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Perfecting Power
for a Secure, Sustainable Energy Future

Smart Meters and Smart Pricing:
A Win-Win for Communities and Consumers

The Galvin Electricity Initiative, launched by Robert W. Galvin in 2004, has brought together the nation's leading electricity experts to transform our electric power system into one that is more affordable, reliable and fuel-efficient. The Initiative has created innovative business and technological blueprints for the ultimate smart grid: the Perfect Power System, a smart microgrid that meets the needs of 21st century consumers.

One of the most important building blocks of a smart grid — and one of President Obama's strategies to jumpstart the economy — is implementation of advanced metering infrastructure (AMI), commonly known as "smart meters" in homes and businesses across the country. With a tough economy hitting policymakers' budgets, as well as consumers' wallets, smart meters are one of the quickest investments in smart grid technology. Smart meters differ from conventional electricity meters, because they allow for two-way electronic communication in which valuable information flows dynamically between consumers and electricity producers.

Smart meters allow utilities to identify and respond to outages more quickly, as well as save the labor costs associated with manually maintaining conventional meters. However, very few utilities now providing smart meters to their retail customers are also allowing two-way communication for consumers to see the actual cost of power via price signals, called "time-of-use" or "real-time pricing." By combining smart pricing with advanced metering, the "iron curtain" now blocking consumer access to the information needed to effectively and efficiently control their electricity use will be removed. With smart meter access to price signals, consumers can automatically monitor electricity prices as the cost of electricity varies dramatically throughout the day. They can pay less accordingly, rather than paying an average price projected by electricity producers. As technology advances, smart meters, in conjunction with pricing information, can act as a portal communicating with smart appliances and technology. As more consumers generate their own power, they will have the ability to sell power back to the grid when the prices are right.

Benefits

Funding for smart meters and other smart grid technologies was included in the American Recovery and Reinvestment Act (ARRA) to help reduce costs for consumers and communities, create new jobs, and reduce environmental impact. Overall, outfitting communities with smart meters featuring real-time pricing can lead to significant monthly savings for consumers and, ultimately, more control over how and when they use power. Also, these meters receiving price signals create expanded networks in homes and businesses, allowing consumers to easily communicate with and more efficiently use smart electronics and appliances to decrease energy consumption and generate additional energy savings.

Smart meters with time-of-use pricing help consumers use electricity in the most efficient and cost-effective ways. Pilot projects have shown that, when consumers

know the actual price of electricity at the time they choose to use it, they will use electricity in the most cost-effective way. For instance, a 2008 Maryland pilot program conducted by Baltimore Gas and Electric Company (BGE) tested how consumers would respond to time-of-use pricing. BGE provided more than 1,000 residents with smart meters, using BGE's "Smart Energy Pricing" in their homes. Participants reduced their consumption during peak periods by 26 to 37 percent, saving more than an average of $100 on energy bills. In all, 93 percent of the pilot participants indicated they were highly satisfied with the program and would participate again if given the opportunity. Based on these results, BGE is expanding the program and installing 2 million residential and commercial smart meters with smart pricing. The utility predicts that smart meters –and the clear financial incentives that time-of-use pricing offers – will save customers in excess of $2.6 billion over the life of the project.[1]

Smart meters with time-of-use pricing are essential building blocks for a smart grid. The Obama administration has identified smart grid technology as a tool for accomplishing several priorities, such as modernizing our aging infrastructure, investing in clean energy technologies, and building an economy based on green technologies. Smart meters not only help the flow of power become more efficient, they also open the doors to derivative products, such as smart appliances and devices for control in homes and in businesses. For instance, smart meters allow consumers to use programmable appliances that can switch on when power is at a certain price. In addition, smart meters help electricity producers better manage peak demand by adjusting electricity prices to reflect real-time market conditions.[2]

Business Case

Smart Meters Are a Cost-Effective Answer for Utilities and Consumers

Research shows that an investment of $7 to $8 billion between 2007 and 2017 in smart metering programs would more than pay for itself, yielding close to $15 billion per year, by 2020.[2] However, the initial costs to install smart meters are significant for utilities. Such costs would include system hardware and software purchases, labor expenses for meter installation, network integration costs and consumer education campaigns.[3] With assistance from American Recovery and Reinvestment Act (ARRA) funding, electricity providers, and later their customers, will not have to shoulder the expenses themselves. In time, smart meters will bring consumers – and utilities – significant savings through energy conservation, efficiency and peak demand reductions.[4] Smart meters with smart pricing will help consumers conserve electricity in homes, resulting in savings for utilities by reducing peak demand expenses and management issues.

COAST TO COAST, SMART METERS ARE SMART INVESTMENTS

California—A $20 million experiment with smart meters by Pacific Gas & Electric, Southern California Edison, and San Diego Gas and Electric over three years led to a 43 percent peak load reduction. Now the Pacific Utilities Commission has mandated the rapid deployment of smart meters by these utilities. Pacific Gas and Electric estimates that it will be able to recover 89 percent of its $1.8 billion investment to install these meters through operational benefits to the utility.[6]

Illinois—On June 1, 2009, ComEd filed a petition with the Illinois Commerce Commission to deploy more than 140,000 smart meters in Chicago and 11 of its suburban communities to learn how consumers will use this technology. Results from ComEd's pilot smart meter program in place since 2003 showed that consumers saved on average 10 percent or $60 annually with real time pricing and a smart meter. Although approval is still pending, ComEd anticipates that full roll out of smart meters could begin as early as November 2009. This project is part of larger program by ComEd's parent company, Exelon, to reduce, offset or displace more than 15 million metric tons of greenhouse gases emitted by its companies and customers.[7]

PLUGGING SMART METERS AND SMART PRICING INTO PERFECT POWER

The real value of smart meters is realized when they are integrated with time-of-use pricing into in a Perfect Power System. Smart meters act as "control panels," conveying price information that, coupled with in-home devices, such as smart appliances and programmable thermostats, enables consumers and their end-use appliances in a very consumer-friendly manner to use less energy in response to price signals. This relieves strain on the grid during high power demand periods and empowers consumers to save money by being more efficient in their energy use. A Perfect Power System is configured to use smart technology and clean distributed power generation to optimally serve the needs and interest of electricity consumers. To learn more, visit www.galvinpower.org.

Policy Outlook

Moving Smart Meters into More Communities

While recent energy legislation, such as Energy Independence and Security Act (EISA) and ARRA, provides federal support and funding for smart meter implementation, it fails to address many of the policies and regulations at the federal and state level that reduce the incentive for electricity providers to provide real-time pricing to their customers.

In Pennsylvania, for example, legislators have mandated that all customers have smart meters by 2018 — which means deploying 6,000,000 meters statewide.[5] Pennsylvanians are projected to save 10 percent per month by using smart meters.[6] But, the state's legislation stopped short of its full potential by neglecting to mandate that utilities provide customers with real-time pricing, as well. Currently, the smart meters already in place in the state are only being used to collect billing information. Without price signals, consumers are left with smart meters — but dumb pricing — and no pricing incentives to change their energy usage.

What is needed are federal and state policies and regulations that make smart meters and the real-time pricing an imperative. If regulations do not give electricity providers incentives to deploy smart meters with price signals, consumers will not receive maximum benefit and value for their investments in smart grid technology. ■

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[2] "The Path to Perfect Power: New Technologies Advance Consumer Control," Galvin Electricity Initiative, 2007

[3] "Moving Toward Utility-Scale Deployment of Dynamic Pricing in Mass Markets," Edison Foundation Institute for Electric Efficiency, 2009

[4] "Characterizing and Quantifying the Societal Benefits Attributable to Smart Metering Investments," Electric Power Research Institute, 2008

[5] "Utility-Scale Deployment of Smart Meters," Edison Foundation Institute for Electric Efficiency, 2009

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