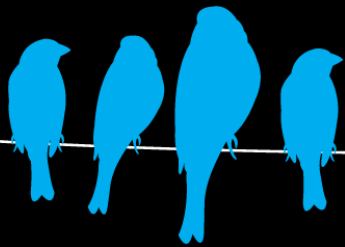
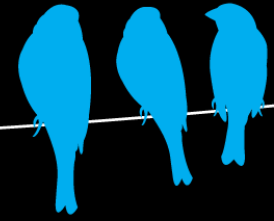
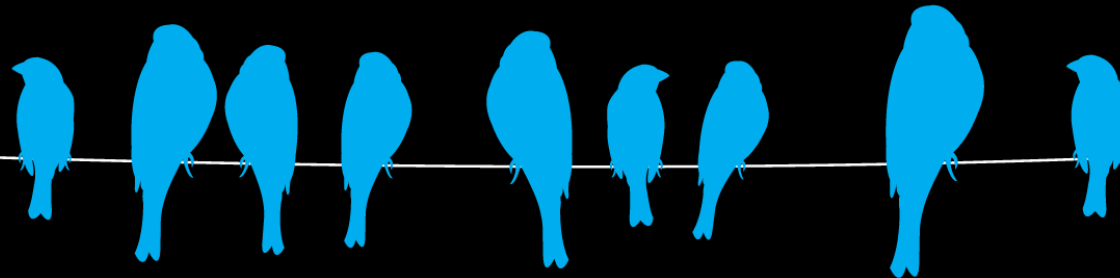


Zpryme Smart Grid Insights Present:



Top 10 U.S. Utilities by DSM Investment

March 2011



## Top 10 U.S. Utilities by DSM Investment

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"There isn't a one-size-fits-all solution, not when utilities in different regions have different ownership structures and different embedded costs... utilities will need to be involved every step of the way and will have to take the lead in educating consumers on the value of Smart Grid technology."<sup>1</sup>

- Gary Locke  
U.S. Commerce Secretary

With Smart Grids in the foreseeable future, demand-side management (DSM) is on the cusp of a revolution that will forever alter the way that homes and businesses use electricity. To add to the positive DSM buzz, budgets to facilitate Smart Grid planning and implementation are on the rise, according to a recent March survey by Microsoft. In the survey, 73 percent of utility professionals and executives surveyed said budgets for these efforts are on the rise.<sup>2</sup>

Governments and utilities have long sought to improve DSM through conservation and load management programs. While these initiatives achieved some progress, the development of Smart Grids offer more tools and avenues towards improving DSM than any other power sector program or technological advancement in the last 30 years. Allan Schurr of IBM Global Energy and Utilities and his colleagues are no strangers to demand-side management as they have or are currently working with DSM projects with several of the ten utilities identified in this report. Mr. Schurr explained to Zpryme that "two key near term benefits of Smart Grids for utilities are operational and asset efficiency, along with improved reliability and quality of electrical service. Smart meters will enable their consumers to use energy more efficiently. Finally, Smart Grids will improve the reliability and lower the cost of incorporating significant amounts of renewable energy supplies." Smart Grids will revolutionize DSM by providing utilities with a flood of data that will improve the management of transmission grids and by allowing flexible, consumption-driven pricing schemes that will level power distribution

<sup>1</sup> Remarks at Edison Electric Institute "Powering the People" Conference on March 3, 2011

<sup>2</sup> Microsoft Worldwide Utility Industry Survey 2011

curves. To gain insight into this transformation, Zpryme examined the level of investment by utilities in DSM over the past 5 years while acknowledging their sales (MWh) and revenue.

## Insight from 3 of Top 10 U.S. Utilities by DSM Investment

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[Quotes below provided to Zpryme in the month of March 2011 – alpha order by company]

### PacifiCorp

"PacifiCorp's load-management programs for irrigation customers, residential and commercial air conditioning have proved both popular with customers and highly effective. Participation by customers in these programs can delay the need for costly new generation plants and that helps keep electricity prices low for all customers."

- Carol Hunter  
VP of Energy Efficiency & Peak Reduction at PacifiCorp

### Progress Energy

"Each utility approaches Smart Grid differently. Progress Energy's EnergyWise Smart Grid approach focuses on enhancing the efficiency and functionality of the energy delivery system. By enhancing our system first, we can more effectively support new energy-efficiency and renewable energy options, and prepare our power system to accommodate future innovations that will benefit and empower our customers."

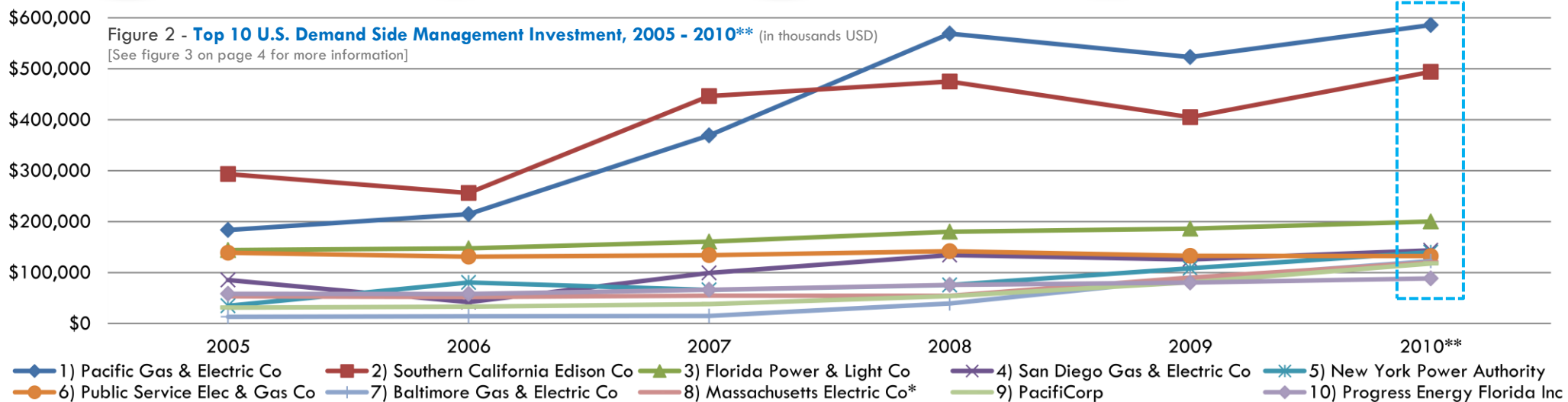
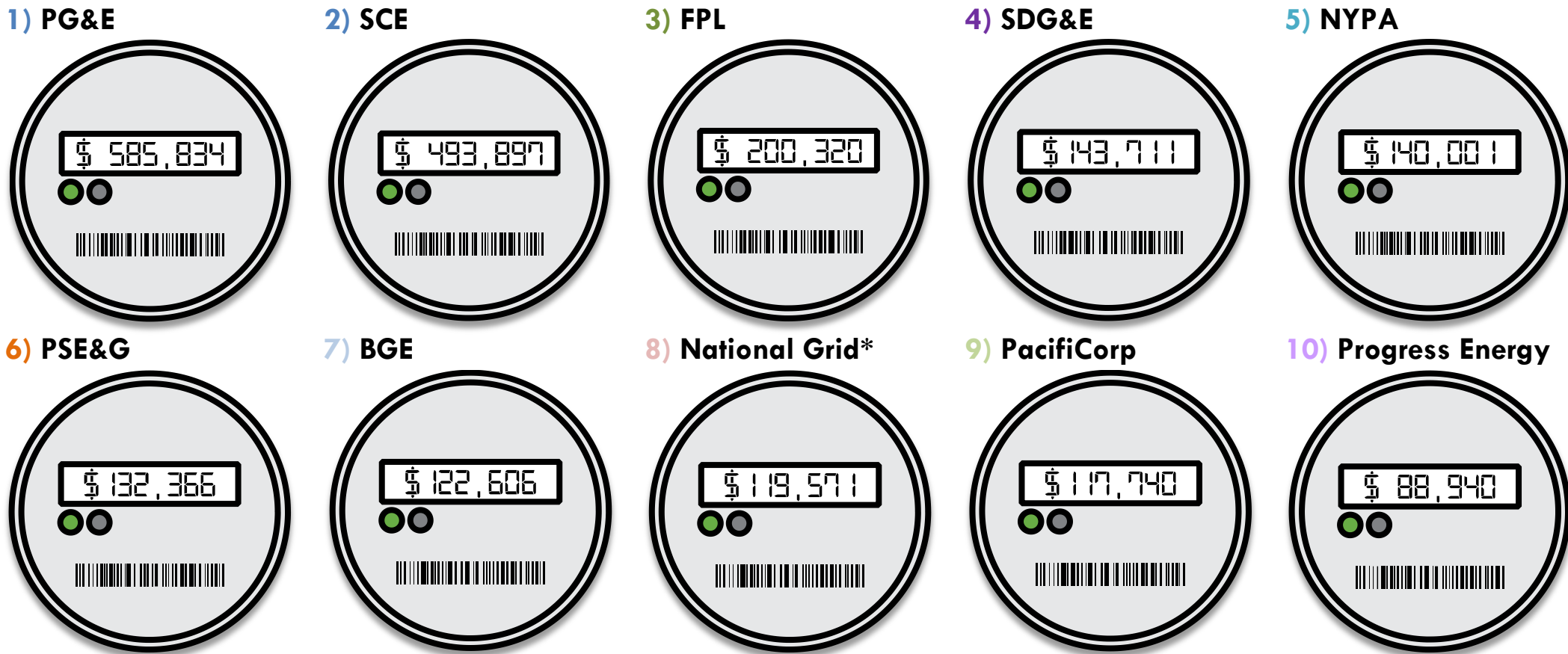
- Becky Harrison  
Director of Smart Grid Technology & Outreach at Progress Energy

### San Diego Gas & Electric

"SDG&E employees have been laying the foundation for a Smart Grid for years by identifying and testing Smart Grid technologies and working with policy makers. Collaboration across a broad spectrum of stakeholders in this area will help ensure we create an efficient and robust Smart Grid to which our customers will be the ultimate beneficiaries."

- Lee Krevat  
Director of Smart Grid at San Diego Gas & Electric

Figure 1 - Top 10 U.S. Utilities by Demand Side Management Investment, 2010\*\* (in thousands USD)



## U.S. National Action Plan on Demand Response

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The US federal government has initiated a nationwide effort to improve DSM. In June 2010, the Federal Energy Regulatory Commission (FERC) released the “National Action Plan on Demand Response,” which called for the formation of a coalition of governments, utilities, and other stakeholders to coordinate measures to improve DSM.<sup>3</sup> These measures include:

- Providing technical assistance to implement effective demand response
- Initiating a national communications program to educate consumers on energy efficiency
- Developing a web-based clearinghouse that disseminates information regarding effective methodologies demonstrated in DSM programs

Support from the federal government to move towards Smart Grids through the 2009 stimulus and other Department of Energy initiatives has been a crucial factor for the expansion of Smart Grids in the U.S. Karl Popham, Division Manager of the Project Management Office for Austin Energy conveyed similar sentiment to Zpryme as he explained that government and consumer engagement play a vital role in Smart Grid deployment, “from a Smart Grid differentiator perspective, we engaged our community early on and I think that’s from a culture derived from being part of city government, it’s just how we think. We get ongoing input and guidance from the Electric Utility Commission, the City Council, and the citizens of Austin. Our other key differentiator is that we did classify a Smart Grid 1.0 and Smart Grid 2.0 program. Smart Grid 1.0 is on needed grid enhancements and upgrades with a focus on grid reliability, efficiency, and management. Smart Grid 2.0 is about understanding consumer behavior and needs, and leverages our collaboration in the Pecan Street Project. Both Smart Grid 1.0 and Smart Grid 2.0 programs have a different approach to complement the desired goals and unique challenges.”

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<sup>3</sup> [www.ferc.gov](http://www.ferc.gov)

Developing a National Action Plan on Demand Response will help share knowledge among entities within the power sector and supplement Smart Grid advancements with better programmatic methods to improve DSM.

## Spotlight: PG&E and SCE

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California’s two biggest utilities, Pacific Gas & Electric (PG&E) and Southern California Edison (SCE), led Zpryme’s study of utilities’ DSM investment by a wide margin. This outcome is unsurprising, considering California’s past scrapes in the electricity sector and most recently legislation passed by the California State Assembly to mandate the use of renewable energy and reduce greenhouse gas emissions. To meet these challenges, utilities have invested in programs and technology to improve demand response as well as signing power purchase agreements with solar power facilities and wind farms. Without a doubt, California will use Smart Grids to improve demand response before the rest of the country.

One of the first utilities in the U.S. to deploy Smart Grid technology, PG&E has initiated several well-publicized programs to improve DSM. Zpryme estimates that PG&E invested nearly \$586 million in DSM in 2010, a 219% increase over the last 5 years. Beginning in 2006, it has since installed over 5.5 million smart meters in residences and commercial properties across northern California. Recently PG&E’s deployment of smart meters has met some resistance from customers with concerns regarding the accuracy of readings and possible harmful side effects from their wireless signals. PG&E has met these criticisms by reaching out to customers through public forums and campaigns to communicate the benefits of smart meters. In November 2010, PG&E announced that it has partnered with two unnamed companies to aggregate and analyze data collected from smart meters and will present these findings to its customers. PG&E has also implemented several energy saving programs designed to improve DSM. Its SmartAC™ program offers customers \$25 to install a remote sensor that can manage air conditioner demand during summer months.<sup>4</sup> Its SmartRate™ program offers customers a

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<sup>4</sup> [www.pge.com](http://www.pge.com)

Figure 3 - Top 10 U.S. Utilities by Demand Side Management Investment, 2005 - 2010 (in thousands USD)

| Rank | Utility Name                     | 2005      | 2006      | 2007      | 2008      | 2009      | 2010*     |
|------|----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1    | Pacific Gas & Electric Co        | \$183,416 | \$214,785 | \$369,132 | \$569,062 | \$523,066 | \$585,834 |
| 2    | Southern California Edison Co    | \$293,322 | \$256,060 | \$446,463 | \$474,947 | \$404,855 | \$493,897 |
| 3    | Florida Power & Light Co         | \$144,192 | \$147,458 | \$160,750 | \$180,016 | \$186,052 | \$200,320 |
| 4    | San Diego Gas & Electric Co      | \$85,438  | \$41,830  | \$99,250  | \$134,341 | \$125,596 | \$143,711 |
| 5    | New York Power Authority         | \$34,653  | \$80,510  | \$66,047  | \$75,496  | \$108,512 | \$140,001 |
| 6    | Public Service Electric & Gas Co | \$138,827 | \$131,259 | \$134,182 | \$142,063 | \$132,797 | \$132,366 |
| 7    | Baltimore Gas & Electric Co      | \$13,054  | \$14,036  | \$14,909  | \$39,373  | \$87,576  | \$122,606 |
| 8    | Massachusetts Electric Co        | \$53,184  | \$52,081  | \$54,685  | \$54,504  | \$90,192  | \$119,571 |
| 9    | PacifiCorp                       | \$31,069  | \$33,151  | \$38,027  | \$53,628  | \$80,753  | \$117,740 |
| 10   | Progress Energy Florida Inc      | \$58,283  | \$58,036  | \$66,207  | \$75,879  | \$80,291  | \$88,490  |

Source: US Form EIA-861 Database 2005 - 2009, file3  
 \*2010 is Zpryme Estimate

Figure 4 - Top 10 Utilities by Sales, 2010 (MWh)

**Finding: 18 percent** of total electricity sales were accounted for by the top 10 utilities in the U.S. (Jan '10 to Nov '10).

| Rank | Utility Name                  | Total Sales (MWh)* |
|------|-------------------------------|--------------------|
| 1    | Florida Power & Light Co      | 96,635,419         |
| 2    | Georgia Power Co              | 79,707,552         |
| 3    | Virginia Electric & Power Co  | 73,508,120         |
| 4    | Duke Energy Carolinas, LLC    | 72,130,354         |
| 5    | Pacific Gas & Electric Co     | 71,007,939         |
| 6    | Southern California Edison Co | 68,793,273         |
| 7    | Alabama Power Co              | 51,000,856         |
| 8    | Progress Energy Carolinas Inc | 41,660,702         |
| 9    | Commonwealth Edison Co        | 39,762,517         |
| 10   | Detroit Edison Co             | 39,088,761         |

Source: US Form EIA-826 Monthly Electric Utility Sales and Revenue Database  
 \*Data from Jan 2010 to Nov 2010

Figure 5 - Top 10 Utilities by Revenue, 2010 (in thousands USD)

**Finding: 20 percent** of total revenues were accounted for by the top 10 utilities in the U.S. (Jan '10 to Nov '10).

| Rank | Utility Name                  | Total Revenue* |
|------|-------------------------------|----------------|
| 1    | Pacific Gas & Electric Co     | \$10,754,534   |
| 2    | Southern California Edison Co | \$10,068,650   |
| 3    | Florida Power & Light Co      | \$9,036,749    |
| 4    | Georgia Power Co              | \$6,892,317    |
| 5    | Virginia Electric & Power Co  | \$6,160,398    |
| 6    | Duke Energy Carolinas, LLC    | \$5,258,834    |
| 7    | Consolidated Edison Co-NY Inc | \$5,121,870    |
| 8    | Alabama Power Co              | \$4,631,516    |
| 9    | Commonwealth Edison Co        | \$4,567,586    |
| 10   | Progress Energy Florida Inc   | \$4,321,355    |

Source: US Form EIA-826 Monthly Electric Utility Sales and Revenue Database  
 \*Data from Jan 2010 to Nov 2010

discounted rate from May through October in exchange for a higher rate during peak times on selected summer days. PG&E also offers rebates for energy efficient washing machines, dishwashers, hot water heaters, and air conditioners.

SCE has invested into improving DSM and formed relationships with firms to implement Smart Grid technology as well. Zpryme estimates that SCE invested nearly \$494 million in DSM in 2010, a 68% increase over the last five years. Over the past two years, it has installed over 2 million smart meters across southern California and intends to install nearly 3 million more through its Edison SmartConnect™ program. In February 2011, SCE partnered with Teradata Corporation to collect customer usage data through Itron's Enterprise Edition Meter Data Management system and plans to integrate this data with billing and weather data.

SCE plans to make this information available to its customers in the middle of 2011.<sup>5</sup> SCE also partnered with Honeywell back in November 2009 to build an OpenADR-based system to automate its Critical Peak Pricing program, which offers commercial and industrial customers incentives to save power during the few hot summer days when demand peaks.<sup>6</sup> SCE also partnered with On-Ramp Wireless, a company that has developed a wireless sensor network that can monitor underground power distribution systems.<sup>7</sup>

Through outreach programs and Smart Grid investments, PG&E and SCE have aggressively moved to improve DSM. Even though this transition has not always been smooth, utilities across the rest of the country will soon follow.

## Utilities & Smart Meters

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The advantages of smart meters are well known across the Smart Grid value chain, and their spread is inevitable. The most immediate benefit that utilities receive from installing smart meters is a flood of data that

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<sup>5</sup> [www.teradata.com](http://www.teradata.com)

<sup>6</sup> [www.honeywell.com](http://www.honeywell.com)

<sup>7</sup> [www.onrampwireless.com](http://www.onrampwireless.com)

provides insight into methods for managing demand response. With this data, utilities understand their customers' energy consumption behavior better, improve the efficiency of billing processes, manage outages better, and can work with customers to reduce peak demand.

The need of utilities for data aggregation and analysis has fostered a growing industry of firms like OPOWER, Tendril, and EnerNOC that work diligently to make sense of the terabytes of information. In particular, OPOWER has successfully leveraged this data to motivate customers to improve energy efficiency by providing them with comparisons of electricity usage in similar facilities. The benefits of enlisting these companies are obvious. Data analytics optimizes the Smart Grid, providing insights into the performance of the distribution system and its various assets in order to help avoid power failures.

However, the role smart meters will play in demand response still largely depends on how consumers react as they are provided with information regarding electricity prices and usage. Dennis McCain of Murata told Zpryme "In transitioning to the Smart Grid, utilities get the short-term benefits of reduced meter reading and service costs and better deployment of their field staff. With better visibility of the power grid enabled by the Advanced Meter Infrastructure (AMI), utilities can also better manage peak demand, reduce theft and energy loss, and provide better customer service through improvements in billing efficiency and information-sharing. With the proliferation of consumer wireless Home Area Network (HAN) devices connected to the smart meters being the primary way consumers interact with and benefit from the Smart Grid; consumer buy-in will be critical to the success of Smart Grid deployments."

Even though studies and demonstration projects have shown that transparent electricity pricing can lower demand, the smart meter is only a conduit for information that by itself will have limited impact. Because the value proposition that smart meters offer to residential customers is much lower than that to commercial and industrial ones, utilities and companies must provide assurances and incentives for customers to integrate the information that smart meters provide into their daily lives.

A coordinated effort from governments, utilities, and other organizations to educate the public about the benefits of smart meters will help, but the key factor will be the way information from the smart meter is interfaced with consumers. Home energy management systems and smart appliances that are easy to use must be made available for DSM to be transformed by Smart Grid technology. Furthermore, installing systems to manage residential demand must be affordable enough and offer substantial long-term financial savings to motivate mainstream households to absorb the upfront costs.

With these factors in mind, the impact of Smart Grids on DSM can expect the following in the near future:

- Regional differences will play a factor in the deployment of smart meters. While California may be the first part of the country to embrace Smart Grid, residences in the southern portions of the U.S. will have more incentive than others to buy into DSM improvements due to their heavy use of air conditioners.
- Privacy concerns have arisen in California regarding the networking capabilities of smart meters. Other utilities across the U.S. have the benefit of seeing these concerns and planning to mute possible protests through outreach campaigns that carefully explain the benefits of Smart Grids and incorporating feedback before aggressively installing smart meters.
- Tablet and smart phone apps provide the perfect platform for customers to receive information about rate changes from utilities. From there, customers will then theoretically be able to control appliances and heating and cooling systems in order to save energy when prices are high.
- Moving forward in 2011 new standards that will enable cost-effective Smart Grid applications such as smart appliances, distribution automation, smart meters, and recharging infrastructure for electric vehicles will rely heavily on the DSM value chain – the DSM focal point will continue to be California for 2011.

- As evident in the Microsoft Worldwide Utility Industry Survey 2011 utilities will see their information systems shifting radically as a result of the Smart Grid, with many utilities looking at replacements or working to find ways to adapt their systems to interval billing, electric vehicles, and other DSM and new energy programs.<sup>8</sup>

## Zpryme Credits

|               |                        |                      |
|---------------|------------------------|----------------------|
| <b>Editor</b> | <b>Managing Editor</b> | <b>Research Lead</b> |
| Daniel Jung   | Robert Langston        | Sean Sayers          |

## Additional Contributions Made By:

|                |  |
|----------------|--|
| Becky Harrison | Smart Grid Technology & Outreach Director<br>Progress Energy       |
| Carol Hunter   | Vice President of Energy Efficiency & Peak Reduction<br>PacifiCorp |
| Lee Krevat     | Director of Smart Grid<br>San Diego Gas & Electric                 |
| Dennis McCain  | Director of Marketing<br>Murata Wireless Solutions                 |
| Karl Popham    | Division Manager of the Project Management Office<br>Austin Energy |
| Allan Schurr   | Vice President of Strategy<br>IBM Global Energy & Utilities        |

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<sup>8</sup> Microsoft Worldwide Utility Industry Survey 2011



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