DRAM

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Testimony
Of
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Before the
House Energy and Commerce Committee
House Subcommittee on Power and Air Quality

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My name is Dan Delurey and I am Executive Director of the Demand Response and Advanced Metering Coalition (DRAM). DRAM is the trade association for companies that provide technologies, products and services in the electricity industry segment known as demand response. Its members[1] include the leading providers of smart metering systems, communications and control technologies, meter data management systems, smart thermostats and other "smart" equipment. DRAM welcomes the opportunity to provide testimony to the Subcommittee on Energy and Air Quality on why demand response needs to be included in electricity policy, planning and operations, and to offer comments on how demand response and its enabling technologies, such as smart meters, not only relate to but are in fact necessary for the development of the smart grid.

Our testimony seeks to do several things:

[1] DRAM members include Cellnet, Comverge, Echelon, Elster Electricity, eMeter, EnerNOC, EnergySolve, Esco Technologies, Itron, Landis + Gyr, Sensus, Silver Spring Networks, SmartSynch, and Trilliant

1. Provide a brief explanation as to what demand response is, why it is important to national energy policy, and why it is an important element of a "smart grid".
2. Provide a brief overview and explanation on demand response technologies such as smart meters.
3. Discuss the many and varied benefits that demand response and its enabling technologies deliver to various parties.
4. Discuss the state of demand response policy and comment on the impact of provisions on demand response and smart meters included in the Energy Policy Act of 2005.
5. Present policy options that the Congress can consider and act upon to accelerate the deployment of demand response technologies, increase the amount of demand response in the national electricity mix, and put the foundation in place for development of the smart grid.

What is Demand Response?

Demand response refers to the policy and business area whereby electricity customers reduce or shift their peak demand usage in response to price signals or other types of incentives. At present, the vast majority of electricity customers, and virtually all residential customers, are on rates or prices that have them paying the same unit price for electricity at any time of day and any time of year, no matter how much the cost to produce or deliver electricity fluctuates as demands on the system rise and fall. These existing "flat" rates do nothing to stem peak electricity usage, which continues to grow unconstrained across the U.S. The lack of any disincentive to on-peak consumption does nothing to address the reliability of the electricity system, which continues to be threatened by the rapid growth in peak demand. When demand response is introduced, and when even a small percentage of customers modify their peak usage, outages can be prevented, overall prices to all customers can be reduced, and customers, utilities and many other stakeholders can reap significant benefits. More discussion of benefits will be provided in a later section of this testimony.

As with any new field, definitions of demand response are still in development within the policy and business community. One definition that many policy makers have accepted was developed by the non-profit U.S. Demand Response Coordinating Committee (DRCC), a diverse group exclusively dedicated to the development of new content and information on demand response. Its definition is as follows:

> *Providing electricity customers in both retail and wholesale electricity markets with a choice whereby they can respond to dynamic or time-based prices or other types of incentives by reducing and/or shifting usage, particularly during peak periods, such that these demand modifications can address issues such as pricing, reliability, emergency response, and infrastructure planning, operation, and deferral.*

An examination of this definition reveals that there are a number of different facets to demand response. While this can make an appreciation of demand response more challenging, it also means that the amount and type of benefits can collectively be very high. Each of these facets will be discussed in the benefits section below, but it is worthwhile to note that key to this definition, and to any definition of demand response, is that it is focused on customers, and providing them with new options to manage their energy use and reduce their energy bills.

One more background item is worth noting. Just as energy efficiency was at one point referred to as "energy conservation," early forms of demand response were known as load management. Under that name, a number of utilities have operated successful programs over the years where in return for some incentive, customers allowed utilities to put controls on certain of their appliances and turn those appliances off when peak demands on hot summer days or cold winter days threatened the reliability and integrity of the system. These programs have functioned well in years past and many continue today. The difference between demand response and load management is that new technologies in the area of metering, communications and controls means that many new types of demand response options are available to customers. These options are "smarter" and allow customers to maintain and share control of appliances and equipment or to employ automated controls that can respond to price and other signals. These options also allow other demand response options to be provided such as time-based rates.

Demand Response Technologies

The most ubiquitous demand response technology is the meter, and some background on metering can be helpful in understanding demand response, its benefits and how it plays a role in the development of the smart grid.

The vast majority of electricity customers in the U.S. do not have a smart meter on their home or business. (The Federal Energy Regulatory Commission, in its Report to Congress required by EPACT 2005, estimates only 6% have smart meters). Many customers still have the basic type of meter that has been in use for decades. This meter has one function—to "count" the units of electricity that the customer consumes and to maintain a cumulative total of that usage that at some point is multiplied by the price of that unit to produce a total electricity bill. In a modern society where customers can easily and quickly obtain information about the things they purchase, such meters and the information they provide are anomalies. A customer with a basic meter gets no informational feedback on how and when they are using electricity or information they can apply to their future electricity purchases. They also are unable to take advantage of any time-differentiated rates or prices that could help them reduce their electricity bill.

A smart metering system does two important things. First, it measures and stores electricity usage in intervals, normally on at least an hourly basis. This time-based measurement allows time-based pricing and rates to be offered and accepted. Second, the smart meter is part of a communications network that allows the data measured and stored to be collected and retrieved on a timely basis—at least daily—for use by the utility and other parties and for presentation to the customer. This communications network and connectivity with the customers' premise provides other non-demand response benefits to utilities and customers alike, as is described below.

Smart meters are not the only new technologies that enable demand response and that help create the smart grid. "Smart" advances have been made in remote controlled and price-sensitive thermostats and lighting systems that allow the new products to be utilized in demand response applications. Energy Management Systems (EMS), formerly only used for energy efficiency purposes, are being made smarter and thus capable of empowering demand response applications. New in-home display devices are available that can transmit information from the meter to the customer in real time. New building automation and management technologies are available that allow optimization of energy use with respect to time of use. New thermal and battery storage systems are available that allow dynamic storage and release in concert with peak demand management. Even automobiles are developing into dynamic storage media in the case of the Plug-In Hybrid Electric Vehicle (PHEV), where the replacement of petroleum with electricity has been shown to have environmental benefits as well as helping to optimize grid management.

It is important to note that it is not just the technology but also how it is employed and applied that creates demand response. For example, some demand response companies have a service, or resource-based business model, whereby they contract with utilities to provide a block of demand response (e.g. 10, 20, 30 or even 40 MWs) in the same manner as if they were offering a peaking power plant to the utility. The demand response provider takes on the responsibility for enrolling and aggregating customers and controlling the peak loads of those they enlist so as to create a "negawatt" resource for the utility that is a substitute for additional power generation.

Demand Response and the Smart Grid

It is perhaps intuitive to understand why demand response technologies such as smart metering are an integral part of the Smart Grid. In the context of the smart grid, demand response and its enabling technologies such as smart meters are the place where the smart grid touches the customer. The vision of a smart grid is that of an intelligent, dynamic "organism" that allows the electricity system to be planned and operated in a way that optimizes all of its components to lower costs, increase reliability and utilize new informational and communications technologies. That vision includes an optimization of not only supply side options but also demand side options, and demand response is the way for demand side resources to effectively and dynamically be engaged.

Viewed another way, given that the smart grid will not arrive in one instant in time or in one fell swoop, smart meters and other related communications and control technologies are, collectively, the building blocks of the smart grid that will provide the foundation upon which the rest of the smart grid will be built. Timely, and in some cases, on-demand information from customers will help smart grid operators better monitor grid conditions and assess potential threats to the reliability and/or security of the electricity system. By providing information, including price signals, to customers, those operators will in turn be able to deploy customer reductions as a resource. Demand response technologies allow information and control over the demand side to be individually addressed yet aggregated into sizable blocks of "negawatts" that will be key to the success of smart grid development. Not only will the deployment of demand response technologies help avoid electricity outages, but also will help utilities and regional operators restore electricity faster than otherwise when outages do occur. In the case of the last major Northeast Blackout, New York State, where a substantial number of demand response technologies are deployed with large customers, was able to use those technologies and customer connections to do a controlled restoration which resulted in power being restored a full day earlier than expected.

Benefits of Demand Response and its Enabling Technologies

Demand response and its enabling technologies offer many different benefits in many different areas. In terms of reliability, a reduction in peak electricity demand reduces the threat of outages. In terms of electricity markets, demand response and its technologies allow dynamic demand reductions to be deployed instead of resorting to additional power production, with the result being lower wholesale prices, which all customers pay one way or the other. Also related to markets, reductions in peak demand serve as a means of mitigating market power of suppliers, which can otherwise occur when demand increases unconstrained during peak periods due to consumers not paying prices anywhere near the cost of producing the electricity during that critical peak period.

In almost all cases, technology is required to enable demand response even if it is only for time-based measurement purposes. In the case of the smart metering system, however, non-demand response benefits are introduced when the technology is deployed for demand response. A good example is grid outage management and restoration. At present, many utilities rely on customers who lose service due to a storm to make a telephone call to let the utility know of the outage. In other cases, utility truck crews drive around to identify which homes and businesses are out. With the communications and connectivity abilities that come with smart metering systems, a utility customer service operator can instantly know when a customer is out and can optimize dispatch of crews to address the situation, increasing the speed and decreasing the cost of restoration. Other types of benefits in the areas of customer service, outage management, system planning, system operations and security maintenance are possible when demand response technologies are deployed.

In terms of customer benefits, demand response and its technologies offer many new benefits. Customers will get information on their electricity usage that they have never had before and get it in a timely manner such that it acts as feedback to reinforce their energy management efforts. They will have price and rate options that will stimulate them to be more efficient energy consumers. Demand response technologies will be the answer to the question “how can you manage what you cannot measure?”. Studies have shown that even where customers are not on time-differentiated rates, they may reduce their electricity usage by 11% just as a result of being more informed and understanding better how and when they are using electricity.

In terms of addressing climate change and other environmental issues, demand response can make important contributions. The obvious one is in the enhancement and reinforcement of customer energy efficiency, the accepted cornerstone of emission reduction policies. Demand response control and information technologies such as smart meters can be the platform upon which the U.S. moves to an entirely new, more expansive and effective era of energy efficiency. Also, demand response technologies and practices will not only lead to greater energy efficiency but also to greater accountability of reductions, something that will be increasingly important under any policy where emissions are constrained and reduction-based offsets are monetized. Indeed, the smart electricity meter, while not an energy efficiency device in and of itself, may prove to be not only a smart meter, but also a green meter, as it helps improve overall energy efficiency and track energy savings.

In the case of some pollutants such as NOx, time-based emissions (e.g. during hot summer afternoons) can lead to ozone non-attainment. In the case of NOx and ozone, demand response holds out the potential to be a dynamic emissions tool that can be used to reduce power plant productions (and emissions) precisely when they contribute the most to non-attainment. Finally, and still in the area of environmental benefits, is the contribution that demand response can make to renewable energy development. In the case of wind energy, a particular geographic wind resource may not be available during peak demand periods. By matching that wind resource with demand response during the period that wind is non-available, the wind resource may become more viable. The result is a greater chance that less environmentally friendly resources can be avoided through a combination of wind and demand response.

Existing Policy on Demand Response

Congress

Section 1252 of the Energy Policy Act of 2005 represents the first legislation by Congress on demand response. It included several important provisions:

- A new PURPA standard that would require that utilities provide time-based rates and smart meters to all customers.

  As with other PURPA standards, States and other bodies with jurisdiction over electric utilities were required by EPACT to conduct an investigation as to whether this new standard was appropriate for its particular jurisdiction and to make a finding on such. States and other bodies were given until August, 2007 to complete their investigation and make a finding.

  Some observers questioned the impact that this new PURPA standard would have at the time of EPACT enactment, pointing out that the only true requirement in the provision was for states to consider the standard, i.e. utilities were not required directly by the statute to do anything with respect to time-based rates and smart meters.

  While many states to date have chosen to not adopt the standards, EPACT 1252 has had significant impact across the country. It has become the common framework within which heightened discussion and debate on demand response has taken place at the state level over the past two years. While many state commissions are still in the middle of their proceeding to consider the standards, the level of attention, awareness and action has risen significantly from where it was prior to EPACT enactment.

Attachment A depicts the status of State Commission proceedings on the new PURPA standard at this time, based on DRAM's assessment:

- A requirement that FERC conduct an assessment and report to Congress on various aspects and characteristics of demand response, including an estimation of the existing penetration of smart meters.

  FERC completed this report[2] on time and the document delivered to Congress represents the first ever nationwide survey of smart metering and other demand response technologies and programs. It also includes a substantial amount of other information on demand response, including barriers to it and how they might be overcome.

- A requirement that DOE make an assessment and report to Congress on the nationwide potential for demand response and provide recommendations as to how to achieve a specific target by a date certain.

  DOE delivered its report[3] to Congress within six months of enactment as required by EPACT but it did not address the question of "how much by how soon." According to DOE, the short turn around time of six months to undertake and complete the report did not allow for such. Instead,

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[2] The FERC Report to Congress is available at the following link: http://www.ferc.gov/legal/staff-reports/demand-response.pdf.
[3] The DOE Report to Congress is available at the following link: http://www.oe.energy.gov/documentsandmedia/congress_1252d.pdf

DOE opted for a compendium approach where it produced a report that presented the range of work by other parties on estimating demand response potential.

FERC

The Federal Energy Regulatory Commission (FERC) has in the past several years made significant strides in fostering the development of demand response. It views demand response as a vital ingredient to the success of wholesale markets and has sought to foster demand response programs and markets at the various regional RTOs and ISOs. As a result, some of the newest demand response resources that have been developed are at the wholesale level. FERC continues to push to demand response both through its actions in party-specific proceedings and in generic rulemakings.

States

In order to employ demand response, it is necessary for two things to happen. First, technology must be in place that allows electricity usage to be measured in time intervals (instead of the present system where usage is measured cumulatively and where all kilowatt hours are treated equally) and provided to utilities, customers and other parties in a timely manner. Adding automated controls and other technologies that monitor and control usage enhances and increases the amount of demand response that can occur. Second, customers must be provided with time-differentiated price options and/or other incentives to reward them for modifying their on-peak usage.

Each of these requirements present state public policy issues that are only beginning to be addressed and resolved. As discussed above, the investigation required by EPACT 2005 represents for many states the first demand response activity they have undertaken. In many cases, state policy makers have been reluctant to support utility investment in new metering deployments. In many more cases, state policy makers have expressed significant reluctance to introduce time-based rates to customers, citing the political backlash that could or would occur. These expressions of concern have come even in the face of suggestions that such time-based rates would be voluntary, and even after research continues to accumulate that customers like having such rate options and the information and technology that comes along with them.

States for the most part "have the ball" on demand response and smart metering. They also therefore have much of the ball on development of the smart grid, even though this is not conventional thought on this topic. Yet states have the least amount of resources to adequately assess and understand demand response and the smart grid. It is imperative to the success of both that states receive additional support to be able to play their necessary role.

Policy Options for Congressional Consideration

DRAM believes that there are a number of steps which Congress can consider to develop demand response, which will in turn be steps toward development of the smart grid. Recognizing that some of these may not be jurisdictional to the Subcommittee on Energy and Air Quality, we list them as follows:

1. Congress should recognize that smart meters represent new, high-technology hardware and software and should be treated for tax and regulatory purposes as such. Tax policy should be changed to accelerate depreciation on smart meters and other demand response technologies.
2. Tax incentives should be provided to utilities and other parties, including customers, to install demand response technologies as quickly as possible so as to develop as much demand response as possible in the nation's electricity mix. One option would be a reduction tax credit, similar to the production tax credit that has allowed the renewable energy industry to gain traction and grow. Such a credit could only be granted when reductions are measured and verified using demand response technologies and applications, in recognition of the capabilities of such. Another option would be an investment tax credit which helps accelerate the installation of devices and equipment.

3. A temporary National Commission on Electricity Modernization should be established, with funding provided, that would undertake the following tasks:

a) Conduct a national assessment of the state of the grid and provide detailed proposals to Congress, the President and the States on how to accelerate the deployment of a smart grid. Included in the Commission's work would be development of a framework for how the smart grid would operate and how its components would effectively communicate and interface. Also included would be a proposal for funding the investment necessary to put smart grid infrastructure in place.

b) Develop a National Action Plan on Demand Response and Smart Technologies that would provide support for education and training of policy makers, customers and other stakeholders, as well as a nationwide communications and outreach program that would lead to greater deployment of demand response.

A temporary independent Commission would allow the efforts of industry, state policy makers and other stakeholders to be integrated with the efforts of DOE, FERC and other Federal agencies in a holistic, comprehensive and effective manner. It would also be able to provide the required support to states, where much demand response activity must take place to realize the potential of the resource.

4. Congress should consider providing additional funds to develop demand response resources and the smart grid in general via the introduction of a national assessment on the transmission system. Even an extremely small "wires charge" would generate significant revenue earmarked for smart grid investments.

5. Congress should consider requiring the federal government to demonstrate leadership by establishing peak demand reduction standards for federal agencies. These standards would require progressive reduction in peak electricity demand as compared to a baseline year, in a manner similar to renewable portfolio standards or energy efficiency resource standards. These

standards would complement and enhance the other efficiency activities that federal agencies already are required to do and/or have underway.

6. With the development of new communications and control technologies that allow individual consumer appliances to receive and "act" upon price signals and other control signals for purposes of demand response, Congress should consider moving to additional types of appliance standards beyond those that govern internal energy efficiency.

7. Congress should consider how to integrate smart metering systems into climate change strategies and regimes to allow such systems and other demand response technologies to be used to more precisely measure and verify energy reductions and the monetary rewards that accrue to the associated carbon reductions.

8. Congress should consider providing funding and technical assistance to States or groups of States for developing smart grid assessments and action plans which will allow them to move forward to begin to create smart grid components in their jurisdiction.

9. Congress should consider requiring the Federal Energy Regulatory Commission to develop a framework on interoperability, one of the key threshold issues to the growth of demand response and the smart grid.

Conclusion

As with any major endeavor such as the transformation of the nation's electric system into a smart grid, it is important to consider the timing and nature of the transition. In the case of the smart grid, it is easy to always see it as something that is out in the future somewhere, just out of reach. It is easy to see it as something that requires substantial research and development and that can only be accomplished if new technologies, not necessarily yet invented, are developed and made available. Some aspects of the smart grid may indeed meet this future-oriented test. But in the case of demand response, smart meters and other smart technologies and applications, the future is now. These technologies, as with any modern technology such as in the computer or telecommunications area, will be on a continual path of evolution and will continue to improve over time. Yet those businesses and consumers do not wait for the next great product to be developed before deploying a computer or cellphone so as to capture the many benefits that present technology provides, even while recognizing that new technology will certainly replace what they have at some point. It is important to take this perspective with the smart grid and not in all cases wait for future technology. Demand response and smart technologies are available today which can deliver immediate benefits to utilities, customers, other stakeholders and the nation as a whole. With a greater commitment by state and federal policy makers to deploying these technologies now, expressed through funding and other types of support, the construction of the smart grid can begin now instead of in the future.

For questions regarding this testimony, please contact:

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Attachment A

Status of State Commission proceedings to consider EPACT Section 1252 PURPA standard requiring utilities to offer time-based pricing and advanced metering

Ongoing Proceedings on Standard

Alabama	Minnesota
Alaska	Missouri
Arizona	New Hampshire
Arkansas	New Mexico
District of Columbia	New York
Georgia	North Dakota
Illinois	Rhode Island
Indiana	South Carolina
Kansas	South Dakota
Louisiana	Texas
Michigan	Washington
	Wyoming

Completed Proceedings and/or Decision on Standards Made

Delaware – decided to not adopt but proceeding still open

Florida – decided to not adopt

Iowa – decided to not adopt

Idaho – decided to not adopt

Kentucky – decided to not adopt

Michigan – decided to not adopt but proceeding still open

Montana – deferred adoption

Tennessee – decided to not adopt but proceeding still open

Ohio – decided to adopt; proceeding still open

Utah – decided to not adopt

Vermont – deferred adoption

Virginia – decided to not adopt

West Virginia – decided to not adopt

Proceeding Deferred

Colorado

Maryland