"
Press Argus-Courier (07/07/2010) Ward, Lareign

Industry News

The following executive summaries of current news items were written for Strategies after being compiled from various news sources.

Utilities Face the Decision Point of Big Shifts - to Gas, Renewables and Efficiency

With or without a climate bill, many electric utilities are investing in efficiency measures that will cut long-term costs and integrate more natural gas and renewable energy into their power supplies according to a new report. "The business landscape for electric utilities is shifting quickly," says a report authored by Navigant Consulting for Ceres, a coalition of institutional investors and environmental groups. "In turn, the traditional operating paradigm of building large generation facilities to sell ever-increasing amounts of electricity is changing." The report also discusses boosting natural gas in the fuel mix for electricity generation. "Natural gas is positioned to play a growing role as a complement to variable renewable energy resources. In addition, natural gas can help optimize overall energy efficiency by integrating thermal and electric technologies and end-uses," it states. The shift is being driven by state policies that make it expensive to build more fossil fuel-based electric generation and by the government's push to cut emissions by up to 80 percent by 2050, the report says. The electric power sector accounts for about 40 percent of U.S. and global carbon dioxide emissions. Cutting those emissions by decreasing energy use has been the leading strategy for much of the industry, according to this and other recent reports. Navigant and Ceres say there are still fundamental hurdles to overcome in order to achieve efficiency's full potential: there is a lack of broad enough regulatory support; the utility-sector business model based on electricity sales remains largely in place; and power transmission capacity limits the amount of renewable energy that can be integrated into the system. "A utility that deals effectively with these trends, and receives sufficient support from regulators and legislators, will be better positioned to [succeed] in the 21st century," says the report. "All else equal, such a utility is also more likely to attract lower cost capital, enabling it to earn stronger returns for investors."

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From "Utilities Face the Decision Point of Big Shifts - to Gas, Renewables and Efficiency"
New York Times (07/09/10) Kirkland, Joel

As Temperatures Soar, KCP&L's Summer Option for Air Conditioners Kicks In

Higher temperatures used to mean more pressure on the power plants for Kansas City Power & Light, because of the increased reliance on air conditioners. However, another option came into play on July 14 when things got hot, thanks to 46,000 KCP&L customers who signed up for the utility's Energy Optimizer program. The utility was able to send electronic signals to make those customers' central air conditioners and heat pumps cycle on and off in 15-minute intervals for a few hours. "They don't know they're doing it, but they've created a generating asset," says KCP&L spokesman Chuck Caisley. Programs like Energy Optimizer, which got off to a slow start in 2005, are beginning to get traction, and the utility now projects that 210,000 residential and business customers eventually could join. "We think we can get 25 percent of our customers in the program," says Jason Jones, manager of KCP&L's demand response programs. Customers who sign up for the program get a free programmable thermostat, which lets them save money throughout the year by making it easier for them to adjust their heating and cooling. In return, customers agree to let the utility cycle their central air conditioners or heat pumps on and off for up to four hours on days of peak demand. Typically, that's no more than four days a year and raises the temperature 2 degrees. Customers can opt out one day a month. KCP&L says Energy Optimizer and a program that pays about 500 commercial businesses to curb electricity consumption on peak days can cut peak demand by 145 megawatts.

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From "As Temperatures Soar, KCP&L's Summer Option for Air Conditioners Kicks In"
Kansas City Star (07/15/10) Everly, Steve

Delaware Utilities: State Removes Decoupling Mandate for PSC

Delaware has removed a mandate for the state Public Service Commission (PSC) to enact electric and gas decoupling, leaving it up to the commission whether to adopt the rate structure for Delmarva Power. In the final hours of the legislative session on July 1, Delaware lawmakers passed a bill that removed language mandating decoupling of utility profits from electric usage by December. A last-minute amendment by Sen. Harris McDowell included language requiring electric and gas rate designs to "avoid unnecessary impediments" to increasing energy efficiency. McDowell says this is not a reference to an argument utilities have made that traditional rate structures encourage them to sell more electricity. Rather, it means the PSC should choose a rate structure and stick to it, he says. In most states, decoupling takes the form of surcharges, allowing utilities to charge customers for drops in their usage. In Delaware, decoupling would instead take the form of higher flat fees. Critics claim this has a disproportionate impact on lower-usage customers. Delmarva spokeswoman Bridget Shelton says the utility never viewed the old law as a mandate, but rather viewed it as a timeline. With that timeline lifted, "it will give us the time necessary to work with the PSC to implement a new rate design and to educate customers on how that new rate design will help us achieve Delaware's ambitious energy efficiency goals."

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From "Delaware Utilities: State Removes Decoupling Mandate for PSC"
Delaware News Journal (07/02/10) Nathans, Aaron

New Report: U.S. Electric Utilities Must Embrace Clean Energy, Energy Efficiency

To remain competitive, U.S. utilities will need to provide cleaner, low-carbon electricity while enabling customers to better manage and reduce their energy use. Achieving this will require significant changes to the traditional utility business model, according to a new report from Ceres - a coalition of investors, environmental groups and other public interest organizations working with companies to address sustainability challenges such as global climate change. The report is titled "The 21st Century Electric Utility: Positioning for a Low-Carbon Future," and authored by Navigant Consulting. "The economics of electric power generation in the U.S. are changing dramatically," says Ceres President Mindy Lubber. "New business models must include aggressive energy efficiency measures and delivery of cleaner, low-carbon energy through renewable and smart grid technologies. Realizing these changes, as a handful of utilities have begun to do, requires a fundamental rethinking of how we produce, transmit, and use electricity in the U.S." Key industry trends affecting the industry include ever-increasing utilization - and policy support - for cost-effective energy

efficiency and smart grid technologies. Roadblocks include rate models based primarily on electricity sales, thus undermining cost-effective measures such as energy efficiency, and limitations of conventional electricity delivery infrastructure to integrate large amounts of renewable energy and enable customer energy management. The report makes clear that the challenges facing utilities also present substantial opportunities – including opportunities in energy efficiency. "Energy efficiency can cost as little as 3 cents per kilowatt hour saved, while electricity costs 6 to 12 cents per kilowatt hour. Despite these obvious advantages, we have historically grossly underinvested in energy efficiency as an industry," wrote National Grid U.S. President Tom King in the report foreword. "Altering this course by investing in all cost-effective energy efficiency measures is the most effective way to both reduce greenhouse gas emissions and lower customer bills."

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From "New Report: U.S. Electric Utilities Must Embrace Clean Energy, Energy Efficiency"
Financial Post (Canada) (07/08/10)

Consumers Getting More Attention in Smart Grid

A study from the American Council for an Energy Efficient Economy (ACEEE) finds that energy use feedback tools are more important than smart meters in reducing consumers' energy use. Analyzing 57 residential feedback programs since 1974, ACEEE concludes that no utilities have sufficient end-user tools, such as more detailed billing or giving real-time feedback through Web pages or in-home displays. "Advanced metering initiatives alone are neither necessary nor sufficient for providing households with the feedback that they need to achieve energy savings; however, they do offer important opportunities," says ACEE's John Laitner. "To realize potential feedback-induced savings, advanced meters must be used in conjunction with in-home (or online) displays and well-designed programs that successfully inform, engage, empower, and motivate people." Programs that give people more control over their household electricity use and help them reduce waste can ultimately cut consumption 4 percent to 12 percent, according to ACEEE, which says the savings could add up to \$35 billion over 20 years. Among utilities aiming to engage more with customers is Duke Energy, which has partnered with Cisco Systems to engineer a touch-screen home energy controller for monitoring smart grid residential energy. This trial, which will give appliance-by-appliance information, is one of a number of consumer-facing Duke smart grid trials. In the case of Duke, the smart meter will transmit energy data regularly to the display and to the utility, so it can view changes in electricity demand over its territory. There are also a number of home energy management systems that can get regular energy data without a smart meter by using a gateway device, home network, and broadband connection. Consulting and research company SBI Energy this week released a study saying about 80 percent of money invested in the smart grid is on the utility side, such as upgrades to grid equipment and computer technology to handle the spike in data. That mix is expected to change, as more equipment, including smart meters, is installed on the consumer side.

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From "Consumers Getting More Attention in Smart Grid"
CNet (07/02/10) LaMonica, Martin

PG&E to Invest in Solar Firm

PG&E Corp. will invest \$100 million in a partnership with solar developer SunRun Inc. to finance residential solar energy systems in five states that offer special incentives for renewable energy. As a result of its investment, the utility will be able to take advantage of hefty federal and state incentives, including a 30 percent federal investment-tax credit. A recent change in federal law made utilities eligible for the incentives as a way of encouraging them to make investments at a time when other investors were pulling back from the renewable energy market. PG&E's investment will go toward solar systems in Arizona, California, Colorado, Massachusetts, and New Jersey. PG&E's investment in the new venture, called SunRun Pacific Solar, is important to SunRun because it needs so-called "tax equity" investors to provide capital and support its growth. Homeowners provide space for SunRun's solar panels but don't purchase the systems, which can cost \$30,000 to \$40,000 each. Instead, they agree to buy the electricity for about 20 cents a kilowatt hour for 18 to 20 years. SunRun maintains the systems. "Our mission is to make solar energy affordable," says Ed Fenster, SunRun's chief executive, by eliminating the upfront cost to

consumers. The \$100 million investment by PG&E, though a subsidiary called Pacific Energy Capital II LLC, will finance installation costs for approximately 3,500 home systems. Revenue from solar-electricity sales will be split by PG&E and SunRun.

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From "PG&E to Invest in Solar Firm"
Wall Street Journal (06/21/10) Smith, Rebecca

EPA Launches ENERGY STAR for Data Centers

The Environmental Protection Agency (EPA) has introduced its ENERGY STAR program for data centers. The agency is worried about energy use in data centers; in 2006 they were already using 1.5 percent of the nation's total electricity use. The program will push data centers to make their facilities more efficient because they can use the ENERGY STAR logo in marketing materials as a sign of their commitment to being "green." It also will allow companies to compare their energy efficiency with that of peers in the same industry, says Mark Harris, vice president of product marketing with Modius, which makes tools for real-time monitoring of data center energy use. In order to receive the logo, companies must be in the top 25 percent of their peers in energy efficiency according to EPA's energy performance scale. Efficiency levels will be calculated mainly by using the power usage effectiveness (PUE) metric, which measures the total power supplied to a data center, divided by the amount that actually reaches IT equipment, as opposed to being lost to cooling systems and inefficient power supplies. Customers that want to apply for the logo must use the EPA's online tool, Portfolio Manager, which will assign them an efficiency score between 1 and 100. Harris expects the program to eventually be revised with a metric that goes beyond PUE to more accurately reflect the efficiency of a particular data center. "It may not be perfect, but at least it allows you to compare your imperfect number with peers in your group," he says. "PUE is an easy enough number to come by, we do it for customers every day. So it's a good place to start."

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From "EPA Launches ENERGY STAR for Data Centers"
PC World (06/07/10) Niccolai, James

AESP News

Featured Article



Doug Mitarotonda

Update on the National Action Plan on Demand Response

By: Doug Mitarotonda and Ahmad Faruqui, The Brattle Group

After almost a year of substantial stakeholder input and participation, the Federal Energy Regulatory Commission (FERC) submitted its **National Action Plan on Demand Response**¹ (National Action Plan) to Congress on June 17, 2010. The National Action Plan is the second stage of a three-stage process that commenced when the Energy Independence and Security Act of 2007 was passed.



Ahmad Faruqui

The first stage of the process was to quantify the potential for demand response (DR) in the United States. That report, **A National Assessment of Demand Response Potential** (National Assessment)², was submitted to Congress in June 2009. The National Assessment evaluated the national- and state-level potential for DR that can be achieved within five and 10 years; identified barriers that have limited the deployment of demand response; and included specific policy recommendations that, if implemented, could overcome these barriers. The National Action Plan provides a path forward to realize the potential for DR as identified in the National Assessment.

FERC staff concluded that forming a coalition of industry stakeholders to coordinate the implementation of the National Action Plan is the optimal strategy. The benefit of a

coalition-based approach is that a wide variety of organizations can contribute, and the resulting outcomes will be greater than if each acted alone. Furthermore, coalitions have been successfully applied in similar national efforts, such as the National Action Plan for Energy Efficiency.

The coalition will serve as a forum for interested parties to discuss insights, experiences, knowledge gaps, and areas of mutual concern or need with the ultimate goal that the group reaches agreement on coordinated strategies. Both the funding of and participation in the coalition could be a public-private partnership. In particular, the coalition is expected to be composed of volunteers from government agencies, utilities, wholesale markets, large end-use customers, consumer advocates, existing coalitions, and other interest groups.

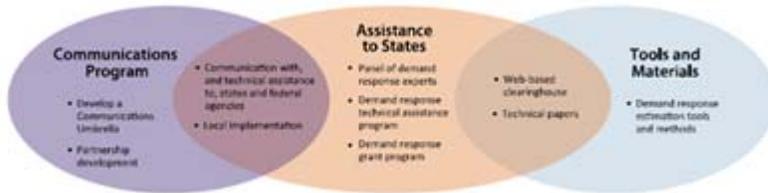


Figure 1 – The three objectives of the National Action Plan

Once formed, the coalition will implement strategies and activities to achieve three objectives: technical assistance to states; a national communications program; and the development or identification of tools and materials for use by customers, states, and DR providers. Though these activities will be coordinated through the coalition, the National Action Plan recognizes the autonomy of individual states and relies on local implementation strategies in order to achieve the nation's DR potential.

First, the National Action Plan clearly identifies ways in which technical assistance can be provided to states, enabling each jurisdiction to achieve its maximum amount of DR. For example, the coalition should recruit a panel of DR experts to deliver lectures in order to inform stakeholders of DR programs, products, technologies, incentives, costs, and benefits. In addition, the coalition should sponsor primary and secondary research on the most pressing DR issues so that high-quality peer-reviewed research is made available to all stakeholders.

Second, in another effort to educate customers and provide support to DR programs, the National Action Plan recommends the creation of a national communications program with an adaptable, tiered approach to allow messages to be easily customized for each locality. The objectives of this multifaceted national communications plan would be achieved by creating several activities. A "communications umbrella" would provide a consistent yet flexible national message framework. Paired with this, local jurisdictions would be advised on how to adapt the communications umbrella for local implementation. National and local partnerships between the coalition and corporations, for example, would be fostered to further enhance the reach of DR messages.

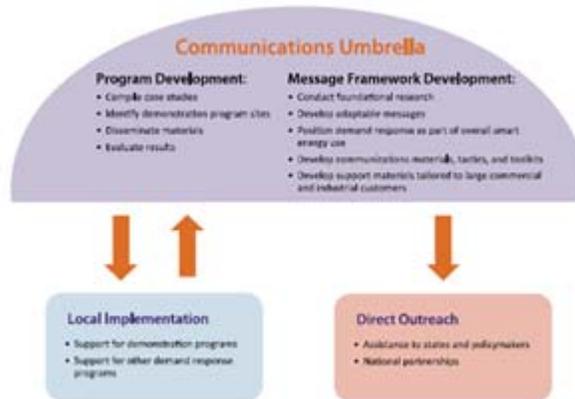


Figure 2 – National communications program structure

Third, the coalition should provide stakeholders with the tools and materials they need to make informed, strategic decisions on DR. To begin, a Web-based clearinghouse should be created to serve as a centralized location for collecting all publicly available materials on DR. This Web site will provide stakeholders with easily accessible, accurate information on DR. In addition, the coalition should oversee the development of analytical tools and methods that stakeholders can use to quantify the potential value and benefits of DR. An example analytical tool, the Demand Response Impact and Value Estimation (DRIVE)³ model, was developed by FERC staff and The Brattle Group as part of the National Action Plan. The DRIVE model takes a granular look at the potential impacts of specific DR and smart grid programs by predicting changes in system dispatch due to modifications to the system load forecast that would be caused by new DR programs.

With a National Action Plan firmly in place, the FERC is now tasked with implementation—the third and final stage of the process outlined in EISA. In this last stage, the FERC is charged with submitting a proposal, which must include proposed assignments of responsibility and a proposed budget, to implement the National Action Plan to Congress.

Note: To download larger images of Figures 1 and 2, [click here](#).

¹The full National Action Plan report is available at <http://www.ferc.gov/legal/staff-reports/06-17-10-demand-response.pdf>.

²The full National Assessment report is available at <http://www.ferc.gov/legal/staff-reports/06-09-demand-response.pdf>.

³The DRIVE model is available at <http://www.ferc.gov/industries/electric/indus-act/demand-response/drive-model-v36.zip>.



Chris Ashley

To Outsource or Not to Outsource – That is the Demand Response Question

By: Chris Ashley, EnerNOC

Demand response (DR) is in the news like never before. In the summer of 2010, as record-breaking heat waves swept the East Coast, even the national television networks made it a point to underscore the importance DR played in maintaining grid reliability (<http://abcnews.go.com/WNT/video/heat-wave-power-grid-brink-11111239>).

A recent study by the Federal Energy Regulatory Commission (FERC) estimates the total potential for DR to be as high as 188 GW, or 20 percent of U.S. peak demand, by the end of this decade¹, with approximately 41 GW, or 5.8 percent of peak demand, already in place today². Recently, NV Energy, Tucson Electric Power (TEP), and Tennessee Valley Authority (TVA) alone have announced plans for more than 450 MW of new dispatchable DR to meet their resource requirements. The commercial, institutional, and small-industrial (C&I) DR that makes up the entire 440 MW of new capacity committed to TVA and TEP represents a fast-growing area of utility demand-side management activity.

Building and operating a C&I DR program presents unique challenges that are distinct from those associated with building a residential DR program or putting an interruptible tariff in place for industrial customers. For example, unlike residential customers, C&I customers exhibit extreme diversity in electricity consumption patterns; unlike large industrial customers, many C&I customers lack in-house expertise to determine how best to participate in utility DR programs.

To meet these and other challenges while building a robust C&I DR resource, utilities typically employ one of two methods:

1. **The Outsourced Model**, where utilities outsource construction and management of the DR resource to a third-party expert, in its entirety or by “component”.
2. **The In-House Model**, where utilities build and operate the entire DR resource using utility personnel and internal resources.

What factors will a utility consider in determining whether to outsource all or part of its C&I DR resource? It is helpful to view the decision through the lens of three key factors that are critical to the success of C&I DR:

1. Marketing and sales
2. Reliable and scalable technology
3. Ongoing management of the DR resource

Marketing and Sales

Marketing and sales is a vital, time-intensive piece of the construction of a DR resource, involving resource design, market analysis, messaging and branding, lead generation, and customer engagement, among other tasks. Decision-making processes at C&I customers can be complex and typically involve a variety of staff, including facilities managers, the finance department, and operations personnel. C&I customers require a more personalized sales approach than the mass marketing strategies used for residential customers.

Additionally, unlike relatively homogenous residential loads, C&I customer loads vary widely across types of facilities. This makes expertise in “behind the meter” energy usage a critical element in realizing the potential for C&I load reductions.

- **To Outsource:** A large portion of customers eligible for C&I DR programs are too small to fit into the utility account management construct. Rather than hiring new staff or making investments in a temporary process (the marketing and sales phase), the utility can hire a third-party service provider experienced at recruiting C&I DR participants. Additionally, most service providers employ professional engineers who possess a deep understanding of electricity use and load patterns across a broad range of facility types, along with the experience to assess and identify strategies to successfully and consistently deliver DR capacity. (Outsourced example—Kansas City Power & Light MPower)
- **Not to Outsource:** Some utilities have sufficient resources, while others plan to build out sufficiently large demand-side management programs to justify investment in permanent headcount additions. Still other utilities are reluctant to allow any third-party access to their customers. All utilities must balance these preferences and program goals when considering the use of third-party service providers. (In-house example—Duke Energy PowerShare)

Reliable and Scalable Technology

Measurement and verification are key to the success of any DR program. While residential DR programs tend to use statistical sampling for measuring and verifying load reductions, this methodology is not common in C&I DR, which involves far fewer sites and loads that are not homogenous. As a result, this dynamic puts a premium on the use of technology to provide granular, real-time usage data for performance calculations. Further, real-time monitoring allows utilities and their customer participants to maximize performance during DR events. Such technology typically includes metering hardware and direct load control capability at the customer site, network infrastructure, and operations centers to monitor customer sites in real-time and software applications and processes to manage event dispatch, energy data, performance, and M&V.

- **To Outsource:** Developing the technology infrastructure described above for a large-scale resource with hundreds of C&I participants can cost millions of dollars. Rather than make these investments themselves, many utilities leverage existing third-party investments and purchase technology applications designed specifically for DR resource management. (Outsourced example—Salt River Project PowerPartner)
- **Not to Outsource:** Some utilities may decide to develop technology in-house or leverage existing advanced metering infrastructure that is sufficient to provide real-time data. Other utilities do not place value on making technology investments for DR and thus forfeit real-time monitoring or automated event dispatch, for example. (In-house example—Otter Tail Power Released Energy Access Program)

Ongoing Management of DR Resource

C&I customers have energy usage profiles and business needs that vary across both industry verticals and individual customer situations. Flexibility on resource parameters such as hours of availability, notification period, dispatch length, and customer incentives maximize the number of customers available for participation, curtailment potential, and performance of a C&I DR resource. Utilities, meanwhile, are often interested in firm, guaranteed capacity to meet resource planning requirements.

- **To Outsource:** Because utilities are typically required to treat customers equitably across specific offerings and programs, they are less flexible to negotiate individualized agreements with customers participating in utility-run DR programs. Furthermore, to deliver a firm, guaranteed resource the utility is required to either impose penalty provisions for nonperformance on their own customers (often a negative impact on customer satisfaction as well as an impediment to customer participation) or bear all performance risk themselves. Third-party service providers, on the other hand, provide sufficient flexibility to allow varied parameters to meet specific customer needs. Furthermore, when providing a turnkey resource (all components are outsourced), the service provider is able to guarantee capacity and availability for the utility (often backed by financial assurances) while insulating individual customers from performance penalties. (Outsourced example—Tennessee Valley Authority Demand Response)

- **Not to Outsource:** For some utilities, capacity available through a one-size-fits-all offering is sufficient to meet their resource planning needs. Other utilities feel comfortable shouldering performance risk in-house or offloading that risk directly to customers. (In-house example—Progress Energy Carolinas Commercial, Industrial, Government (CIG) Demand Response)

Like their C&I customers, each utility has unique system characteristics, resource needs, and management culture. While there is no right or wrong way to build a C&I DR program, there are many factors a utility must consider that will help determine its optimal approach to implementing C&I DR.

¹See, Federal Energy Regulatory Commission, "A National Assessment of Demand Response Potential," June 2009, p. xii.

²See, Federal Energy Regulatory Commission, "Assessment of Demand Response and Advanced Metering," December 2008, p. 23.



Stephen George

Load Impact Evaluations of California's Demand Response Portfolio: Valuable New Data on the Impact of Demand Response Programs

By: Stephen S. George, Freeman, Sullivan & Co., Steven Braithwait, Ph.D., and Dan Hansen, Ph.D., Christensen Associates Energy Consulting

The recent publication of the FERC's National Action Plan on Demand Response (<http://www.ferc.gov/legal/staff-reports/06-17-10-demand-response.pdf>) is just the most recent reminder of the important role that demand response (DR) can play in balancing electricity supply and demand in an economically efficient manner. Given the rapid growth of advanced metering, which enables widespread use of time-varying pricing and the growing need for DR as a complement to variable supply resources such as wind and solar, DR should be even more valuable in the future. For DR to realize its full potential, however, system planners and operators must have realistic estimates of the amount of DR resources that can be realized under various ex ante conditions.



Steven Braithwait

Recognizing the importance of empirical estimates of DR as a catalyst for making DR "used and useful," the California Public Utilities Commission (CPUC) issued a decision (D:08-04-050) requiring that each of California's major investor-owned utilities (Pacific Gas & Electric Company—PG&E, Southern California Edison—SCE, and San Diego Gas & Electric Company—SDG&E) prepare and file ex post and ex ante load impact evaluations of DR based on evaluation protocols that were adopted by the CPUC in the same decision (see <http://docs.cpuc.ca.gov/efile/PD/80529.pdf>). These evaluations, filed on April 1 of each year, provide a large and growing database of rigorously developed empirical estimates of the impact of DR resources under historical conditions for the prior year, as well as a standard set of ex ante conditions (e.g., normal and extreme weather, common event windows and day types, etc.) based on estimates of program participation for the subsequent decade. The first load impact evaluations produced under this ruling were in 2009, for the program year 2008. The most recent evaluations were filed on April 1, 2010, covering the program year 2009 and containing ex ante estimates through 2020.



Dan Hansen

With a three-year program budget exceeding \$600 million, PG&E, SCE, and SDG&E have a large and diverse portfolio of DR resources. All three utilities are in the process of deploying advanced meters. Within a couple of years, roughly 11 million electricity customers will be able to be billed according to time-varying rates (based on hourly or subhourly interval data), and dynamic pricing is an important and rapidly growing component of California's DR portfolio. All three utilities are rolling out default dynamic pricing for nonresidential customers with the opt-out rate being a static time-of-use rate. Put another way, by 2013, all nonresidential customers served by PG&E, SCE, and SDG&E will be on some form of time-varying rates. In addition, PG&E's SmartRate tariff is already the nation's largest

dynamic pricing program for residential customers and all three utilities have plans to roll out peak-time rebates in 2011. PG&E is in the process of filing a default critical peak pricing program for residential customers to be implemented in 2014. There are also roughly 500,000 accounts enrolled in direct load control programs across the three utilities.

California's nonresidential customer programs include a statewide base interruptible program (BIP), demand bidding (at PG&E and SCE), capacity bidding, voluntary opt-in critical peak pricing (a precursor to the opt-out tariffs that will roll out over the next few years), aggregator managed programs, real-time pricing and agricultural pumping interruptible programs at SCE, and direct load control programs at all three utilities.

Due to the large volume of evaluation reports for the programs outlined above, it is not possible to summarize even briefly the totality of the useful findings they contain. Below are a few interesting findings from the recent DR program evaluations undertaken by Freeman, Sullivan & Co. (FSC) and Christensen Associates Energy Consulting (CAEC), under contract to the California utilities.

Predicting Enrollment in Dynamic Pricing

While there have been a number of pilots around the country focusing on estimating the load impacts associated with customers who sign up for dynamic tariffs, empirical analysis of how to get customers to enroll in dynamic pricing programs is almost nonexistent. To our knowledge, the enrollment modeling completed as part of the ex ante load impact evaluation of PG&E's SmartRate program is the only publicly available study of the impact of various marketing features and customer characteristics on residential customer enrollment on a dynamic tariff based on analysis of actual choice data, not survey data¹. The choice model developed for PG&E allows one to predict the likelihood of enrollment as a function of various factors based on direct mail solicitation, including the magnitude of a sign-up incentive offered (\$0, \$25, \$50), the timing of the promotional campaign (pre-summer, early summer, late summer), the number of times a customer is contacted, the format of the marketing offer (e.g., business letter, glossy brochure), and the characteristics of targeted customers (e.g., whether they are likely to have air-conditioning, whether they are enrolled in a direct load control program, etc.). These are among the more interesting findings:

- A modest sign-up incentive of \$25 doubles enrollment rates compared with no incentive, but increasing the incentive to \$50 has only a modest incremental effect.
- Marketing prior to the summer produces enrollment rates that are nearly double those achieved when dynamic rates are marketed in late summer.
- The enrollment rate from a third direct mail solicitation to customers who had not responded to two prior solicitations is roughly one-quarter of what the enrollment rate is for those who respond to the first solicitation.
- The enrollment rate for a dynamic tariff is nearly five times greater for customers who are already enrolled in an emergency direct load control program (that would be used to automate DR under the tariff) compared with similar customers who were not enrolled in the load control program.
- The enrollment rate for customers with less than a 25 percent likelihood of owning central air-conditioning is more than twice as large as it is for customers with more than a 75 percent likelihood of owning central air-conditioning.

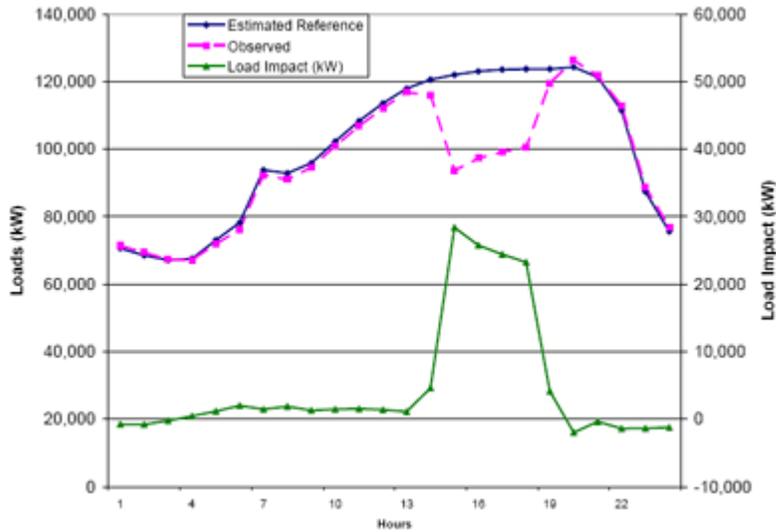
CPP and Aggregator Program Load Impacts

All three of the major investor-owned utilities in California are transitioning to default critical peak pricing (CPP) rates for their medium and large commercial and industrial customers. SDG&E was the first to implement a default CPP rate in 2008. However, because they did not call any events in 2008, the 2009 program year provided the first opportunity to observe load impacts for customers defaulted onto critical peak pricing. In addition to reporting program-level load impacts for each utility, which totaled more than 50 MW, CAEC compared the load impacts for SDG&E customers who were defaulted onto CPP (and did not opt out) with customers who had previously volunteered for a CPP rate and were subsequently migrated to the default CPP rate. Somewhat surprisingly, we found that after controlling for industry type, the estimated percentage load impacts per customer did not differ between defaulted customers and previously voluntary customers.

In an analysis of aggregator-managed DR programs, we found that enrollment was generally greater in day-of versions of the program compared with day-ahead versions, presumably due to larger credit payments. Estimated load impacts for the two programs

with the highest enrollment exceeded 140 MW in total. The figure below illustrates the hourly estimated reference load, observed load, and estimated load impacts (shown as positive values against the right axis) for SCE's day-of Capacity Bidding Program. Among the interesting findings, the overall average percentage load impacts were relatively large, at 20 to 40 percent, and a relatively small percentage of customers (4 to 20 percent) accounted for more than half (60 percent) of the total load impacts.

Estimated Loads and Load Impacts—SCE Capacity Bidding Program (day-of)



In conjunction with the aggregator evaluation, a baseline analysis was conducted to examine the performance of a proposed morning-of adjustment option to a 10-in-10 baseline method. The analysis found that baseline performance varied by customer type, with baselines for commercial-type customers more accurate and less biased than those for industrial-type customers and that the adjusted 10-in-10 baseline performed better than unadjusted versions of the 3-in-10 and 10-in-10 baselines.

¹A copy of the SmartRate evaluation that contains many more details about the choice analysis summarized here can be obtained from the following Web site:

https://www.pge.com/regulation/DemandResponseOIR/Other-Docs/PGE/2010/DemandResponseOIR_Other-Doc_PGE_20100401-01.zip

[Return to Headlines](#)

Updates from AESP, Local Chapters, Topic Committees and Members

Midwest Chapter Update

AESP's Midwest Chapter is thrilled to announce Jessica Burdette as its new AESP-MW Secretary! Jessica's "real job" is an energy analyst with Energy Management Solutions, Inc. in Chanhassen, Minnesota. You can reach her at jburdette@emsenergy.com.

AESP-MW will host a meeting on Thursday, August 19 at 11am – 1pm at the MN DOT Training and Conference Center. The meeting will focus on Customer Empowered Distributed Energy – aka "Smart Grid". For more information or to RSVP, email jburdette@emsenergy.com.

[Click here](#) to view the Midwest Chapter Newsletter for the summer of 2010. Highlights of this edition include:

- Information about the next AESP – Midwest meeting on August 19
- A schedule for AESP – National training opportunities and conferences
- Points of interest from the last AESP – Midwest meeting
- A professional networking success story
- AESP – Midwest member profile

Cascade Chapter Update

Future of Energy is hosting its second Political Forum on Energy and Sustainability on Wednesday, October 8, 2010 at the Bagdad Theater in Portland, OR. This forum will feature candidates vying for some of the most contested political positions in the region. Candidates will meet their competitors at the Bagdad Theater to answer questions about energy and sustainability issues that are important to voters. Candidates will choose challenging questions in a gameshow style format in a relaxed environment featuring Livewire's very own Sean McGrath.

For more information, contact Phillip Kelsven at Phillip.Kelsven@csgrp.com.
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AESP Welcomes...

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[Return to Headlines](#)

News Releases and Announcements

[AESP Announces CEO of Bonneville Power Administration to Keynote at its Fall Conference](#)

[CSG Wins Five Awards for Energy Efficiency Marketing](#)

[CSG and Massachusetts Oilheat Council Win Contract to Help Working Families Make Homes More Efficient](#)

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