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Report to Congress on the Benefits of Demand Response Provides Guidance for States Responding to EPACT Requirements

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Last week, the Department of Energy (DOE) issued a report to the U.S. Congress on the benefits of demand response. The report, entitled: "Benefits of Demand Response in Electricity Markets and Recommendations for Achieving Them," satisfies language in Section 1252(d) of the 2005 Energy Policy Act (EPACT), directing DOE to submit a report to Congress that "identifies and quantifies the national benefits of demand response and makes recommendations on achieving specific levels of benefits by Jan. 1, 2007." The report is a Meta study that summarizes what is known, and what is still under debate, about how demand response should be valued. It summarizes ten recent studies that sought to quantify those benefits, revealing work still needs to be done to close the gap between divergent market perspectives.

The report's recommendations target various federal agencies (FERC and DOE) to help foster demand response. However, it suggests an even greater role for state policymakers, regulators, and utilities. Within 18 months of EPACT's enactment (by early 2007), states are required to conduct investigations to decide whether to offer time-varying retail rate schedules and the necessary advanced metering to enable them to each customer class. This report provides important and timely guidance to state regulators and utilities as they begin this process.

A Crash Course in Demand Response

The report begins with an overview of the various types of demand response available, a crash course for state regulatory agencies and policymakers that are new to the subject and are faced with making important decisions about in the role of demand response in their market. Old hands at pricing and demand response will find the report a helpful synopsis of key issues and an insightful summary of the findings of studies conducted to quantify the value of demand response.

An important distinction is made between price-based demand response, associated with retail electricity rates with time-varying prices, and incentive-based demand response, defined as programs that compensate customers for reducing load when system reliability is threatened or peak loads are anticipated. Price-based options are in place all the time and response to them is the result of an economic decision by customers. They react to prices in a way that best suits their interests. Some refer to this as self-financed demand response, because no explicit payment is made to induce the behavior.

By comparison, incentive-based seek to induce load changes only under very specific conditions. They allow system operators to realize load curtailments when they are most needed to preserve system security, and load serving entities to reduce peak demand and therefore capacity costs. The report discusses how these options fit into electric system planning and operations over the course of the system operating timescale. It also describes how customers' decisions to participate in demand-response programs and respond to high-price or reliability events differ from traditional energy-efficiency programs that many states and utilities are familiar with.

Identifying Benefits and Costs

To establish how demand response is valued, the report identifies and discusses various types of demand response benefits and costs, distinguishing those that inure directly to program participants, the customers that provide demand response, and those that are enjoyed by electricity consumers in general. Participant benefits include electric bill savings that result for price response and financial incentive payments from responding to inducements to adjust load.

The general, system-wide benefits are important because they are enjoyed by most or all consumers, and therefore motivate policymakers' interest in demand response. They are characterized as short-term and long-term market impacts (cost savings from efficiency improvements), reliability benefits, and others such as more robust retail markets, more choices for consumers. Whether demand response results in reduced environmental emission is an unsettled issue.

Participant benefits may be offset by transaction costs. The amount depends on whether customers' usage response involves shifting load or reducing discretionary usage, or both, and the means by which the behavior is accomplished. They include inconvenience applicable to all customers, process and shift rescheduling costs for commercial or industrial customers, and the costs of equipment installed specifically to help them respond. The report also identifies costs associated with implementing demand response programs and tariffs, including metering and communications infrastructure upgrades, billing and related costs, and program-specific costs such as administration, incentive payments to customers, and measurement and evaluation costs.

Quantifying Benefits

To satisfy the Congressional directive to quantify the benefits of demand response, DOE reviewed recent studies that quantified demand response benefits and costs. It selected ten that represent a variety of methodological approaches and policy perspectives to characterize the range of values, which varied by order of magnitude due to difference in scope or scale. They demonstrate the consequences of lack of standardized and accepted analytic methods to estimate demand response benefits today, and how this impacts confidence in the results. An important difference found in the value of demand response across studies is market structure. Regions with organized wholesale markets administered by ISOs or RTOs, in which demand response program benefits were evaluated retrospectively, exhibited much lower values for demand response than regions with vertically integrated utilities where benefits were estimated as part of forward-looking resource planning exercises.

Recommendations for Achieving Benefits

The report's policy recommendations are targeted at states, regions, utilities and federal agencies charged with evaluating demand response opportunities under EPACT and implementing new programs or enhancing existing programs. The recommendations fall into six areas, and are summarized below.

- Fostering price-based demand response

DOE urges implementation of price-based demand response targeted to customer circumstances. Real-time pricing (RTP) is recommended for large and medium-sized business customers, as a default-service tariff in retail choice states and as an optional service elsewhere. State regulatory agencies and utilities are encouraged to develop ways to segment medium- and small-sized business customers to match customer circumstances with the best mechanism for price response, which in some cases might be RTP. But

critical-peak pricing and time-of-use pricing, and variations thereof, may be better-suited for medium and small business and for most residential customers. DOE also recommends investigating the cost-effectiveness of offering technical and/or financial assistance to small business and residential customers to enable their participation and price response.

- Improving incentive-based demand response programs

The report also provides recommendations for expanding and improving incentive-based demand response programs. DOE suggests maintaining or expanding traditional load-management programs, such as direct load control, with an established track record of providing cost-effective demand response. The report provides several design suggestions for developing or modifying existing emergency demand response programs, including adopting pay-for-performance incentives linked to prevailing market circumstances, reducing barriers to demand response providers and offering multi-year program commitments. State regulatory authorities are also advised to investigate the cost-effectiveness of default-service providers offering demand-response programs, and to provide cost recovery for investments in such programs.

- Strengthening demand response analysis and valuation

DOE highlights the need for universally applicable protocols and methods to accommodate valuing demand response resources routinely and consistently, and calls upon a variety of regulatory, stakeholder and academic parties to coordinate their efforts to establish them. Shortcomings that require attention include: developing standardized methods to evaluate demand response potential, performance and benefits, identifying appropriate benefit-cost tests for foreseeable programs, and developing methods to document the impact of price-based demand response on wholesale market electricity prices and reliability.

- Integrating demand response into resource planning

DOE recommends that FERC and state regulatory agencies work with interested ISOs/RTOs, utilities, other market participants and customer groups, to review and improve methods for integrating demand response into resource planning initiatives. ISOs and are advised to conduct studies to establish the benefits of demand response as part of long-term regional capacity and transmission planning.

- Increasing adoption of enabling technologies

DOE makes several recommendations related to enabling technologies. States and utilities evaluating the feasibility of installing advanced metering systems (as EPACT requires them to do) are urged to include explicitly their ability to support expanded demand response benefits, along with operational benefits, in their business case analyses. In addition, DOE advises states and utilities to evaluate demand-response-enabling technologies, particularly when they can be deployed to leverage advanced metering, communications, and control technologies. State legislatures are also advised to review building and

construction codes and standards to ensure that they do not discourage deployment of cost-effective demand response and enabling technologies in new construction.

- Enhancing federal demand response actions

DOE makes several recommendations aimed at some federal agencies. DOE charges itself to continue providing technical assistance to states, regions, electric utilities, and the public to identify and discuss lessons learned, best practices, new technologies, barriers, and ways to mitigate them. FERC is urged to continue encouraging demand response in the wholesale markets it oversees. DOE recommends that its Federal Energy Management Program explore the possibility of conducting demand response audits at federal facilities. Finally, DOE and the Environmental Protection Agency are urged to explore efforts to include demand response programs and pricing approaches, where appropriate, in ENERGY STAR® and other voluntary programs.

The report is available on DOE Office of Electricity Delivery and Energy Reliability's Website:

http://www.electricity.doe.gov/documents/congress_1252d.pdf