

**Possible Elements of a
National Action Plan on Demand Response
- A DISCUSSION DRAFT -**

The Federal Energy Regulatory Commission Staff

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Introduction

The staff of the Federal Energy Regulatory Commission (FERC) has prepared this Discussion Draft of Possible Elements of a National Action Plan on Demand Response (Discussion Draft) to seek comment from the public on the proposed content of a National Action Plan on Demand Response (National Action Plan), required of the Commission under section 529 of the Energy Independence and Security Act of 2007 (EISA), entitled “Electricity Sector Demand Response.”¹

The National Action Plan is the second stage of a three-stage process that began with a national assessment of the potential for demand response nationwide, and in each state, that can be achieved within five- and ten-years (See Sidebar 1).² The Commission was required to make specific policy recommendations in *A National Assessment of Demand Response Potential* (Assessment) that if implemented can achieve the estimated potential, and then to develop a National Action Plan on Demand Response that shall meet each of the following objectives:

- (1) Identification of requirements for technical assistance to States to allow them to maximize the amount of demand response resources that can be developed and deployed.
- (2) Design and identification of requirements for implementation of a national communications program that includes broad-based customer education and support.
- (3) Development or identification of analytical tools, information, model regulatory provisions, model contracts, and other support materials for use by customers, States, utilities and demand response providers.

The Discussion Draft is a proposal with two parts:

- Part 1: Objectives and Overarching Strategy. This part discusses the objectives of the National Action Plan and proposes for discussion the establishment of a national coalition of stakeholders to implement the National Action Plan.
- Part 2: Possible Strategies and Activities. This part discusses and seeks comment on possible strategies and activities that could be included in the National Action Plan to achieve the objectives of EISA, to maximize the amount of demand response resources that can be developed and deployed.

¹ Pub. L. No. 110-140, § 529, 121 Stat. 1492, 1664 (2007) (to be codified at National Energy Conservation Policy Act, 42 U.S.C. §§ 8241, 8279).

² *A National Assessment of Demand Response Potential* (June 2009), available at <http://www.ferc.gov/legal/staff-reports/06-09-demand-response.pdf> (Assessment).

Sidebar 1: EISA Demand Response Requirements

Section 529 of EISA requires the Commission to do three things, which can be broadly characterized as follows:

1. National Assessment of Demand Response. The Commission must conduct the Assessment that estimates nationwide demand response potential in 5 and 10 year horizons on a State-by-State basis, estimates how much of the potential can be achieved within those time horizons, identifies barriers to the development of demand response and demand response programs, and makes policy recommendations for overcoming the identified barriers. This Assessment was completed in June 2009.¹
2. National Action Plan for Demand Response. Within a year after completing the Assessment, the Commission must develop a National Action Plan that meets the enumerated three objectives.
3. FERC-DOE Implementation Proposal. The FERC and the Secretary of Energy (DOE) must submit to Congress a proposal for implementing the National Action Plan, including specific proposed assignments of responsibility, proposed budget amounts, and any agreements secured for participation from State and other participants.

In June 2009, FERC staff issued the Assessment, completing the first requirement.² To estimate the nationwide demand response potential in five- and ten- year horizons, the Assessment developed four scenarios of demand response that reflect different levels of potential. These scenarios are called Business-as-Usual, Expanded Business-as-Usual, Achievable Participation and Full Participation. The Assessment's four scenarios are not cumulative or additive. Instead, they represent different assumptions about types of demand response programs and products, the speed of advanced metering infrastructure (AMI) installation, technology and other factors. For example, the Full Participation scenario is an estimate of how much cost-effective demand response would take place if advanced metering infrastructure were universally deployed and if dynamic pricing were made the default tariff and offered with proven enabling technologies. It assumes that all customers remain on the dynamic pricing tariff and use enabling technology where it is cost-effective. The Full Participation scenario resulted in the greatest amount of cost-effective demand response potential. The Assessment estimated under its full participation scenario that the sum of the states' demand response potential is as much as 188 gigawatts (GW) by 2019, or about a twenty percent reduction in U.S. peak demand. This represents a significant increase over the 37 GW of demand response that would be achieved if business continued as usual, i.e. if existing and currently planned demand response programs and products continued unchanged over the next ten years.³

¹ Assessment, *supra* note 2.

² *Id.*

³ *Id.* at xi (“programs include interruptible rates and curtailable loads for Medium and Large commercial and industrial customers, as well as direct load control of large electrical appliances and equipment, such as central air conditioning, of Residential and Small commercial and industrial customers”).

Sidebar 2: Definition of Demand Response

The Commission uses the term demand response to refer to the ability of customers to respond to either a reliability trigger or a price trigger from their utility system operator, load-serving entity, regional transmission organization/independent system operator (RTO/ISO) or other demand response provider by lowering their power consumption. For many years, the term was used to refer to peak clipping actions that were confined to a limited number of hours of the year. As adopted in Order No. 719, the Commission defined demand response to mean “a reduction in the consumption of electric energy by customers from their expected consumption in response to an increase in the price of electric energy or to incentive payments designed to induce lower consumption of electric energy.”¹ Demand response can be both dispatchable and non-dispatchable. Dispatchable demand response refers to planned changes in a customer’s consumption in a response to direction from someone besides the customer. It includes direct load control of customer appliances such as those for air conditioning and water heating, directed reductions in return for lower rates (called curtailable or interruptible rates), and a variety of wholesale programs offered by RTOs/ISOs that compensate participants who curtail loads when directed for either reliability or economic reasons. This direction to reduce load can be in response to acceptance of consumer’s bid to sell its demand reduction at a price in an organized market (a wholesale price-responsive demand response) or to be sold to a retail provider. Non-dispatchable demand response refers to programs and products in which the customer decides whether and when to reduce consumption based on a retail rate design that changes over time. This is sometimes called retail price-responsive demand and includes dynamic pricing programs that charge higher prices during high-demand hours and lower prices at other times.

As used in this Discussion Draft, the term demand response includes consumer actions that can change any part of the load profile of a utility or region, not just the period of peak usage. As a result of technology innovations and policy directions, new types and applications of demand response are emerging. In particular, consumer response to signals from a utility system operator, load-serving entity regional transmission organization/independent system operator (RTO/ISO) or other demand response provider, can be deployed to shape any or all parts of a customer’s load profile. This concept of demand response encompasses the effect of smart appliances in customer dwellings that can respond in near real-time to the signals of a load-serving entity, or other demand response provider, or to changes in bulk power system conditions such as a change in system frequency. It also includes the smart integration of changeable consumption with variable generation to enable the addition of new technologies such as wind farms and roof top solar systems to utility systems. Demand response also includes deployment of devices that can manage demand as needed to provide grid services such as regulation and reserves, and can also draw power from energy storage devices such as plug-in hybrid electric vehicle batteries to provide these same grid services. Demand response can go beyond simple reduction in peak period consumption to include shifting consumption from peak to off-peak hours. For example, the use of thermal energy storage devices may be advanced through the use of time-of-use rates² that encourage night-time charging of home energy storage systems, plug-in hybrid vehicles and all-electric vehicles.

¹ See *Wholesale Competition in Regions with Organized Electric Markets*, Order No. 719, 73 Fed. Reg. 64,100 (Oct. 28, 2008), FERC Stats. & Regs. ¶ 31,281 (2008), *order on reh’g*, Order No. 719-A, 128 FERC ¶ 61,059 (2009) (codified at 18 C.F.R. § 35.28(b)(4) (2009)).

² Time-of-use rates, which are not dynamic (because the rates for each time period are fixed and do not change with system conditions) and were not included in the Assessment as a demand response program, are being included here as an element of the expanded array of opportunities for customers to reduce demand in response to signals.

This document is designed to help the public comment on these possible strategies and activities to include in the National Action Plan which will assist in the development of the National Action Plan. EISA requires the development of the National Action Plan after “soliciting and accepting input and participation from a broad range of industry stakeholders, state regulatory utility commissioners, and non-governmental groups.”³ Also, the Commission is directed to “seek consensus where possible, and decide on optimum solutions to issues that defy consensus.”⁴ To accomplish this, FERC staff began in summer 2008 to conduct background research and informal outreach with a diverse range of stakeholders on possible elements that would meet the objectives of EISA. FERC staff, with assistance from consultants, has based this Discussion Draft on this research and the input received from regulators, utilities, consumers, and many other types of stakeholders. At this stage, FERC staff is requesting reaction to the content of the Discussion Draft and input on how the plan could be constructed. This document will also serve to elicit input from interested stakeholders during a FERC staff technical conference that will be conducted to further support the development of the National Action Plan. The conference will be open to the public, and all interested persons are invited to participate. After consideration of the received input and completion of the National Action Plan, it shall be published together with any favorable and dissenting comments submitted by participants in its preparation.

This Discussion Draft describes possible activities that can be undertaken to maximize the amount of demand response resources that can be developed and deployed. The Discussion Draft envisions two simultaneous, compatible paths. First, it seeks to identify communications strategies, technical assistance and tools to achieve deployment of the maximum price-responsive demand response identified in the Assessment, which found the greatest potential for peak load reductions to be in price-driven demand response from such retail rate designs as dynamic pricing using advanced metering. Second, and simultaneously with the first path, the National Action Plan would set forth communications strategies, technical assistance and tools to be used to develop and deploy emerging technologies and resources such as dispatchable and automated demand response that enable customers to respond to price or other signals for demand response such as those becoming available with the Smart Grid. This includes development and deployment of dispatchable demand response as a versatile resource for a variety of applications besides lowering peak demand, such as automating demand response in all hours of the day, using demand response to provide operating reserves and other ancillary services, and partnering demand response with wind generation and other variable resources. These new and emerging technologies and applications offer benefits in addition to those estimated in the Assessment. They can also bring these benefits of demand response to all consumers by serving as a bridge or facilitator for states that decide to transition over time to some form of retail rate design such as dynamic pricing. Therefore, the Discussion Draft proposes that the National Action Plan build on the successes of demand response initiatives to date by seeking to develop more dispatchable (to price and non-price directions) demand response, foster the full deployment of AMI and

³ § 529.

⁴ *Id.*

dynamic pricing, employ competitive market forces to develop more customer demand response, and plan for the deployment of many innovative demand response applications that create greater consumer control over energy usage and create new cost-saving opportunities for consumers. If achieved, these developments will allow business and other customers to make choices about consumption and power markets to work better; lower costs; and benefit the environment.

FERC staff requests comments on the following questions, and the specific questions listed in the text boxes throughout the document:

- Are the three sets of possible strategies and activities described in the Discussion Draft appropriate and effective?
- Should any of the possible activities described in the Discussion Draft not be part of the National Action Plan? Should any activities not listed be added to the National Action Plan?
- Is the possible strategy of using a coalition to carry out the objectives discussed in Part 1 consistent with EISA?
- How can such a coalition best facilitate the implementation of the National Action Plan?

Part 1: Objectives and Strategy of the National Action Plan

1.1 The Objectives

The statutory precursor to the National Action Plan, as mentioned earlier, is the Assessment issued in June of 2009. That report includes nationwide and state-by-state demand response potential in five- and ten-year horizons, and identifies barriers to demand response along with recommendations for overcoming them. The National Action Plan will set out activities that may be considered by states and others in their decisions to deploy demand response. The activities are geared toward maximizing the amount of demand response resources that can be developed and deployed, consistent with the three objectives of section 529 of EISA for the National Action Plan. As stated above, the National Action Plan must meet each of the following objectives:

- (1) Identification of requirements for technical assistance to States to allow them to maximize the amount of demand response resources that can be developed and deployed.
- (2) Design and identification of requirements for implementation of a national communications program that includes broad-based customer education and support.
- (3) Development or identification of analytical tools, information, model regulatory provisions, model contracts, and other support materials for use by customers, States, utilities and demand response providers.

Sidebar 3: Demand Response in Organized Markets

During the past decade demand response resources have increased their market share in organized markets. The FERC and the RTOs/ISOs themselves have acted to eliminate barriers to demand response participation in organized, wholesale energy, capacity, and ancillary services markets, and to ensure that demand response resources that are technically capable of providing a service are treated comparably to supply resources offering the service. For example, demand response resources that are capable of providing reserves may participate in the day-ahead and real-time ancillary services markets in the Midwest ISO.¹ Furthermore, demand response resources may offer operating reserves and regulation service in New York ISO; participate in California ISO's energy and ancillary services markets; and participate in PJM's Reliability Pricing Model and ISO New England's Forward Capacity Market. Appendix 2 provides a list of the opportunities for demand response resources to participate in RTO/ISO markets currently.

As a means of supporting these initiatives, the Commission issued Order No. 719 on October 17, 2008. Through Order No. 719, the Commission sought to further address barriers to demand response participation in ISO and RTO markets. Among various reforms, Order No. 719 required system operators to accept bids from qualified demand response resources to provide ancillary services, and eliminated deviation charges during system emergencies to buyers taking less energy in real-time than purchased day-ahead.² Also, unless prohibited by state or local law, Order No. 719 permitted aggregators of retail customers (ARCs) to bid demand response on behalf of retail customers directly into the organized markets.³

Presently, 31,695 MW of demand response are available in ISO and RTO markets, up from 17, 146 MW at the end of 2006. Such gains represent 6.6 percent of 2008 peak electricity demand within the regions combined.⁴ Demand response capacity resources have nearly tripled in New England and PJM, and resources providing ancillary services accounted for more than 4,000 MW at the end of 2008. Such an infusion of demand response resources has aided in providing greater grid reliability, mitigation of generation market power, and an overall decline in fuel-adjusted power prices in organized, wholesale markets.⁵ Moreover, permitting ARCs and other curtailment service providers to participate in organized, wholesale markets facilitates greater involvement from customers such as universities, big-box retailers, and residential customers.

¹ FERC Staff, *Assessment of Demand Response & Advanced Metering: Staff Report*, at 41 (Dec. 2008), available at <http://www.ferc.gov/industries/electric/indus-act/demand-response.asp>.

² Order No. 719, FERC Stats. & Regs. ¶ 31,281 at P 15.

³ *Id.*; Order No.719-A, 128 FERC ¶ 61,059 at P 51 (On rehearing the Commission broadly affirmed its finding that organized market, but took a different approach with small utilities.).

⁴ ISO/RTO Council, 2009 State of the Markets Report, at 26 (2009).

⁵ *Id.* at 18.

1.2 Overarching Strategy: Establish a National Coalition to Implement the National Action Plan

Strategy	Develop a Strong Coalition
Expected Outcome	A strong coalition of diverse stakeholders would deliver the message of the National Action Plan and oversee the requirements for technical assistance to states, national communications and tools and support materials.
Questions	1.2A Is a coalition strategy the best approach? 1.2B How should the coalition be funded? 1.2C What agency and/or organizations should initiate oversight of the coalition? 1.2D What agency and/or organizations should have oversight of the coalition? 1.2E What entities should the coalition include?

This Discussion Draft is proposing the formation of a coalition to implement the National Action Plan. The coalition will implement the activities identified in the National Action Plan in order to enable stakeholders, such as states, to maximize the demand response resources developed and deployed. The coalition would be comprised of members representing different stakeholder groups. It would be responsible for coordinating the actions provided in the National Action Plan. The coalition would be tasked with developing or overseeing the development of technical assistance, the national communications plan, and tools and materials identified in the National Action Plan. We recognize that there are additional details that need to be further developed; however, we propose the coalition in this Discussion Draft so as to receive feedback on the overall concept and general structure. We also seek feedback on what roles federal and state government bodies and agencies, private sector organizations, and non-governmental organizations might have in carrying out the various activities identified in the plan.

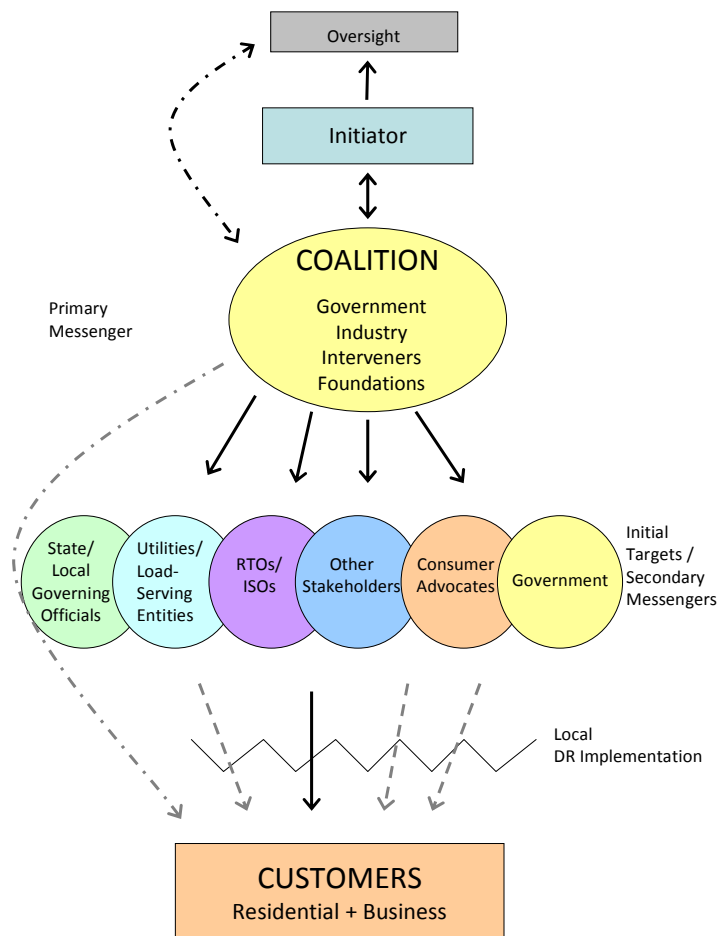


Figure 1: Illustration of National Action Plan Coalition Strategy

Figure 1 illustrates how such a coalition could be structured. Table 1 provides additional description of the role of various participants and their potential interactions.

Use of a coalition in other policy areas has been successful. Two examples, although varying in objectives and approach, serve to provide useful information for discussion of this approach to communicating the benefits and opportunities for demand response and for developing the methods and tools which states, utilities, demand response providers and others involved find useful and beneficial to consumers. Appendix 1 contains more information on these two examples.

Table 1: Summary of the Coalition Strategy Elements

Element	Description
Coalition	A group of organizations representing different interests around demand response, including, but not limited to government, industry (utilities, load-serving entities, and other demand response providers, wholesalers, vendors), intervenors/consumer advocates, and non-profit foundations. Acts as a “service provider,” coordinating communication and training, distributing tools and resources, and allocating funding through grant-type mechanisms.
Initiator	Organization that “founds” the coalition or causes its creation, including recruiting founding coalition members. Allocates funding to the coalition. May be a member of the coalition.
Oversight	Organization that ensures the coalition is meeting its objectives and being fiscally responsible.
State/Local Governing Officials	Includes public utilities commissions, local governments, and cooperative boards.
Utilities/Load-serving Entities/Other demand response providers	Includes vertically integrated utilities, transmission or distribution owners, RTOs/ISOs, cooperatives, municipals, other demand response providers.
Other Stakeholders	Product and service providers (hardware, software, program administration/implementation, measurement & verification), intervenors (consumer advocates, consumer groups), foundations (non-profits, non-government organizations), and others.
Customers	Residential, small commercial and industrial, medium commercial and industrial, large commercial and industrial, government, and other segments.

The National Action Plan for Energy Efficiency

In 2006, a Leadership Group comprised of more than 50 leading electric and gas utilities, state utility commissioners, state air and energy agencies, energy service providers, energy consumers, and energy efficiency and consumer advocates released the *National Action Plan for Energy Efficiency* (National Action Plan for Energy Efficiency).⁵ The National Action Plan for Energy Efficiency is a call to action to increase investment in energy efficiency, and envisions providing experts and resource materials to parties who are interested in pursuing energy efficiency. In 2008, the National Action Plan on Energy Efficiency was updated with its *Vision for 2025*⁶ that identifies ten implementation goals, and measures the progress made so far.

The initial Leadership Group was co-chaired by the then-president of the National Association of Regulatory Utility Commissioners, Diane Munns, and the President and Chief Executive Officer of Duke Energy, James Rogers. DOE and Environmental Protection Agency’s (EPA)

⁵ National Action Plan for Energy Efficiency (2006), available at http://www.epa.gov/cleanenergy/documents/napee/napee_report.pdf.

⁶ National Action Plan for Energy Efficiency, Vision for 2025: A Framework for Change, at ES-1 (2008), available at <http://www.epa.gov/cleanenergy/documents/vision.pdf> (Vision for 2025).

participation in the Leadership Group is limited to facilitation related to the National Action Plan. As of 2008, more than 120 organizations have endorsed these recommendations and/or made commitments to promote energy efficiency within their spheres of influence.

The Air Bag and Seat Belt Safety Campaign

In 1993, General Motors and the National Safety Council formed the “Air Bag & Seat Belt Safety Campaign,” a coalition of automobile manufacturers, insurance companies and the Insurance Institute for Highway Safety, safety organizations, law enforcement associations and the National Highway Traffic Safety Administration, to address the issue of child air bag deaths and stagnant nationwide seat belt use.⁷ As a coalition, they conducted a national umbrella campaign to encourage parents to restrain their children properly in the back seat, and to encourage all drivers and passengers to buckle up. This campaign provided media and organizational outreach materials to states and communities so that they were well-prepared to serve as spokespeople for the effort even if they were not demonstration program states, and provided intensive, on-the-ground support to key demonstration markets.

As a result of the coalition’s work in demonstration states, and then nationally, seat belt use increased more than it ever had during a prior period, from 61 percent in 1996 to a record high of 82 percent in 2005.⁸ Child fatalities from traffic crashes have dropped by 20 percent, and proper restraint use among toddlers has jumped dramatically from 60 to 94 percent.⁹

FERC staff seeks general comment from stakeholders on its proposal to use a coalition to undertake activities identified in the National Action Plan, and on mechanisms the coalition should adopt, if any, to measure the success of the implementation of the Plan. We also seek comment on how oversight of the coalition’s activities should be accomplished. Finally, we seek specific comments on the coalition’s role in undertaking each of the possible strategies and activities to implement the three objectives of EISA for a National Action Plan, as discussed below.

⁷ For more information about the Air Bag & Seat Belt Safety Campaign, visit <http://www2.nsc.org/airbag.htm>. General Motors and the Insurance Institute for Highway Safety provided the primary funding.

⁸ Press Release, Nat’l Safety Council, National Safety Council Honors Air Bag and Seat Belt Safety Campaign for Lifesaving Achievements (Oct. 30, 2006), *available at* http://www.csrwire.com/press/press_release/18157-National-Safety-Council-Honors-Air-Bag-and-Seat-Belt-Safety-Campaign-for-Lifesaving-Achievements.

⁹ Welcome to the Air Bag & Seat Belt Safety Campaign, <http://www2.nsc.org/airbag.htm> (last visited Sept. 14, 2009).

Part 2: Possible Strategies and Activities

This section identifies possible strategies and activities that could be included in a National Action Plan to fulfill the objectives in EISA Section 529.

Following section 2.3.6 is a summary of the possible strategies and activities for the three objectives. Each objective will be discussed in detail below and we seek comments on the possible strategies and activities. The presentation of the activities does not imply any sequence or ordering. Requirements for tools and support materials can be developed at the same time as requirements for technical assistance and the national communications plan. Furthermore, there will be significant, inherent overlap between these three objectives. For example, providing messaging and talking points to states that implement demand response would be a component both of the communications program and of technical assistance to states. However, for the sake of simplicity, possible action items are listed under the statutory objective areas that are most closely related to each activity. In practice, some activities would address multiple objectives to varying degrees. Figure 2 illustrates the functional overlap between the three activity areas.

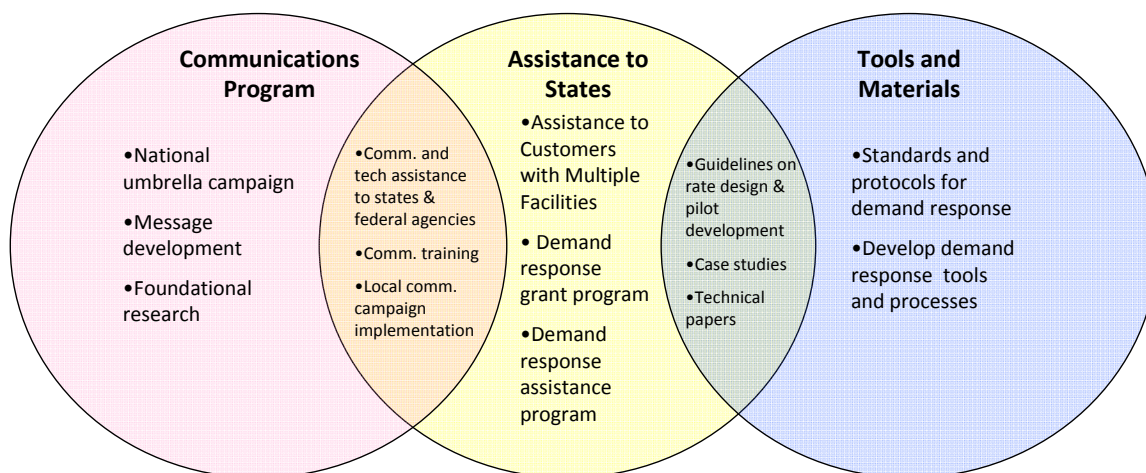


Figure 2: Functional Overlap in Some National Action Plan Activities

Given the overlap in technical assistance and tools and materials, we anticipate that not only states but also customers, utilities, demand response providers and other bodies and institutions will be able to take advantage of the resources identified in the National Action Plan.

To meet the three objectives in EISA, the National Action Plan will be applicable to a wide range of demand response programs, products, technologies, and incentives, as well as at various stages of implementation.

2.1 Technical Assistance to States¹⁰

Section 529 of EISA requires that the National Action Plan shall meet the objective of identifying the requirements for technical assistance¹¹ to States to allow them to maximize the amount of demand response resources that can be developed and deployed. While the statute requires the National Action Plan to identify “the requirements for technical assistance to States,” demand response activities of publicly-owned and cooperatively-owned utilities do not generally fall under state commission jurisdiction. Thus, providing technical assistance only to state agencies will not achieve the goals of providing assistance to other governing bodies responsible for overseeing the provision of electric service to all customers. Local officials governing publicly-owned and cooperatively-owned utilities face challenges similar to those of state governing officials, and FERC staff proposes that the National Action Plan identify requirements for technical assistance to them as well. Therefore, our discussion of most types of technical assistance targets the needs of state and local governing officials.

Several entities such as RTOs/ISOs and other demand response providers are developing ways that demand response can be utilized more broadly as a resource not only in energy, capacity, and ancillary services markets but also as a way to foster the full deployment of AMI and dynamic pricing, release competitive market forces to develop more customer demand response, and plan for the deployment of many innovative demand response applications that create greater consumer control over energy usage and create new cost-saving opportunities for consumers. These efforts would likely benefit from technical assistance, however, this EISA objective focuses on such assistance to states. Assistance to others to develop and deploy demand response —such as consumers, utilities, and demand response providers—is discussed later under the National Communications Program and the Tools and Materials section.

In several states, a variety of entities are already successfully providing demand response resources. (See Appendix 2 for examples of existing retail demand response programs.) These states tend to be those that have passed laws and/or regulatory mandates or action plans that incorporate demand response in the energy policy formation process. Often, these states (for example, Connecticut) have laid out a framework for integrated resource planning that explicitly incorporates demand response as a resource.¹² In some cases, these states are part

¹⁰ For the purposes of this Discussion Draft, generally states include governors, state regulators, state energy offices, state legislators, and state consumer advocates.

¹¹ FERC staff defines technical assistance to include, for example, the provision of information, supporting research, and funding. The Discussion Draft does not address issues related to the amount or source of any technical assistance that may be necessary to support some of the possible activities included in the Discussion Draft.

¹² Conn. Gen. Stat. § 16a-3a (2008).

of organized energy and capacity markets operated by RTOs and ISOs into which demand response can be bid as a resource. (Appendix 2 also lists current opportunities for demand response to participate in RTO/ISO markets.)

Not surprisingly, more demand response is found in higher cost states, which are typically located along the two coasts and in parts of the Midwest. In several cases, states have taken regulatory or legislative actions to induce demand response and energy efficiency.¹³ For example, the Michigan Public Service Commission's *Michigan's 21st Century Energy Plan*¹⁴ and the New Jersey Board of Public Utilities' *Energy Master Plan*¹⁵ set forth targets to reduce energy consumption and peak demand for the utilities and/or load-serving entities operating in those states. Massachusetts' Green Communities Act,¹⁶ Maryland's EmPOWER Maryland Energy Efficiency Act of 2009¹⁷ and Pennsylvania's Act 129¹⁸ set goals for reductions in energy consumption and peak demand. In Colorado, the legislature recently passed legislation that permits cooperative electric associations to introduce inclining block rates for residential customers in order to promote energy efficiency.¹⁹ In Iowa, utilities are required to develop energy efficiency programs,²⁰ which include demand response.²¹

Many state and local governing officials and other key stakeholders (such as other demand response providers and public power entities, including rural cooperatives and municipal utilities) recognize the potential benefits of demand response programs, products, technologies and incentives and would like to maximize their deployment.²² However, inadequate training, time constraints, and staffing or resource limitations can impede effective implementation and deployment of demand response. While wholesale markets are seeing increasing participation

¹³ See, e.g., *2009 Assessment of Demand Response & Advanced Metering*, at 12 (August 2009) (identifying the steps that states have taken to encourage demand response, such as Pennsylvania, Maryland, New York, New Mexico, Ohio, and Iowa's adoption or enhancement of energy efficiency resource standards that include demand response).

¹⁴ J. Peter Lark, Chairman, Michigan Pub. Serv. Comm'n, *Michigan's 21st Century Energy Plan* (2007), available at http://www.michigan.gov/documents/mpsc/21stcenturyenergyplan_185274_7.pdf.

¹⁵ New Jersey Bd. of Pub. Utils., *New Jersey Energy Master Plan* (2008) http://www.state.nj.us/emp/docs/pdf/081022_emp.pdf.

¹⁶ 2008 Mass. Acts 50 (amending Mass. Gen. Laws ch. 164B, § 116(a) (2009)).

¹⁷ 2008 Md. Laws 131 (amending MD Code Ann., Pub. Util. Cos. § 7-211(b)(2) (2009)).

¹⁸ 2008 Pa. Laws 129 (amending 66 Pa.Cons.Stat. § 2806.1 (2009)).

¹⁹ S. 39, 67th Gen. Assem., Reg. Sess. (Co. 2009) (amending Colo. Rev. Stat. § 40-9.5-106(2)) ("A cooperative electric association . . . establishes a graduated rate for increased energy consumption, for energy conservation and energy efficiency purposes, by residential customers that is revenue-neutral for the class . . . [and] shall give due consideration to the impact of such rates on low-income customers.").

²⁰ Iowa Code § 476.6.16 (2009). See Iowa Utils. Bd., *Energy Efficiency in Iowa's Electric and Natural Gas Sectors*, Report to the Iowa General Assembly (2009); Iowa Utils. Bd., *Overview of Energy Efficiency Plans and Programs in Iowa*, http://www.state.ia.us/government/com/util/energy/energy_efficiency.html (last visited October 14, 2009).

²¹ "Energy efficiency programs include activities which lessen the amount of heating, cooling, or other forms of work which must be performed, including but not limited to . . . direct and indirect load control, time-of-use rates. . ." Iowa Code § 476.6.16(c)(2) (2009) (existing code amended in 2008).

²² Several states have already implemented demand response programs and useful lessons can be drawn from existing programs. Specific case study examples of demand response programs and policies in various states and regions are discussed in Appendix 2.

by providers of demand response resources, customers who participate in these programs represent a relatively small fraction of all retail customers. Provided below are some ideas for ways to provide technical assistance to states and other stakeholders. We seek comment on these ideas as well as suggestions for other types of helpful technical assistance.

Where appropriate, please provide comment on the following questions for each of the following possible activities.

- 2.1A** Will this type of technical assistance assist a state to maximize the amount of demand response resources that can be developed and deployed?
- 2.1B** Is the proposed activity of high, medium or low priority?
- 2.1C** Is the coalition the best group to lead this activity? If not, who is?

2.1.1 Establish a National Forum

Purpose	Provide a venue for federal, state, and local leaders, as well as key stakeholders, to discuss carrying out the National Action Plan.
Expected Outcome	Develop necessary support from policymakers for accomplishing the activities identified in the National Action Plan.
Questions	2.1.1A Is the proposed scope of this forum appropriate? 2.1.1B Is a national forum necessary, or should separate regional workshops be conducted in addition to or instead of a national forum? 2.1.1C How often should the national forum be held? 2.1.1D How should broad participation/support be achieved?

A national forum could be held for federal agencies, state public utility commissioners, state energy offices, gubernatorial offices, state legislators, state consumer counsels, utilities, and other key stakeholders to discuss the National Action Plan. The forum(s) could be a stand-alone one day session in Washington, D.C. or elsewhere, or could be a half-day session that follows or precedes another national conference (e.g., National Association of Regulatory Utility Commissioners or National Demand Response Town Hall Meeting). The forum would be designed to provide the overall vision contained in the National Action Plan for key decision makers on demand response and provide an opportunity to share ideas, examine barriers, and explore solutions. It could also examine the complementary role of demand response to help with state initiatives, such as reliably meeting renewable portfolio standards, and objectives related to climate change, energy efficiency, consumer protection, and customer satisfaction.

2.1.2 Conduct Informational & Educational Sessions for Policymakers and Regulators

Purpose	For state and federal regulators, legislators, and other policy makers to share and learn about the attributes, uses, and benefits of effective demand response and opportunities to implement demand response.
Expected Outcome	Better prepared state and local governing officials as they implement demand response in their state.
Questions	2.1.2A Is the proposed scope of the workshops appropriate? 2.1.2B How can existing regional organizations (e.g., Western Governors Association, Organization of PJM States, Inc., etc.) be encouraged to participate? 2.1.2C Should the workshops be conducted more than once? If so, how often?

Following the national forum, multiple regional and state workshops could be held, targeted to a broader set of state employees, regulators, and other stakeholders. The workshops may be more convenient for other interested retail regulators such as municipal city councils and rural cooperative boards. The objectives of the regional workshops would include those of the national forum but would also seek to coordinate and implement applicable activity proposed within the National Action Plan for the deployment of demand response in the region. Regional workshops also allow more targeted discussion of demand response issues specific to each region, such as demand resource participation in wholesale organized markets in regions served by RTOs or ISOs; and use of demand response to meet ancillary service needs associated with integration of renewables. The workshops could address the various services provided by demand response, the associated costs and potential benefits of demand response programs, products, technologies and incentives to the states and their electric customers, and present strategies for deployment. Additionally, the workshops could include topical sessions led by expert speakers examining various practical aspects of demand response implementation. Periodic workshops or roundtables also could be held to discuss progress in implementing demand response, to consider best practices, and to promote sharing of problems and solutions among state and local governing officials responsible for establishing demand response policies.

2.1.3 Conduct Communications Training for State and Local Governing Officials

Purpose	Train state and local governing officials on educating customers about demand response.
Expected Outcome	Enhanced knowledge and skills on the best means to communicate with customers and stakeholders regarding demand response benefits, economics, markets and legislative initiatives.
Questions	2.1.3A Is the proposed content of the training appropriate?

Communications trainings or workshops could be provided to state and local governing officials as a part of or independent of regional workshops, and in concert with the National Communications Plan described in Section 2.2 below. Such training could share findings from consumer research and demand response experts, provide message training for engaging various stakeholder and consumer audiences, and provide tools to ensure state and local governing officials can begin reaching out to customers with educational information about demand response programs, products, technologies, and incentives.

Analogous Example



As a part of The Robert Wood Johnson Foundation’s “Covering Kids & Families” initiative aimed at enrolling eligible children in available public health insurance programs, the foundation and its consultants conducted an annual communications training conference aimed at training spokespeople from the grassroots and state level to advocate on behalf of children’s health coverage. The training conference taught participants how to reach out to the news media to get news stories written about the issue, how to use current research findings in interviews and speeches, how to do on-camera interviews successfully, and how to conduct a meeting with a lawmaker or other decision-maker.

2.1.4 Build a Panel of Demand Response Experts

Purpose	Deliver lectures on demand response social and technical topics at national and regional conferences.
Expected Outcome	Enhanced knowledge, skills, and attitudes of stakeholders regarding demand response programs, technologies, markets, statutes and/or ordinances, benefits and economics.
Questions	2.1.4A How should the expert panels be developed?

The coalition or an appropriate federal agency could canvass regulators and industry resources to compile a list of potential speakers on demand response topics. The coalition or agency could then offer to provide expert speakers at meetings and conferences that relate to demand response, in particular to those of state and local governing officials involved in development of electric policy (e.g., the National Council of State Legislatures, the National Association of Regulatory Utility Commissioners, and the National Association of State Utility Consumer Advocates). The speakers list could consist of demand response experts from existing demand response working groups, national laboratories, federal agencies, utilities, state agencies, demand response providers, and other stakeholder groups. The purpose of this program would

be to help inform various constituencies about demand response programs, products, technologies and incentives and their benefits. In addition, the experts would serve as contacts for state and local governing officials during phases of policy development or regulatory proceedings.

2.1.5 Sponsor Technical Papers

Purpose	Generate new knowledge or synthesis of existing knowledge to inform the design of demand response programs, products, technologies, incentives, markets and legislation.
Expected Outcome	Peer-reviewed or similar quality papers; creation of a peer-reviewed, multidisciplinary journal specifically for demand response topics.
Questions	2.1.5A What is the best means for providing the results of this research to states? 2.1.5B Are the potential research topics provided useful?

The coalition, or an appropriate federal agency, national laboratory, academic institution, or other entity, could sponsor a series of informational, technical, research, or policy papers targeted to various practical aspects of demand response implementation. This sponsorship could also lead to the creation of a multidisciplinary (social and technical), peer-reviewed journal for publishing the papers. The primary purpose would be to highlight questions that require new research to address barriers or obstacles to demand response.

In developing a list of possible areas for further research, some potential resource and research gaps were identified. The potential gaps identified below serve as examples for discussion purposes; they are not a comprehensive list. A resource gap indicates the lack of strong examples of good practice. A research gap indicates that important research questions remain unanswered. In order to fill resource and research gaps, research topics (organized by whether the research topic relates more to social science²³ research or technical issues) could include:

Social Science Research Issues

- Exploration of issues related to rate design, metering costs, and an analysis of customer response to time-varying prices in successful programs.
- Investigation of typical demand response participation rates and how these rates vary based on program design parameters, marketing strategy, customer type (residential, commercial, and industrial), and customer profile (e.g., age and geographic location). Also, investigation into the non-price response incentives that motivate customers to participate in demand response programs and products.
- How the participation rate and demand impacts vary depending on whether the demand response rate design is required by law or regulation (e.g. as the default rate) or if customers voluntarily sign up for it.

²³ Social science research focuses on customer interest in demand response and how customers change their consumption or behavior in response to demand response programs or dynamic pricing.

- Exploration into the effectiveness of demand response when critical days are sustained for multiple days in a row and the persistence of demand response behavior when programs and products are implemented over a long-term time horizon.
- Understanding whether consumer reduction in demand during peak hours leads to increased demand during other hours of the day, and also understanding whether consumers take conservation measures to lower demand over all hours of the day, not just during peak hours.
- The short run price elasticities from pilot demand response programs are results which originate in a few states (and Canadian provinces); investigate whether these results are applicable to other areas.
- Estimates of customer price sensitivity by type and class of customer.

Technical Issues

- Relative benefits of various types of demand response programs, products, technologies and incentives, covering such topics as the various types of benefits, potential costs, and payback horizons associated with each.
- Better understanding of the optimal amount of consumer versus demand response providers' control of appliances.
- An analysis of the environmental effects of demand response, such as: an estimate of emission mitigation when considering load reduction versus load shifting; an assessment of the potential for demand response to assist the integration of variable resources like renewable energy; and a calculation of environmental benefits stemming from the reduced need to build new generation capacity and transmission systems.
- A study of the expected longevity of demand response compared to other resources, e.g., generation, transmission, storage.
- A study of how demand resources can be dispatched to support and balance variable generation from renewable energy.
- A study of how plug-in hybrid electric vehicles (PHEV) interact with demand response programs, examining whether demand response rate design provides a price signal that encourages PHEVs to charge during off-peak hours as well as how different demand response pricing mechanisms interact with PHEVs and their net impacts on how demand for electricity might change.
- Best strategies to maximize deployment of demand response potential for states with specific programs or needs taking into account electric demand profile, generation mix, preferred type of demand response programs and products, regional trends, stakeholder views, and previous assessment research.
- Research the appropriate codes and standards for demand response, considering whether they will be mandated at the federal or state level; whether they are mandatory or voluntary requirements; how they will be complied with and enforced; and how the costs involved in their development, compliance, and enforcement will be paid for. The integration of the many utility and third-party programs, devices, and software applications needs to be taken into consideration.

- Advanced metering topics such as estimating initial costs, methods used to recover costs, calculating time to payback, the pace of installation, the functionality of the devices, and dealing with rapid product obsolescence due to swift technology advancement.
- Smart metering for residential customers, covering such topics as categories and characteristics of various smart metering systems, cost-effectiveness, setting up the communications and data base, customer awareness, access to data, retrofitting existing meter connections with smart technology, and consumer protections.
- Curtailable load programs aimed at industrial customers, covering such topics as potential benefits to all customers, cost recovery, rate design, and program marketing.
- Implementation of demand response programs and products at government-owned campuses, covering such topics as the types of demand response suitable for government customer applications, barriers and lessons learned from existing programs, percentages of state electricity portfolio under municipal, county, state, and federal control, and potential impact of incorporating government loads into demand response programs and products.
- The relationship of demand response to other state energy initiatives (e.g., energy efficiency, renewable energy, smart grid, or others). This would explore how demand response overlaps or complements these other initiatives, and where management and oversight could be leveraged or combined.
- Ensuring smart grid cybersecurity, system reliability, and systems interoperability, especially in consideration of the massive amounts of data that could be transferred between customers and utilities and other demand response providers.
- An assessment of the job skills and training needed in order to successfully deploy demand response programs, products, technologies and incentives.
- Understanding the interest of elected officials, regulatory agencies, utilities and load-serving entities, RTOs/ISOs, other demand response providers and third-party vendors in making demand response a priority.
- Best strategies to coordinate retail demand response programs with RTO/ISO demand response programs for organized power markets.
- A study of the benefits of a national demand response policy, including reliability, efficiency, economic and environmental benefits, and benefits related to consumer savings, the increased ability to integrate variable generation, and the increase in potential competitive sources of ancillary services.

2.1.6 Establish a Demand Response Assistance Program

Purpose	Provide support to states for implementing demand response.
Expected Outcome	Demand response expertise is provided to states requesting assistance in the development and deployment of any and all forms of demand response.
Questions	2.1.6A Is there an opportunity for the creation of a clearinghouse or other electronic forum to facilitate this program? 2.1.6B What type of expertise is needed to provide this assistance? 2.1.6C How should the assistance program be funded? 2.1.6D What is the best avenue to provide this technical assistance? 2.1.6E Who should be eligible for this technical assistance?

This activity involves establishing a program administered by a coalition, under which state agencies (e.g., state regulatory commissions or state energy offices) may apply for specific on-site technical assistance with demand response implementation. The program administrator would provide appropriate technical assistance to stakeholders, which might range from referring a caller to a website, to providing the applicable reference material, to providing on-site technical help (for a day, a week, or longer). The technical help could be provided through a number of avenues, including the following:

- Staff of a federal office.
- National laboratory staff.
- Consulting firms specializing in operational and dispatch algorithms to allow demand response to be incorporated as a resource, similar to generation resources.
- Funding for lead staff from a state that has successfully implemented a particular demand response program to travel to and inform another state developing a similar program.
- Consulting firms, working as above, specializing in demand response communications and marketing.
- Other knowledgeable individuals.

2.1.7 Establish a Demand Response Grant Program

Purpose	Provide funding for demand response innovations.
Expected Outcome	Innovative solutions to demand response problems.
Questions	2.1.7A What grant funding mechanisms should be included in this program?

A demand response grant program would provide funding opportunities to entities interested in implementing states' demand response activities. The grant program would be subject to Congressional authorization and be weighted toward stakeholder projects that have the potential for maximum, sustained deployment of cost-effective demand response. The program could be administered by an appropriate federal agency either directly or through a national laboratory or other entity.

Selection criteria for grants to demand response programs, products, technologies and incentives could include that they: are consistent with best practices or are otherwise innovative in their application; demonstrate significant potential based on the results of scientifically conducted pilots; explore previously untested areas with strong potential; and are novel applications of demand response to address emerging climate issues.

2.2 National Communications Program

Section 529 of EISA requires that the National Action Plan meet the objective of designing and identifying requirements for implementation of a national communications program that includes broad-based customer education and support.

A national communications program could be multi-faceted to facilitate widespread acceptance and implementation of demand response in order to not only achieve the highest potential peak load reduction identified in the Assessment. It could also enable a variety of applications such as automating demand response in all hours of the day, using demand response to provide operating reserves and other ancillary services, and for partnering demand response with wind generation and other variable renewable resources.

FERC staff proposes a national communications program that informs residential, commercial and industrial customers about the availability and possible benefits of demand response programs, products, technologies and incentives through broad-based customer education and support. This Discussion Draft suggests a national campaign/local implementation strategy for the development of a national communications program. A national umbrella communications campaign (or national campaign) could be developed to communicate directly to stakeholders to build support for demand response, and provide the messaging framework and communications tools to allow demand response implementers to tailor the campaign locally to reach their own customers. The national campaign would provide communications support for local implementation of demand response to provide a successful program model which will be used to further inform the national campaign. By bringing it to the local, regional, and state levels, the communications messaging will be more effective, and feedback on what works can be used to influence the national effort.

The national communications program is subject to many challenges. There is no single nationwide demand response program in place. Different types of demand response programs, products, technologies and incentives currently exist across the country, and different programs, products, technologies and incentives are being considered and implemented. In addition, because demand response will be implemented differently depending on the location and circumstances, it may be difficult to develop one single message.²⁴ There are other

²⁴ For example, in some localities, the action step for the consumer might be “You need to do nothing,” if an opt-out program is implemented that gives the utility, load-serving entity or other demand response provider the ability to override the end-user’s air-conditioning controls; for other customers, the action step might be “Look for

challenges that a national communications program must consider, including the great diversity of stakeholder interests, the lack of knowledge about consumer perceptions and motivations, and the degree to which different local entities will be receptive to demand response and technical assistance. Thus, while ultimately, a national demand response mass media campaign targeting residential and small commercial customers could be undertaken, such a campaign may be premature at this time given the limited opportunity for such customers to participate and capture the potential value of demand response programs.

With these challenges in mind, the design of a national communications program could include the following objectives:

- Provide information to relevant stakeholders (including, but not limited, to state and local governing officials, utilities, load-serving entities, and other demand response providers, and state legislators) about the benefits and costs associated with demand response, including peak reduction and ancillary services to reliably integrate variable resources.
- Inform policymakers about the benefits of having a demand response policy that could complement their renewable energy and climate change goals.
- Inform renewable resource developers of the benefits of “partnering” with demand response to improve reliability and provide needed ancillary services.
- Increase electricity customers’ awareness and understanding of their energy-consuming behavior and the means to adjust their consumption to realize the most economical use of electricity. For example, the customer could adjust what times of day they use most of their energy.
- Increase the commercial, industrial, and residential electricity customers’ awareness and understanding of demand response (in addition to energy conservation and energy efficiency).
- Inform customers about the potential opportunities, benefits and costs of demand response and thereby engender customer support and participation in demand response in their local programs or regional markets.
- Establish clearly defined objectives and measurable goals with benchmarks to facilitate program evaluation and accountability.
- Address concerns about negative impacts on low-income and elderly consumers.

price signals, and then manually turn your air conditioner to a higher temperature,” if their utilities, load-serving entities or other demand response providers introduce opt-in dynamic pricing.

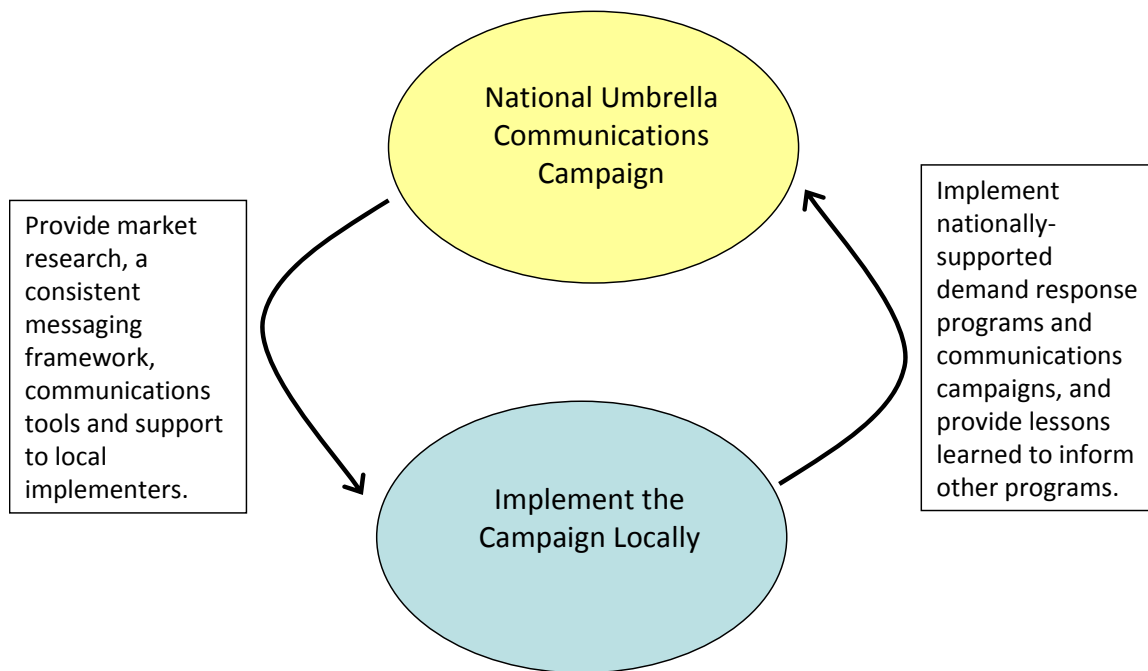


Figure 3: Proposed National Umbrella Communications Campaign Approach

The national umbrella communications campaign could communicate as a coalition, conduct foundational market research, develop messages that resonate, reach commercial and industrial customers, position demand response as a component of smart energy use practices, develop consumer-friendly terminology for demand response, provide communications assistance to state and local governing officials and stakeholders, distribute toolkit materials and develop partnerships. Such a national campaign could create a consistent messaging framework that can be customized and used in developing advertisements and message materials for use by local stakeholders, especially utilities, load-serving entities and other demand response providers, to communicate with customers. The strategy would be achieved through the use of a demonstration program approach. This demonstration program approach would include the following progression:

- Provide targeted communications support as new or enhanced demand response programs, markets, and products are developed at the state, local, and regional level. These local implementations could then serve as sample demonstrations of effectively communicating the benefits and opportunities for demand response.
- The national campaign would develop a consistent messaging framework and help tailor the national message to the local audience to help yield greater demand response participation. This could include information on the versatility of demand response resources for a variety of applications beyond lowering peak demand, such as automating demand response in all hours of the day, using demand response to provide operating reserves and other ancillary services, and for partnering demand response with wind generation and other variable renewable resources.

- Locally disseminate communications to residential and small commercial customers in the areas that are implementing new or improved demand response programs, products, technologies and incentives.
- Utilize the success of the demonstration programs to spread communications and successful utility, load-serving entity, RTO/ISO, and other demand response providers' program and product models that can be replicated in those areas that plan to implement demand response in the near term.
- Eventually disseminate communications on a national scale as opportunities for demand response becomes more widespread.

The following preliminary elements of a national communications program are set out for comment and discussion. The elements could be pursued individually or as part of an integrated communications plan and could be supplemented by other elements as may be later recommended.

Where appropriate, please provide comment on the following questions for each of the following possible elements.

2.2A Is the proposed element of high, medium or low priority for design and/or implementation of a national communications program?

2.2B Is the coalition the best group to lead this activity? If not, who is?

2.2.1 Develop a National Umbrella Communications Campaign to Communicate Opportunities and Benefits of Demand Response to the Consumer and the Community

Purpose	Provide a consistent messaging framework based on research and best practices that allows for specific tailoring to meet the unique needs of states, localities and regions.
Expected Outcome	A clear messaging framework, a body of consumer research, and customizable message materials.
Questions	2.2.1A How should stakeholders participate in the national umbrella communications campaign? 2.2.1B What should the consistent messaging framework contain?

A national campaign could provide the foundation in terms of market research, messaging, and outreach tactics upon which all communications efforts at the national, regional, state and local level are built. It may be most effective to think of this national campaign as a targeted effort to reach different audiences sequentially.

The national campaign will be more effective if it first provides assistance to stakeholders to build decision-maker support and technical capacity for demand response implementation, and then educates residential and small commercial customers through integrated communications in the localities and states that adopt demand response programs or where regional markets for demand response exist. An effective campaign would provide a national umbrella for communications but would be implemented locally in partnership with local stakeholders. (Large commercial and industrial customers could be targeted concurrently, at the national level for national retailers and at the local level for large building owners and industrial customers.)

This local implementation, or demonstration program approach, would first roll out to the public in areas that have already implemented or are on the verge of implementing pilot or full-scale demand response programs and products. Then the demonstration program approach would spread to those areas that plan to implement programs and products in the near term, and eventually become national in scope as implementation becomes more widespread. The national campaign could coordinate with the DOE’s American Recovery and Reinvestment Act of 2009²⁵ stimulus smart grid grants. For instance, recipients of stimulus grants could serve as examples within the demonstration program approach. The same benchmarks would apply in terms of clearly-defined objectives and measurable goals as would apply in a national campaign, but evaluation would be conducted in each area independently.

2.2.1.1 Element 1: Communicate as a Coalition

Purpose	Provide a credible national campaign “voice” that comes from a diverse group of stakeholders and decision-makers.
Expected Outcome	A clear sense among states, localities, regions, coalition members and other stakeholders that the coalition is a primary resource for demand response communications assistance.
Questions	2.2.1.1A Is it best for a coalition to develop the communications messages and support materials that could be used across the country?

Given the scope of the National Action Plan, only a diverse coalition of stakeholders involved in an integral way could develop a communications program that will be effective across the country. Because there are so many regional differences among energy stakeholders and among customers, and different priorities for organizations at different points in the energy-generation and delivery spectrum, only a diverse coalition, including parties from different regions, from all sectors of the energy generation and delivery continuum, from all levels of government, from enabling technology manufacturers and vendors, and from consumer and professional organizations would have the credibility to communicate effectively both with stakeholders to build support for demand response, and with consumers in all classes. The

²⁵ Pub. L. No. 111-5, 123 Stat. 115 (2009).

coalition would take the actions in the National Action Plan, and would develop campaign messaging framework and communications support materials, would determine which states, localities, and regions to highlight as demonstration programs, and would report to the overseeing agency on campaign progress.

Analogous Example



The Air Bag and Seat Belt Safety Campaign coalition was comprised of a diverse group of organizations, including the National Highway Traffic Safety Administration, the Insurance Institute for Highway Safety, the major American automakers led by General Motors, the National Safety Council, Mothers Against Drunk Driving, national law enforcement organizations, governors, legislators and others. The coalition determined which states to target in communications efforts, how to allocate the campaign’s resources to yield the most publicity and attention, and how to adapt the campaign based on progress made. The coalition also collected data on the increases in proper occupant restraint and the impact of paid advertising, and used this data to build Congressional support for a national paid advertising campaign. Ultimately, state leaders, members of the media, and law enforcement officers knew to go to the coalition for anything related to occupant restraint.

2.2.1.2 Element 2: Conduct Foundational Market Research

Purpose	Gain insights into electricity customers’ perceptions, motivations and receptivity to particular demand response messages, all of which will inform national and local campaign development.
Expected Outcome	High-quality data that informs message development, communication methods, and communication channels. Data may also inform state and local governing officials’ decisions about whether to invest in demand response.
Questions	<p>2.2.1.2A Should foundational market research be included in the national communications program?</p> <p>2.2.1.2B Are the research questions proposed representative of the major remaining research gaps?</p> <p>2.2.1.2C Who are the potential target audiences of the research? Utilities, load-serving entities and other demand response providers or state and local governing officials?</p>

Foundational market research could be used to develop a nationally consistent messaging framework for demand response, similar to the Energy Star program.²⁶ The national messaging framework could facilitate customers' understanding of demand response as well as its benefits. For example, the national message could be called "Smart Energy," and could include two possible benefits to participants: save money and help the environment. These core elements could be included consistently in messaging across the country.

In addition, the market research could include the gathering of information that would help target the appropriate local audiences with effective messages to change their energy usage behavior and illuminate which incentives and messages would be most persuasive to each customer class. Much of this research would be relevant across the country, thus avoiding the inefficient "re-inventing of the wheel." This information could be used to design the national communications campaign and tailor local campaigns.

Virtually all stakeholders interviewed by FERC staff during the outreach process agree that foundational or formative market research should be the first major component of a national communications program that includes broad customer education.

Formative research can be extremely helpful in assessing customers' understanding of the key issues, their assumptions, their conscious behaviors, and what would motivate them to change their behaviors. This foundational market research would include quantitative survey research of residential, commercial and industrial customers as well as qualitative research (for example, focus groups) among all customer classes. For example, key research questions that could be explored include:

- *How should messages be tailored to reach different classes of potential demand response providers?*
- *What messages are most effective to help consumers understand what demand response is?*
- *What messages are most effective to help consumers understand demand response's benefits?*
- *How much understanding of demand response do consumers need to have in order to participate? Do they need to understand the concept fully, or is it enough to give them easy tools and instructions and tell them the potential benefits of demand response?*
- *Is a financial incentive such as a billing savings or rebate the most powerful benefit or motivator, or is it better to know that reducing peak demand helps the environment? For example, is there a difference in response between paying a customer not to consume (but no penalty if it continues to consume) and building in a discount that the customer surrenders if it does not respond (peak time rebate vs. critical peak pricing (CPP))?*

²⁶ Energy Star is a joint voluntary labeling program of EPA and DOE that is designed to identify and promote energy-efficient products to reduce greenhouse gas emissions. For more information about the program, visit <http://www.energystar.gov/index.cfm?c=home.index>.

- *How well do consumers trust their utility, load-serving entity, or other demand response providers, and how much inconvenience will they be willing to endure if the provider asks them to be a part of a demand response program or product?*
- *Who should broadcast the demand response event for it to have maximum impact?*
- *Do messages that promote energy efficiency or energy conservation conflict with or support demand response messages?*

Customers’ answers to these questions will help the national campaign to shape its messaging in all outreach support materials, and ensure that the right messengers deliver those messages. In addition, the answers to these questions will serve as support to any entity interested in investing in demand response programs, products, technologies incentives and infrastructure.

Foundational research among customers will also provide insights into whether it is helpful to a customer’s understanding to link demand response to other smart energy use concepts, or whether that would confuse the customer, and whether it furthers the campaign’s objectives to link demand response with any existing state, regional, and national initiatives and policies (e.g., state renewable portfolio standards, climate change, energy efficiency, regional markets, etc.).

Finally, the research can help to determine the best market segments to target to achieve the greatest behavioral shifts for the lowest cost. Because virtually every person and every business uses electricity, the potential audience for this campaign is essentially the entire adult population, which would be prohibitively expensive to reach. Therefore, zeroing in on smaller groups could help to ensure efficiency in message delivery and avoid wasting time and resources trying to reach those who are unlikely to change their behavior.²⁷

2.2.1.3 Element 3: Develop Messages that Resonate

Purpose	Provide a consistent, effective message platform that educates customers, stakeholders, and state and local governing officials.
Expected Outcome	A full, research-based messaging framework that can be adapted for unique audiences.
Questions	2.2.1.3A What audiences should the messages target? 2.2.1.3B Who should deliver the messages? 2.2.1.3C Is the message content proposed for each audience group appropriate? 2.2.1.3D How does the message reach the right constituencies?

²⁷ For example, the California Statewide Pricing Pilot found that residential, medium C&I, and large C&I customers are more responsive to dynamic rates than are small C&I customers in the absence of automating technologies.

Table 2: Examples of Messages

Audience/“Who”	Message Content/“What”	Messenger	Delivery/“When”
Key stakeholders	Be a part of the coalition to lead the demand response campaign	Initiator of Coalition	Immediately/continually (as outreach begins in new states)
All stakeholder leadership	Implement your demand response goals with our support	Coalition	Short-term/ongoing
Stakeholder leadership in states, localities, and regions with demand response	We can support and supplement your efforts with technical and communications assistance	Coalition	Short-term/ongoing (continual as new states adopt demand response)
Stakeholder leadership in states, localities, and regions receptive to demand response	Implement demand response with our support; once implemented, we can support and supplement your efforts	Coalition	Short-term, medium-term, long-term
Stakeholder leadership in non- demand response states	Look at success in other states and localities as potential roadmap; we can help you achieve your unique goals	Coalition	Medium-term, long-term (continual as success stories and best practices emerge)
State and local governing officials	Support customer interest in implementing and receiving benefits of demand response	Coalition	Short-term/ongoing
Utilities, Load-serving Entities, and other demand response providers	Utilize our support to communicate with customers and provide additional sources of ancillary services and tools to reliably integrate with variable resources.	Coalition	Short-term/ongoing
Large commercial and industrial customers	Implement demand response because it can provide widespread benefits, save you money, and be directly beneficial to you as a participant in wholesale markets	Coalition, Utilities/Load-serving Entities, Public Utility Commissions, Other demand response providers	Short-term/ongoing
Current residential and commercial customers with access to demand response programs	Join the demand response program because it can provide widespread benefits (for example, you could earn a cash rebate, protect the safety of our power supply, and promote the use of clean energy)	Utilities/Load-serving Entities, Public Utility Commissions, Coalition, Other demand response providers	Medium-term, long-term (continual roll-out as new states and localities adopt demand response)
Future customers	Demand response is an important practice to reduce energy use during peak periods and protect the environment and promote the use of clean energy	Coalition, Utilities, Load-serving entities, Schools, Other demand response providers	Medium-term, long-term
Consumer advocates	Support demand response nationwide because it can provide widespread benefits (for example, less need for future power plants, safer power supply, potential money savings)	Coalition, Other demand response providers	Short-term/ongoing
Renewable Resource Developers	Partner with demand response for ancillary services	Coalition	Short-term, medium-term, long-term

Because this type of campaign would segment the audience into discrete groups, which research would help refine, each with its own call-to-action, the messages delivered to each group would differ. To simplify this notion, Table 2 provides for **illustrative purposes**, examples of messages for different audiences. The coalition would develop the actual content that the national campaign could deliver to each unique segment of the audience, with research providing insight into the most persuasive ways to convey this content.²⁸

The national campaign would develop easily-understood, research-based messages targeting each of the audiences outlined above. For example, when addressing residential customers in areas with available demand response programs, products, or markets, a generic messaging framework might inform them about the following topics:

- **Variability of Electric Prices and Sources.** Inform consumers that the cost of generating electricity varies by time and there are “peak periods” when there is a lot of demand for electricity, during which time electricity is more expensive to produce. Also inform consumers about which generation sources are used by time of day and during peak periods.
- **Urgency of Demand Response.** Seek to raise the urgency of the need for demand response, load shifting, energy efficiency, energy conservation, etc.
- **Actions to Take.** Educate consumers about specific actions they could take at critical peak periods to reduce electricity use, and publicize the benefits of participating in demand response. These messages would highlight the importance and value of taking action by framing that action with the motivators that emerge from the consumer research as most effective, such as the opportunity to save money on electricity bills or the ability to help the environment.
- **Minimizing Negative Impacts.** Provide reassurances to customers that any potential negative consequences of demand response implementation have been anticipated, and will not pose a threat to them. These messages would lessen customers’ concerns and prevent a customer backlash, in concert with messages about the need for demand response, the specific actions to take, and the benefits of taking them.

When addressing large commercial and industrial customers, the message framework might inform them about:

- **Compensation.** Inform consumer that not only can their actions result in reduced bills, but in specific parts of the country, actions can result in compensation opportunities.
- **Opportunities.** Educate large commercial and industrial customers with the role they can play by participating in regional markets such as to firm variable resources.

²⁸ Note that the technical assistance would help to provide the underlying factual basis for the content of the message.

Whether any of these messages or others are appropriate or motivating to customers would be determined by foundational research and message testing, as well as coalition input.

The national campaign could also develop messages to educate customers about specific actions they could take at critical peak periods to reduce electricity use or by participating in regional markets, and specify the benefits they will capture by participating in demand response. The messages would highlight the importance and value of taking action by framing that action with the motivators that emerge from the consumer research as most effective, such as the opportunity to save money on electricity bills or the ability to help the environment. The messages would be clear, concise, and specific, based on an understanding of the audiences, and be crafted to increase awareness and elicit behavioral change, and provide information for customers to take advantage of opportunities.

2.2.1.4 Element 4: Provide Communications Platform for Reaching Commercial and Industrial Customers

Purpose	Provide communications support materials to engage commercial and industrial customers in demand response.
Expected Outcome	Increased commercial and industrial awareness and possible adoption of demand response activities.
Questions	<p>2.2.1.7A Should the entire commercial and industrial sectors be the primary targets for the communications platform, or should it be targeted at specific subsectors?</p> <p>2.2.1.7B Are the suggested communications assistance or messaging appropriate for commercial and industrial customers?</p>

Residential and small commercial customers are a very important part of the audience for demand response, and reaching them effectively will have a disproportionately positive impact on broad public opinion surrounding demand response. But a major drawback is that effective communications to residential and small commercial customers cannot begin until demand response programs, products, technologies and incentives are in place in their states or localities.

That is not the case, however, with large-scale commercial customers and industrial customers, especially when existing demand response programs, regional or RTO markets, or dynamic pricing options are available. Because these large-scale customers – including national retail chains, large building owners, and industrial customers – often have the infrastructure in place to participate innovatively as a source of demand response, the national umbrella communications campaign could undertake direct outreach to these customers right away.

Working both at the national level and at the local level, depending on the customer, the coalition, and state, regional, and local stakeholders could reach out to large companies to make them aware of opportunities to provide demand response and receive bill savings or

direct payments for doing so. The coalition could showcase how demand response can be made available through distinct messages and template materials geared toward large-scale customers, which the coalition could distribute directly to national chain retailers and which state and local stakeholders (e.g., utilities, load-serving entities, and other demand response providers) could distribute to large local customers. Coordination would also be needed with RTOs and ISOs to reach the large commercial and industrial customers about opportunities for demand response to participate in regional markets.

Materials could include best practices and model program guides that provide assistance to large-scale customers implementing demand response and participating in a utility, load-serving entity, or RTO/ISO’s demand response programs. Additionally, informational template slide show presentations could be used to inform customers and enlist their support. Furthermore, a template press release could be customized to congratulate and thank commercial and industrial customers for investing in demand response (the promise of public recognition could be a strong motivator for some customers).

2.2.1.5 Element 5: Position Demand Response as a Component of Smart Energy Use Practices

Purpose	Introduce demand response to customers as another important way to save energy, in conjunction with energy efficiency and smart grid practices.
Expected Outcome	Effective communications about demand response that speak to customers’ understanding of the relationship between demand response and other smart energy use practices.
Questions	2.2.1.4A How should messages concerning demand response be positioned in relation to renewable energy, load shifting, energy conservation, energy efficiency, and the smart grid?

A core question in the development of messages for the campaign will be how best to position demand response in relation to other smart energy use concepts, such as renewable energy, load shifting, energy conservation, energy efficiency, and smart grid, in order to aid customer understanding. In addition, messaging should consider providing linkages to known, evolving, and emerging technologies (e.g., automated demand response such as AutoDR for commercial and industrial facilities) and opportunities in retail and wholesale energy markets. Anecdotal market research to date shows that consumers are already confused about the distinctions between energy conservation and energy efficiency, so positioning demand response as a new twist on existing concepts may confuse consumers further. Though foundational market research will provide the best insights, it may be necessary to link demand response with other smart energy use principles in order to gain customers’ understanding, or even to use other smart energy use terms to describe demand response.

Moving beyond the *concept* of demand response, this action would provide a strategic framework to integrate the education and promotion of demand response with other federal

government or state-based initiatives to educate customers on smart energy use or sustainable energy conservation practices. For example, under the Energy Star program, DOE and EPA jointly market cost-effective opportunities for customers to receive the same level of energy service by using fewer kilowatt-hours, saving money and reducing carbon emissions.

The implementing agency could work in collaboration with existing renewable energy, energy efficiency, smart grid, and other related initiatives to develop a comprehensive message leading customers to take action and alter their energy use patterns, while meeting the communications objectives of each of the individual campaigns.

2.2.1.6 Element 6: Develop Consumer-Friendly Terminology for Demand Response

Purpose	Develop terminology that helps consumers understand demand response as a concept.
Expected Outcome	A new term for demand response, and/or a new brand representing the national demand response effort.
Questions	<p>2.2.1.5A How will states, localities, and regional introduce this new term? Will it conflict with or complement existing terminology?</p> <p>2.2.1.5B What is the value of a separate demand response brand?</p> <p>2.2.1.5C Should this effort work in tandem with or separately from other coordinated energy conservation and efficiency efforts?</p>

Another element of a national communications program could be reframing demand response with a new, more consumer-friendly term that will better explain the concepts of energy use reduction, load shifting, and managing energy usage in response to price or non-price signals. Research will direct the campaign and help determine how best to communicate these concepts to customers, but research might inquire whether sample terms like “energy use management,” “energy leveling,” “peak energy conservation,” “blackout prevention,” “energy peak reduction,” “consumer energy use management,” or “smart grid” do a better job than “demand response” at communicating to customers what demand response is and what actions they could take. Based on findings from the foundational market research, the campaign could seek to develop a new term like one of these examples to be universally applied when communicating with customers to describe demand response as a principle.

Another way to approach this would be for the national communications campaign to develop a national “brand” around demand response-enabled or “smart energy-enabled” technology. Working with vendors, the implementing agency could examine the potential for creating a nationally recognizable symbol for appliances used in the residential home, as well as commercial and industrial buildings, similar to the Energy Star or Leadership in Energy and Environmental Design (commonly referred to as LEED) designations, or “Intel Inside.” The creation of a new brand, such as “Demand Star,” “Demand Smart,” or “Price Smart,” could be used to certify appliances and/or facilities that meet established criteria for certain levels of demand response capability. It could show consumers that their chosen appliance will respond

automatically to critical peak warnings from their electricity provider or changes in bulk power system frequency. The brand could then be incorporated into the messaging of localized campaigns seeking to increase demand response development and deployment.

2.2.1.7 Element 7: Provide Communications Assistance to Policymakers and Stakeholders

Purpose	Support the broad implementation of demand response by informing state and local governing officials and stakeholders about the potential for demand response to meet their goals and objectives.
Expected Outcome	Increased understanding and support for demand response opportunities.
Questions	2.2.1.6A Who should be the primary targets for the communications assistance? 2.2.1.6B What type of communications assistance would be most useful for state and local governing officials and stakeholders?

Support to the states, localities, and regions could be a key part of any national campaign on demand response. As discussed above in Section 2.1.3, technical assistance focused on providing communications training to state and local governing officials will assist in achieving the objectives of the National Action Plan and support the national campaign. Given that support by state and local governing officials is important for implementing demand response, efforts to implement demand response programs and products locally may benefit by providing communications assistance to state and local governing officials and stakeholders. The coalition could provide communications assistance to state and local governing officials to allow them to properly assess and understand demand response. Such communications assistance could include: (1) communications training and message guides that outline the need for demand response action; (2) national spokespeople to inform media and state and local governing officials; and (3) assistance in building support for demand response among the general public. Such communication assistance should enable policymakers and other groups to reach out to customer groups to make them aware of the opportunities and capabilities of demand response technologies to be incorporated into their businesses, industries, and homes.

2.2.1.8 Element 8: Distribute Toolkit Materials for Specific Utility, Load-serving Entity, or other Demand Response Providers' Programs to Manage Their Own Communications Campaign


Purpose	Support local communications programs that are not demonstration programs or which do not wish to have direct assistance from the national campaign.
Expected Outcome	Greater adoption of campaign principles and messages across the country.
Questions	2.2.1.8A Are the identified toolkit materials the correct set of tools? 2.2.1.8B Which stakeholders will likely use these tools?

To support those utilities, load-serving entities and other demand response providers that would prefer to manage their own communications from beginning to end, the coalition could develop template toolkit materials enabling those entities to manage their own local demand response communications campaigns. The materials in the toolkit could be tagged with the local program name, logo, and web address. This would be either an alternative or a supplemental approach to the local communications campaign undertaken by the national campaign. Local stakeholders, federal grants, states or localities could fund this program.

Toolkit materials could include:

- Sample messages to be tailored with local program information
- Template talking points
- Template public service announcements (PSAs)
- Sample press materials
- Print-ready materials such as brochures and flyers

Analogous Example



The Covering Kids & Families campaign provided free toolkits and message guides to anyone interested in reaching out to families about children’s health coverage. The campaign developed tools such as the comprehensive “Back-to-School Campaign Action Kit,” which provided templates and tools to do everything from writing and sending a press release, to conducting a local enrollment event and press conference. Another toolkit provided step-by-step instructions on customizing and placing a PSA. These toolkits enabled even organizations that were not official grantees or demonstration programs to be a part of the larger campaign and get the message out in a way that was most convenient to them.

2.2.1.9 Element 9: Develop Corporate and Organizational Partnerships

Purpose	Gain extra visibility for the campaign to increase its effectiveness through low-cost options that reach target audiences efficiently.
Expected Outcome	Partnerships yielding in-kind placements for the campaign’s messages.
Questions	2.2.1.9A Which organizations or stakeholders present the best opportunity to develop these partnerships? 2.2.1.9B What is the best way to develop partnerships?

A possible element of a communications program could be the development of national and local partnerships between the coalition and (1) corporate partners whose customers are making decisions about electricity usage; and (2) organizations representing various customer classes such as commercial and industrial customers, certain subsets of residents and so forth; and (3) trade associations or other groups that could benefit one another with symbiotic relationships, e.g., the pairing of variable resource development with dispatchable demand response.

While manufacturers of large home appliances that could be demand response- or smart grid-enabled would be ideal candidates for the campaign coalition, large home improvement retailers who sell these appliances would be ideal corporate partners. Because these corporations have regular interfaces with the public when customers are considering the purchase of new appliances, achieving some visibility for the campaign and its messaging at the point of purchase would be extremely advantageous, and would reach the audience at its most receptive point. Similarly, partnerships between trade groups like those representing industrial customers and those representing wind resources might prove advantageous in helping states to meet renewable portfolio standards.

In terms of organizational partnerships, groups that represent businesses, industrial customers, and subsets of the customer public would be excellent campaign partners, as they provide access to millions of key business and household decision-makers through their communications networks. These types of partnerships allow the coalition to target those groups or geographic regions that have the greatest potential for maximizing use of demand response to reliably and economically meet goals and objectives at the local, state, regional, national, or individual levels. Coordination with key associations representing these customer segments could prove valuable in increasing the effectiveness of a communications strategy while reducing costs.

Analogous Example



The image shows a CVS/pharmacy receipt on the left and a milk carton on the right. The receipt is for a purchase of 4 boxes of Advantix 200mg Tablets for \$12.89. The milk carton is a 'SUPER G' brand milk with a campaign advertisement on its side. The advertisement features a photo of three children and the text: 'You work hard to take care of your kids... Now there's help. Low-cost and free health care coverage is available for uninsured children - even in working families. Call Toll-Free 1 (877) KIDS-NOW. Find out if your child is eligible.' The receipt also includes a similar advertisement at the bottom.

The Covering Kids & Families campaign sought to enroll eligible children and families in public health insurance programs. To get these kids enrolled, the campaign had to reach their parents. Through the development of corporate partnerships, the campaign gained millions of dollars of in-kind placement in the retail environments most likely to have parents thinking about their kids. In a partnership with Giant Foods on the east coast, the campaign secured placement of an enrollment PSA on the side of milk cartons during the back-to-school time period. In a partnership with CVS/Pharmacy, the campaign ran PSAs on the prescription information forms for anyone under the age of 18. These partnerships involved no direct cost to the campaign, but provided enormous added visibility for its messages.

2.2.2 Implement the Campaign Locally

Purpose	Adapt the national umbrella communications campaign to states and localities to increase exposure of and participation in demand response.
Expected Outcome	Tailored communications that integrate the broad, national messages with the local program's needs and unique characteristics.
Questions	<p>2.2.2A Is a local implementation campaign (the demonstration program approach) appropriate as a core component of the national umbrella communications campaign?</p> <p>2.2.2B Which elements associated with communicating messages associated with local implementation campaign (demonstration programs) will be the most effective?</p>

A core element of the national communications program would be the implementation of a broad strategic and messaging framework through a local demonstration program approach.

Within the messaging framework of the broader national umbrella, the communications programs to be locally implemented would be specifically tailored to translate the national umbrella messages and strategies to the local demand response initiatives, the seasonal peak load patterns and any other regional factors, via conferences, meetings, and communications outreach tactics conducted through the national campaign on the local program's behalf. In

this approach, the campaign would first support local demonstration programs that are already operating, and help build support for those about to be undertaken. From there, the campaign would expand into more localities as they begin to implement their own demand response. The campaign would eventually spread to the national level as demand response becomes widely adopted.

The strategy for communicating messages for local implementation associated with demand response should not rely on one type of method or media for communication. Rather, media planners select and orchestrate methods and media that deliver **reach** (the number of consumers who see the message), **frequency** (the number of times they see the message), and **impact** (what consumers ultimately do after seeing the message) metrics, within a given budget. The typical elements of an integrated marketing communications program include:

- **Public Relations.** An important tactical component of a national and local communications program could be a comprehensive news media outreach and public relations strategy. This strategy would build public and policymaker support for demand response, and educate consumers. By communicating with members of the news media about demand response's benefits, the need for it, and the ease of implementation for the customer, positive news stories and editorials would help to shape public opinion in favor of demand response. In addition, appearances by experts on talk shows would be helpful.
- **Advertising.** Advertising could be a key part of a national and local communications effort, with advertisements and PSAs produced nationally that could be tailored or tagged to reference local programs and information. Media buys could be funded federally, by the states or localities, utilities, load-serving entities or other demand response providers, or some combination of these. Possible advertising outlets could include:
 - Television
 - Radio
 - Outdoor
 - Direct mail
 - Internet
 - Emerging media technologies, such as cell phone text messaging

The campaign could also develop attractive, consumer-focused educational support materials, differentiating between audiences, and available for free in print and online (e.g., brochures, videos, PSAs, and a reference website).

- **Viral²⁹ and Grassroots Marketing.** In addition to a local mass media campaign, a fully-integrated communications program could also include a grassroots approach that

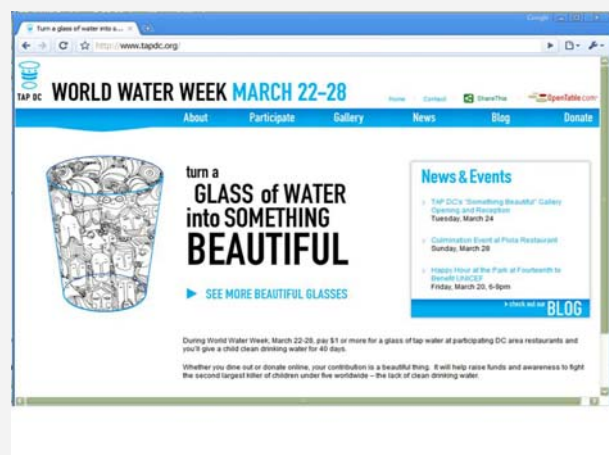
²⁹ "Viral" marketing refers to marketing intended to be "spread" by those to whom it is marketed, instead of via traditional media channels like news and advertising. For example, a viral video is one produced with the intent that individuals within the target audience will view the video and then share it with their friends and associates,

leverages social networks in the digital space. Viral and grassroots marketing outreach might include:

- The creation of groups within social media sites like Facebook and Twitter.
- The engagement of third-party “demand response champions” who can blog or twitter about it.
- Development and posting of viral videos that demonstrate the potential benefits of demand response or, alternatively, what the future might be like without demand response.

This type of approach could potentially tie into a national campaign over time, as the social network around the groups, champions and videos grows larger and more geographically diverse.

Analogous Example



In 2007, UNICEF created a grassroots initiative called the Tap Project, which raises money during World Water Week with the goal of providing clean water to children around the world. The Tap Project began in 2007 as a demonstration program in New York City, and has now expanded into all 50 states. The national campaign develops the broad campaign message platform, an annual theme and template materials, and then hands them over to individual communications teams in each of the targeted cities. Each city’s team translates the messages and theme into its own campaign, and launches that campaign through PSAs, news media outreach, local events, and extensive online viral and grassroots marketing. The result is a series of localized communications efforts with their own unique characteristics.

2.3 Tools and Materials to Support Demand Response

Section 529 requires that the National Action Plan shall meet the objective of developing or identifying analytical tools, information, model regulatory provisions, model contracts, and other support materials for use by customers, states, utilities and demand response providers.

The National Action Plan will identify tools and materials and will recommend the strategy for developing, and enhancing existing tools and processes, fostering the development and deployment of the maximum amount of demand response resources. This includes maximizing the amount of demand response resources that can be developed and deployed, and deploying

who will in turn view it and share it with their own networks, and so on. This spreading of content through social networks is called viral marketing because of its similarity in structure to the public health model of a virus spreading from its original source.

emerging technologies that enable demand response as a versatile resource for a variety of applications besides lowering peak demand, such as automating demand response in all hours of the day, using demand response to provide operating reserves and other ancillary services, and for partnering demand response with wind generating and other variable resources. In this document, we refer to them as simply “support materials.”

Based upon preliminary research and stakeholder input, FERC staff developed a candidate list for demand response support materials. The list is divided into the following basic categories:

- Enhance or Develop Demand Response Estimation Tools and Processes.
- Specify Standards and Protocols for Demand Response.
- Provide Information to Design a Pilot Demand Response Program.
- Provide Guidelines on Rate Design for Dynamic Pricing.
- Distribute Information and Case Studies via the Web.
- Provide Assistance to Customers with Multiple Building Facilities

FERC staff seeks comment on:

2.3A This approach for developing tools and supporting materials.

2.3B The additional support materials the National Action Plan should include.

2.3C The organizations or agencies best suited to lead the development and dissemination of support materials.

In addition, where appropriate, please provide comment on the following question for each of the following possible activities.

2.3D Is the proposed activity of high, medium or low priority?

2.3.1 Enhance or Develop Demand Response Estimation Tools and Processes

Purpose	Determine the potential value and benefits of demand response solutions. Assess whether demand response solutions deliver value and benefits once deployed.
Expected Outcome	A set of tools provided to regulators, operators, utilities, load-serving entities, other demand response providers and consumers for conducting simulations, analyses, and evaluations.
Questions	<p>2.3.1A Will these demand response estimation tools and methods be useful to governing officials, utilities, load-serving entities, other demand response providers, other stakeholders, and customers?</p> <p>2.3.1B Who should be responsible for developing the tools?</p> <p>2.3.1C How should tools be distributed?</p> <p>2.3.1D What other demand response estimation tools should be developed?</p>

The enhancement or development of analytical tools and methods should help in the expansion of existing demand response programs and in the creation of new programs (to, for example, allow commercial building owners to automate their response to price signals and directions from the system operator). They should also advance the use of demand response to support reliable and efficient operations of wholesale transmission, energy, capacity, and ancillary services markets.

Organizations, guided by a coalition, could achieve the enhancement or development of tools through new research identifying beneficial characteristics of existing tools or through conference venues specifically set up to foster information sharing on current successful examples. Based on this research, existing tools/methods could be improved or new tools/methods could be developed. Such tools and methods could include:

- Demand response estimation and prediction tools
- Cost effectiveness tools
- Measurement and verification tools
- Cost recovery methods for enabling technology
- Decision tools for specific industries
- Methodologies for incorporating demand response in dispatch, ancillary Services, transmission planning and resource planning
- Transparency of price information

Examples of existing tools include the InterAct, and the tools included in the Building Energy Software Tools Directory.³⁰ Each of these tools is discussed below.

The InterAct tool developed by Pacific Gas & Electric Company is an example of an existing demand response tool that has been developed for customers. This online tool provides large customers (200 kW or greater) with reference load shape data and temperature readings to guide decisions related to demand response.³¹

Another industry example comes from Lawrence Berkeley Laboratory. The Demand Response Quick Assessment Tool helps commercial customers predict energy and demand savings for various demand response strategies. It allows users to run simulations based upon a set of assumptions and variables.³²

³⁰DOE developed this directory because many Office of Building Technology, State and Community Program (BTS) programs develop software tools to help researchers, designers, architects, engineers, builders, code officials, and others involved in the building life-cycle to evaluate and rank potential energy-efficiency technologies and renewable energy strategies in new or existing buildings. To learn more about the directory and tools, visit http://apps1.eere.energy.gov/buildings/tools_directory/.

³¹ For more information about the InterAct tool, visit <http://www.pge.com/mybusiness/energysavingsrebates/demandresponse/tools/>.

³² To learn more about the Demand Response Quick Assessment Tool, visit http://apps1.eere.energy.gov/buildings/tools_directory/software.cfm/ID=522/pagename=alpha_list.

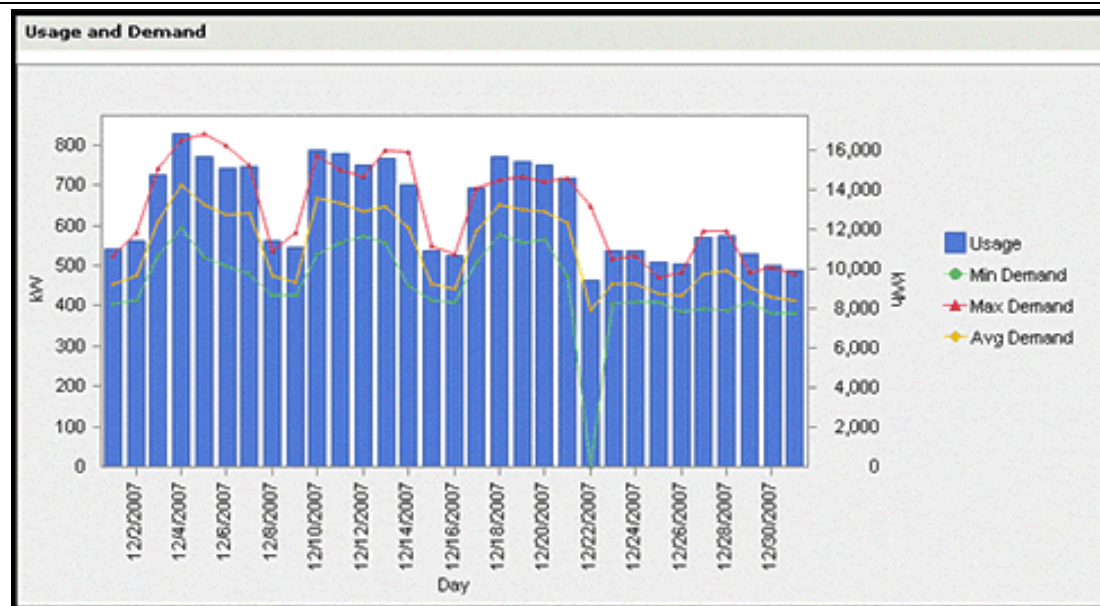
A final example of an analysis tool comes from the Rocky Mountain Institute (RMI). RMI developed a dispatch model that acts as a real-time tool designed to provide insight on the potential of specific dispatchable demand response resources and technologies (e.g., for air conditioning, lighting, and plug loads), to reshape the load profile to better match renewable output.³³ RMI's modeling focus has been on analyzing the combined effects of these resources in an electric system with high penetrations of wind and solar energy. The capabilities of the dispatch model with respect to demand response are: modeling traditional load-curtailment demand response; modeling thermal storage strategies such as ice storage and pre-cooling buildings, to analyze consumer savings and electric system impacts; and analyzing driving and charging patterns for fleets of plug-in vehicles. RMI is also incorporating the hourly dispatch methodology into an integrated system planning tool for utilities and regulators to use for modeling the financial and operational characteristics of future scenarios. This expanded functionality will include modeling the impacts of investing in demand response along with renewables to minimize reliability concerns.

³³ For more information about RMI's dispatch model, visit <http://ert.rmi.org/research/next-generation-utility.html>.

Industry Example 1

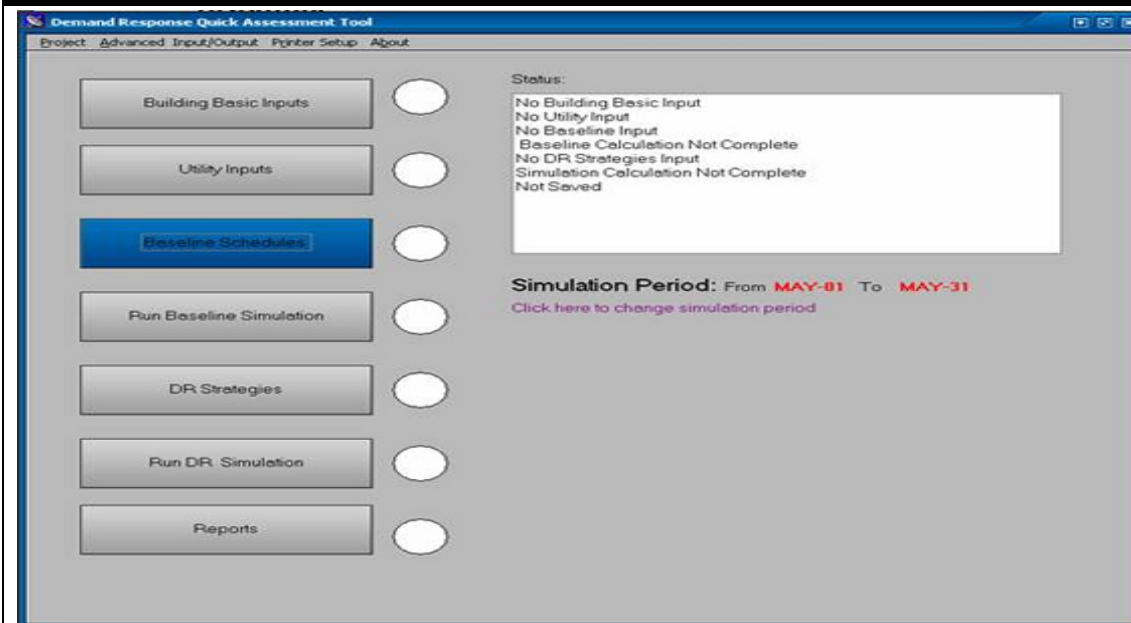
Energy Statistic		Value	Load Statistic		Value
Weekday Energy Usage (kWh)		283,533.36	Load Factor		65.16
Weekend Energy Usage (kWh)		117,903.12	Weekend Load Factor		69.02
Total Energy Usage (kWh)		401,436.48	Weekday Load Factor		71.34
			Avg Demand (kW)		539.57
			Min Demand (kW)		0.00
			Max Demand (kW)		828.00
			Power Factor At Maximum Demand		
			Weekday Max Demand (kW)		828.00
			Weekend Max Demand (kW)		647.04

The InterAct tool provides summary statistics regarding usage and load.

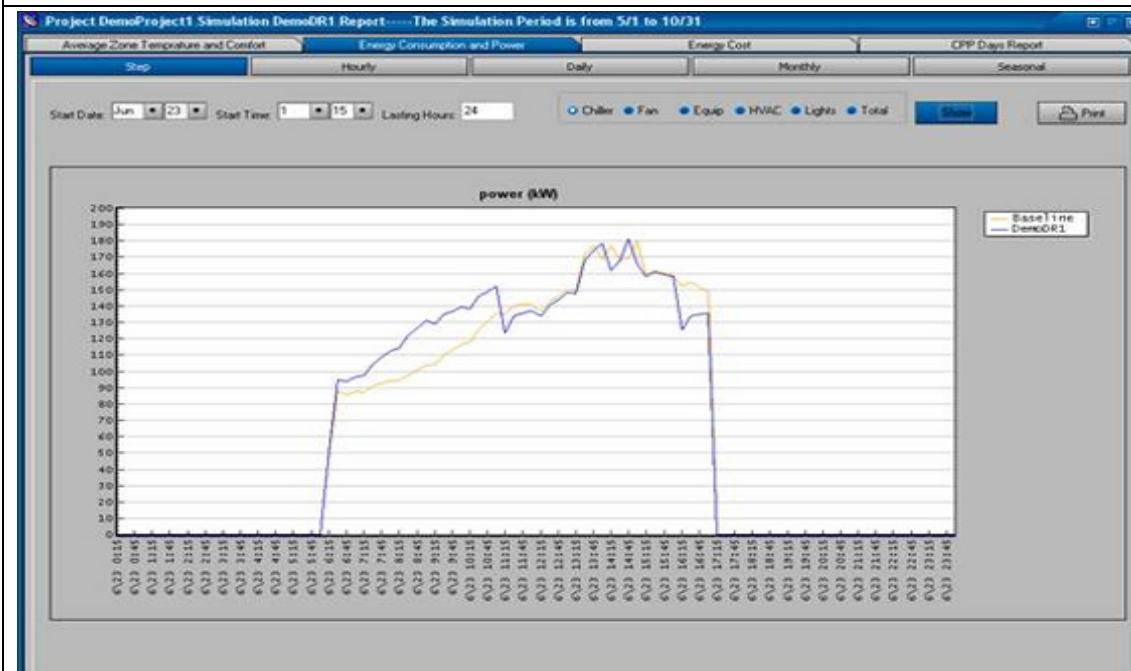


The InterAct tool summarizes usage and demand data in graphical form with temperatures overlaid.

Industry Example 2



The above example is an interface that allows users to set the assumptions and variables associated with a building.



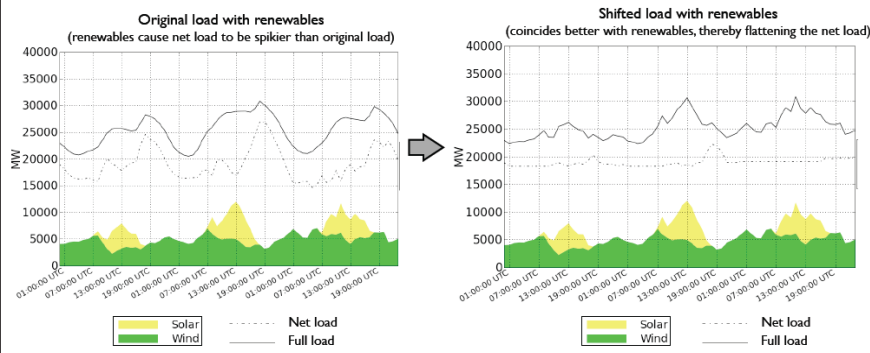
In the above example, results of the simulation are presented graphically and textually for analysis.

Industry Example 3

Adding Demand Response

In most electric systems, high penetrations of renewable energy means large amounts of variable wind and solar resources. This translates to a greater need for quick-ramping generators to provide energy when renewable generators cannot. Unfortunately, these quick-ramping generators are often expensive and inefficient. Demand response provides an alternative strategy to meeting demand with high penetrations of renewables. Rather than dispatching elastic supply resources to meet an inelastic demand, demand response makes the demand elastic - shifting it to times when renewable generators are producing power.

In the model, there are two types of demand response: peak-reduction and dynamic load shifting. Peak reduction is the conventional form of demand response and can be useful in displacing peaking generators. Dynamic load shifting is a more advanced form of demand response that relies on SmartGrid technology to shift flexible loads (e.g. washing machines, dishwashers, electric vehicle charging) to times when renewable energy is abundant. RMI is conducting research to identify how much dynamic load shifting is available for different systems.



The RMI dispatch model illustrates how demand response can shift demand to times when renewable generators are producing power rather than dispatching expensive and inefficient quick-ramping generators.



The RMI Dispatch Model can simulate the capacity mix for alternate scenarios and resources.

To provide opportunities to achieve the maximum amount of demand response that can be developed and deployed, organizations should begin by identifying well-established tools already being used to evaluate program impacts and cost-effectiveness, as well as areas where the development of additional tools would be beneficial. Electric utilities with long-standing demand response programs and demand response providers who participate in utility or RTO/ISO demand response programs are possible sources for these tools. In addition, a greater focus would be on new tool development, particularly as it relates to dynamic pricing and new smart grid technologies. This would require a significant level of incremental research beyond what has already been done to date.

Table 3 suggests the types of tools and methods that could be developed to support the National Action Plan.

Table 3: Possible Demand Response Tools and Methods

Tool	Description
1. Demand Response Estimation and Prediction Tools	<p>Tools that allow stakeholders and policymakers to estimate the effects of demand response programs, products, technologies, and incentives, for example, on system resource requirements and wholesale prices. To support the National Action Plan, FERC staff will be developing a quantitative estimation tool that, given a capacity expansion plan, will yield information on plant dispatch and energy margins, reserve margins and unutilized supply. Another tool will estimate how load shapes and peak demand will change with varying levels and types of demand response resources.</p>
2. Cost Effectiveness Tools	<p>This includes:</p> <ul style="list-style-type: none"> • Tools for retail electricity consumers, especially commercial and industrial consumers, which help them assess the likely net financial benefits of participating in demand response programs and products or in investing in the capability to directly participate in wholesale markets, thus increasing their willingness to participate. • Tools for utilities, load-serving entities and other demand response providers and states that can help them determine the cost-effectiveness of implementing demand response programs and products. Although methods for evaluating demand-side management programs have been in use for many years (e.g., the California Standard Practices Manual), tailoring these methods or developing new methods for analyzing demand response through national workshops or additional research may be beneficial. • Tools that aid load-serving entities, developers of variable resources, and transmission developers in assessing the value and cost effectiveness of demand response as a resource. This may become especially important in carbon constrained environments.
3. Measurement and Verification Tools	<p>These tools measure and verify load reductions. They could enhance reliance on demand response as a resource. Both demand response program operators and participants require accurate measurement of demand reductions.</p> <ul style="list-style-type: none"> • For operators, verifying that demand response resources actually provide the intended reduction in demand when called upon is essential for demand response to grow as a resource as well as to ensure electric power system reliability and mitigate gaming behavior. • For program participants, measurement of load reduction is necessary for purposes of billing and ensuring appropriate compensation. <p>Central to measurement and verification is knowing the amount of electricity that a customer would have consumed if it had not engaged in load reductions. While the need for measurement and verification is recognized, methods for measuring and verifying demand response reductions vary significantly across the country.</p> <p>Development of measurement and verification standards is needed at both the wholesale and retail levels to support these measurement and verification tools. The North American Energy Standards Board (NAESB) is currently leading such an effort. The effort has produced a document describing model business practices for the measurement and verification of demand response.³⁴ NAESB is also working in conjunction with the North American Electric Reliability Corporation (NERC) to ensure that the demand response data collection effort undertaken by NERC conforms to a consistent measurement and verification standard. NERC's Demand Response Data Task Force is charged with developing a systematic approach for collecting and disseminating data on demand response programs, products, and services administered by retail and wholesale entities throughout North America.</p>

³⁴ NAESB, M&V for Demand Response Programs (2009), *available at*. http://naesb.org/pdf4/dsmee_group2_070709reqcom_attach.doc.

Table 3: Possible Demand Response Tools and Methods (continued)

Tool	Description
4. Cost Recovery Methods for Enabling Technology	These methods involve estimating, recovering the costs of, and developing the business case for approved, cost-effective new technologies that enable demand response, and an assessment of the effect of each method on customer rates. Such tools could assist utilities and state and local governing officials considering demand response programs. For example, devices such as advanced meters and smart thermostats are essential for some demand response initiatives and can greatly increase the effectiveness of others. The installation of these devices requires investment from load-serving entities and/or customers. An appropriate method may be needed for utilities or load-serving entities to recover the costs they incur.
5. Decision Tools for Specific Industries	These tools would draw on past experience and case studies to help customers in specific industries or with specific types of facilities (such as warehousing, health care, or retailing) select appropriate demand response providers, programs and technologies. Information in the tools would be updated as market, economic and regulatory factors change.
6. Methodologies for Incorporating Demand Response in Dispatch, Ancillary Services, Transmission Planning, and Resource Planning	New tools and methodologies could be developed to directly incorporate demand response into dispatch algorithms and resource planning models. Incorporation of demand response directly into these models should better capture the capability of demand response to serve an alternative to building new generation and transmission and to act as a resource to alleviate transmission congestion. FERC’s Order 890 requirement that demand response be included by transmission providers in transmission planning comparable to other types of resources should provide (via Attachment K of their respective tariffs) a good example of where a consistent methodology for incorporating demand resources into resource planning would be beneficial.
7. Transparency of Price Information	Applications or information technology that make available real-time or near real-time energy prices, ancillary service prices, capacity payments, and congestion costs. Large customers and policymakers can use this information to make decisions on the types of economic and business opportunities available.

2.3.2 Specify Standards and Protocols for Demand Response

Purpose	Ensure that systems, solutions, and data for demand response are open and interoperable.
Expected Outcome	Systems, solutions, and data that meet the standards adopted by states, utilities, load-serving entities and other demand response providers.
Questions	2.3.2A Which standards and protocols are the most important for further development of demand response as a resource? 2.3.2B Which industry group or standards development organization should be responsible for each standard? 2.3.2C Who should enforce the standards? 2.3.2D What other standards should be specified?

As the industry develops new technologies and communication systems that enable the effective deployment of demand response, new standards will emerge. The ongoing National Institute of Standards and Technology (NIST) process is designed to establish these types of smart grid interoperability standards. FERC’s authority to adopt these standards puts it in a

unique position to assess their suitability for demand response applications. There is already an established plan for moving the process forward.³⁵

Table 4 suggests several standards that have been identified through outreach with stakeholders. The ongoing NIST effort subsumes several of these standards and protocols.

Table 4: Possible Standards and Protocols

Standard	Description
1. Communication Standards for Consumer Demand Information	Standard communication protocols would allow information on electricity demand to flow unimpeded from consumers to utility (and/or demand response provider), and to wholesale market operators. This information should also be readily available to consumers. These protocols could include specific electronic data interchange standards and detailed business or regulatory rules associated with accessibility of customer data.
2. Consumer Data Privacy Standards	Demand response activities will generate a significant amount of new data about consumer actions and consumer energy usage. Protocols could be developed for the appropriate protection of this information, as well as standards for the entities that should or may have access to this information and under what conditions.
3. Enhanced Cyber Security Protection Standards	Having secure lines of communication between system operators and demand response providers is critical for the continued maintenance and development of the demand response industry, as well as for potential infrastructure investments in smart grid enabling technologies. Establishing a secure and open standard for the transmittal of private consumer data in addition to sensitive information relating to the overall electrical grid would be a significant step forward for states, utilities, other load-serving entities and customers looking to invest in demand response programs, products, or other enabling technologies.
4. Tools and Standards to Support the Provision of Ancillary Services by Demand Resources	Tools and standards necessary to build upon RTO/ISO bid-based program experience and fully realize the potential of demand response as a provider of ancillary services could include communication protocols for monitoring and controlling demand resources such as air conditioners, refrigerators, and electric vehicles; better methods to forecast and model the capability of demand resources to adjust consumption in near real-time; and further development of hardware and software that allows customer appliances or vehicles to autonomously provide reliability services, such as frequency response service.
5. Nationwide PHEV Standards that Support Demand Response Services	Adoption of nationwide standards for PHEVs and all electric vehicle charging stations, with appropriate communications, metering and electric flow control, and standardized plug interface would facilitate use of PHEV and electric vehicles variable storage potential to provide ancillary services to the electric grid and would reduce barriers to interoperability posed by having various state-by-state standards.

³⁵ More information and a summary of recent activity can be found at <http://www.nist.gov/smartgrid/>.

Table 4: Possible Standards and Protocols (Continued)

Standard	Description
6. Standard Demand Response Signals	Communication is a critical component to demand response programs and transactions, as signals must be sent from system operators to utilities, load-serving entities, and other demand response providers and eventually down to end-use customers. These signals instruct customers to reduce their load in response to market prices or grid reliability concerns, and have traditionally come in the form of calling or paging facility managers. Current technology, such as automated demand response (Auto-DR), allows system operators and utilities to interact directly with commercial and industrial facility control systems that are pre-programmed to take action based on a demand response signal, without manual intervention. ³⁶ Standardizing demand response signaling could make it easier for facilities to respond to calls for load reductions and management, and thus potentially increase the amount of customer participation in demand response programs and products. An example of such a standard could be the Open Automated Demand Response (OpenADR) Specification, developed by the Demand Response Research Center, which provides a standardized demand response communications and signaling infrastructure using open, industry approved data models.
7. Common Specification for Price and Product Definition	"This specification will be used in demand response applications, market transactions, distributed energy resource integration, meter communications, and many other inter-domain communications Price is a number associated with product characteristics, including delivery schedule, quality (reliability, power quality, source, etc.), and environmental and regulatory characteristics. Price is also a common abstraction for abundance, scarcity, and other market conditions." ³⁷

Existing demand response programs depend less on emerging technologies and are not subject to issues surrounding the sharing of information about customer actions. However, the standards development effort is necessary to achieve the maximum amount of demand response that can be developed and deployed. The standards described above focus heavily on issues surrounding AMI, enabling technologies, smart appliances, and other smart grid applications, which are all relevant to the requirements needed to achieve maximum amounts of demand response. Development of these standards should also support RTO/ISO demand response programs and the use of demand response to support variable renewable generation.

2.3.3 Provide Information to Design a Pilot Demand Response Program

Purpose	Facilitate the design of pilot demand response programs.
Expected Outcome	Build a body of literature stakeholders can use to design a pilot demand response program.
Questions	2.3.3A Are the attributes for a good pilot design listed the right set? 2.3.3B Who should lead this effort?

³⁶ See Lawrence Berkeley Nat'l Lab., Open Automated Demand Response Communication Specification (Version 1.0) (2009), available at <http://drcc.lbl.gov/openadr/pdf/cec-500-2009-063.pdf> (Report prepared for the California Energy Commission's Public Interest Energy Research Program "that outlines a communications exchange signals specification to enable demand response in end-use participant or customer systems.").

³⁷ NIST, NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 1.0 (Draft) (2009), available at http://www.nist.gov/public_affairs/releases/smartgrid_interoperability.pdf.

If demand response is likely to have benefits for a particular geographical area, but there is uncertainty about the net benefits that would flow from it, it makes sense to conduct a new pilot. Pilot demand response programs could focus on testing new demand response technologies (such as home area networks and smart thermostats), demand response program types, or different retail rate designs. The following discussion lists several attributes that any pilot should embody.

Ensuring Validity

To be credible and useful to policy makers, pilots need to have both internal and external validity. Internal validity means that a cause and effect relationship can be established between the various treatments being tested and the variables of interest such as peak demand and overall energy consumption. External validity means that the pilot results can be extrapolated to the population of interest. Both require careful design and it is generally easier to ensure internal validity than to ensure external validity.

Design Principles

The well-established principles of experimental design are crucial to an effective pilot and the salient ones are summarized below:

1. To measure the impact of a new program design, technology or rate design (called “treatments”), the design should: (a) control for the effect of other factors such as weather and the economy, and (b) be capable of inferring what the customers on the treatments would have done in the absence of the treatments. Otherwise a valid cause-effect cannot be established between treatment and result.
2. The design objectives are best accomplished in two ways: (a) by including a control group in the design, comprised of customers who are similar in all other respects to customers in the treatment group, and (b) by measuring the load profiles of customers in both the control and treatment groups before the new programs, technologies, or rates are initiated and during the time the treatments are initiated.
3. Sufficient numbers of customers should be recruited to fill the control and treatment groups. This often means that at least one hundred customers should be in each group. Too few customers in the groups will result in the inability to detect the effect of the treatment through statistical means.
4. Customers should be randomly selected and assigned, to the extent practical, to the treatment and control groups. This will allow valid inferences to be drawn about the behavior of the target population.
5. Data should be collected not only on customer load profiles but also on their socio-demographic characteristics and their attitudes toward energy use.
6. Customers should be encouraged to stay in the pilot for as long as possible.
7. If any payments need to be made to customers to ensure that they stay through the end of the pilot, these payments should be (a) made only toward the end of the pilot, (b) unrelated to the level of their monthly usage, or (c) tied to the amount of bill savings generated by their actions.

2.3.4 Provide Guidelines on Rate Design for Dynamic Pricing

Purpose	Facilitate the design of a dynamic pricing rate.
Expected Outcome	Model tariffs and other guidelines stakeholders can use to design a dynamic pricing rate.
Questions	2.3.4A Are the design elements identified sufficient to design a dynamic pricing rate? 2.3.4B Are there other elements that should be considered?

Most retail customer tariffs in place today do not provide a signal to customers that would encourage them to use less energy during expensive peak times than during other times. Nor do they provide any specific incentives to customers to become more energy efficient. In other words, they provide no specific incentives for either demand response or energy efficiency. Costs are averaged over hours in one dimension and over usage levels in another dimension. The provision of guidelines for developing dynamic rates, supplemented with model dynamic pricing tariffs, would support the development of dynamic rate offerings.

A model dynamic pricing tariff would de-average costs and send accurate time-varying signals to customers. In addition, it would also send a price signal that varies with usage levels. There are several possible examples of dynamic pricing tariffs. A simple example of a time-based rate design is a CPP rate. This is essentially a dispatchable version of a time-of-use rate in which the price charged on certain critical days is a significant multiple of the flat rate. A second rate is a variable peak pricing rate. In this rate, hourly prices based on market conditions are charged in the critical hours. They are not set ahead of time as in the CPP rate. A third rate is a combination of CPP/variable peak pricing and time-of-use rates. This would function as a simple time-of-use rate on non-critical days and as a CPP/variable peak pricing rate on critical days. A fourth dynamic pricing example is a real-time pricing rate. This would charge hourly prices on either a day-ahead or hour-ahead basis. These would be based on system marginal costs or locational marginal prices.

After deciding upon the type of dynamic rate, there are many points that should be considered in determining its design.³⁸ Below are some proposed guidelines for dynamic rate design that we request comment on:

Strong price signal: A strong price signal to customers, e.g., a large differential between the peak and off-peak prices, gives the customer a significant incentive to reduce consumption when the price is high, and produces the opportunity for greater bill savings by creating a large off-peak discount.

³⁸ For more detailed information on the principles of dynamic rate design and recommended guidelines see, for example: Ahmad Faruqui & Ryan Hledik, *Transition to Dynamic Pricing*, Pub. Util. Fort., March 2009, and Ahmad Faruqui, ET. AL., *Rethinking Rate Design Demand Response (2007)* (Issue paper prepared for the Demand Response Research Center, Lawrence Berkeley National Laboratory).

Rates reflecting system costs: While a significant price signal is important, the differential between the peak and off-peak rates should reflect the cost of providing power to the customer. The peak period rate would reflect both the higher average variable cost of generation, as well as the cost of capacity necessary to meet peak demands. The off-peak rate would reflect the lower average cost of meeting customer demand during hours with lower loads.

Opportunity for significant bill savings: Customers are less likely to enroll voluntarily in a dynamic rate program if they do not see an opportunity for significant bill savings. Similarly, once customers are on these rates, they are more likely to produce large peak reductions if doing so allows them to save money.

Revenue neutrality: Each dynamic pricing rate option could be revenue neutral (prior to the average customer adjusting his load shape). Under revenue neutrality, the rate would not lead to an over- or under-collection of utility costs on a system-wide basis. At the individual customer level, some bills would increase and others would decrease, but the average customer’s bill would not change in the absence of load shifting, all other things being equal.

Simplicity: Dynamic pricing rates should be easy for the customer to understand. If the customer does not understand how the pricing works, or is overburdened with information, then he or she will not be able to appropriately respond to the price signals and shift load.

As identified in the Assessment, the Full Participation scenario is based on the widespread offering of dynamic pricing tariffs.

2.3.5 Distribute Information and Case Studies via the Web

Purpose	Provide easily accessible information on demand response for federal, state, and local leaders, key stakeholders, and customers.
Expected Outcome	Increased awareness of benefits and existing demand response experience, resulting in additional use of demand response.
Questions	<p>2.3.5A Will the distribution of information and the use of a web-based clearinghouse assist stakeholder and customer understanding and acceptance of demand response?</p> <p>2.3.5B If the coalition will lead or guide this effort, should they be responsible for</p> <ul style="list-style-type: none"> o Summarizing and identifying new research? o Managing the website? o Developing website content standards? <p>2.3.5C What content should be included on the website?</p> <p>2.3.5D Have other web-based clearinghouses been successful?</p>

FERC staff outreach with stakeholders indicated strong support for a compilation of information and resources on an easily accessible website. The development of this website (or “web-based clearinghouse”) could provide important support for the implementation of the National Action Plan. This demand response clearinghouse would potentially be coordinated with the new DOE

smart grid information clearinghouse funding opportunity.³⁹ Customers, policymakers, state and local governing officials, regulators, utilities, load-serving entities, other demand response providers and other interested parties would use the system to find more information on demand response. The website could serve as a centralized location for collecting all publicly available reports on the results of dynamic pricing pilots or deployment of new automated demand response technologies. It could also include the results of measurement and verification studies on existing demand response programs. There is a lot of detailed supply-side information that is currently contained on the Energy Information Administration's website. A similar level of granularity in data could be collected on the demand side (e.g., peak demand impacts from demand response by utility/load-serving entities/state/RTO/ISO, a centralized listing of each demand response program and product being offered by utilities, load-serving entities or other demand response providers, basic information on the costs of these programs, information about participation rates).⁴⁰

More detailed qualitative information could be collected on a subset of representative demand response programs and products, profiling the regulatory environment in which the programs are being offered (e.g., whether the state has decoupling, whether the program is being driven by the utility, regulatory commission, RTO/ISO, other demand response provider, or other party), a summary of marketing and customer recruitment efforts, and key lessons learned. In particular, additional information could be collected on the variations in RTO and ISO demand response offerings, such as what requirements the provider must meet in order to bid and the incentives to participate. Information could also be collected on the amounts and types of demand response being incorporated into transmission planning and resource planning.

Additionally, the site could be used to collect and present information about the specifications, impacts, costs, and benefits of new smart grid technologies. Information on demand response programs and products offered by regional markets, load-serving entities, utilities and other demand response providers could also be made available. Simply making this information available and easily accessible could encourage awareness and adoption of the technologies and use of demand response.

The existence of a central collection of reported impacts from existing demand response programs and products would help to shed light on the ability of demand response to provide consistent, measurable impacts and would also serve as a resource for benchmarking newly reported impacts from demand response program offerings.

One analogous example is the Database of State Incentives for Renewable Energy (DSIRE), which is a DOE funded project for collecting and distributing information about renewable energy and energy efficiency efforts. The DSIRE website provides users with visual tools for

³⁹ Press Release, Dept. of Energy, DOE Announces Funding Opportunity to Develop the Smart Grid Information Clearinghouse (March 18, 2009), *available at* http://www.oe.energy.gov/news_room_and_events/1223.htm.

⁴⁰ To some extent, FERC collects this information through its annual survey of demand response programs. NERC collects related data at the wholesale level and recently initiated an effort to improve its data collection methodology.

understanding the current status of funding, standards, and market penetration of renewable energy resources. It also contains information about financial incentives and regulations regarding energy efficiency, along with an extensive library of industry presentations and reports provided on a state-by-state basis.

Another analogous example comes from the behavioral healthcare field. It involves the dissemination of a process for screening and treating substance abuse disorders called SBIRT. The Substance Abuse and Mental Health Services Administration supported the creation of several websites that disseminate information, and provide case studies, and tools. In addition, the website provides links to websites managed by other organizations, including the Alcohol and Drug Abuse Institute’s site that provides a database of over 600 screening and assessment tools.

Table 5 describes the types of content that the website could include.

Table 5: Possible web content

Content Type	Description
1. Case Studies of State Laws, Regulations and Tariffs	The website could contain comprehensive case studies of demand response programs, including specifics about the environment surrounding the demand response programs, such as state laws, regulations, and tariffs, generation mix, forecasted load, technology employed, communications strategy, and retail cost recovery. This information could be used as models for program development, would provide background context and goals, as well as benefits and drawbacks, and could also include information such as actual laws, regulations, and tariff language, expert commentaries, and summaries of results. The case studies would provide a menu of choices for stakeholders to adapt based on their unique goals, preferences, and needs.
2. Summaries of Lessons Learned from Existing Demand Response Programs and Markets	Summaries or analyses of the lessons learned from demand response programs could be useful to all those interested in starting a new program. Such a summary would draw from the many demand response pilot projects and full implementation programs that have been, or are being, conducted. The summaries should document both successes as well as problems that were encountered.
3. Database of Demand Response Programs and Markets	Website content could include a database of demand response programs and products by location, as well as potential contractors or vendors providing enabling technology and devices that support demand response. Information on demand response programs and products could also include program evaluations, marketing materials, and other status information. This could be supplemented with information on customer circumstances, measured usage, and surveys of satisfaction in order to provide a more robust base of data to which to apply analytical techniques in order to fill research gaps.

Achieving the maximum amount of demand response that can be developed and deployed would be facilitated through a web-based distribution of case studies and other demand response information. In addition, the effort would be focused more on assembling results of pilots and studies on the impacts and benefits of new dynamic pricing and smart grid-enabled programs such as distributed generation and plug-in hybrids. This would help to establish confidence in the ability of these new programs to provide reliable benefits. In the longer term

as programs become established through full scale implementation, the focus would shift to identifying “best practices” programs and policies.

2.3.6 Provide Assistance to Customers with Multiple Building Facilities

Purpose	To assist the energy efficiency and demand response efforts of a variety of customers.
Expected Outcome	Increased understanding of demand response and increased participation in demand response activity by customer with multiple facilities.
Questions	2.3.6A Is there a need for a specific activity directed at customers with multiple facilities?

Many customers are already engaged in issues dealing with the overlap of energy efficiency and demand response; the acceptance of incentive payments from commercial interests; advanced metering installations; cyber-security standards development for demand response related smart grid technology; the installation of distributed back-up generation; and new building standards. The development of demand response related tools, policies and plans to engage these existing customers with larger facilities (i.e. university campuses, national retailers and federal or military sites) may assist in achieving the maximum amount of demand response that can be developed and deployed.

Below is a list of the proposed strategies and activities described in the Discussion Draft.

Table 6 : Proposed Strategies and Activities

Requirements for Technical Assistance

- 2.1.1 Establish a National Forum
- 2.1.2 Conduct Educational Sessions for Policymakers
- 2.1.3 Conduct Communications Training for State and Local Governing Officials
- 2.1.4 Build a Panel of Demand Response Experts
- 2.1.5 Sponsor Technical Papers
- 2.1.6 Establish a Demand Response Assistance Program
- 2.1.7 Establish a Demand Response Grant Program

Requirements for National Communications Program

- 2.2.1 Develop a National Umbrella Communications Campaign
 - 2.2.1.1 Element 1: Communicate as a Coalition
 - 2.2.1.2 Element 2: Conduct Foundational Market Research
 - 2.2.1.3 Element 3: Develop Messages that Resonate
 - 2.2.1.4 Element 4: Provide Communications Platform for Reaching Commercial and Industrial Customers
 - 2.2.1.5 Element 5: Position Demand Response as Component of Smart Energy Use Practices
 - 2.2.1.6 Element 6: Develop Consumer-Friendly Terminology for Demand Response
 - 2.2.1.7 Element 7: Provide Communications Assistance to Policymakers and Stakeholders
 - 2.2.1.8 Element 8: Distribute Toolkit Materials for Specific Utility, Load-serving Entity, or other Demand Response Providers' Programs to Manage Their Own Communications Campaign
 - 2.2.1.9 Element 9: Develop Corporate and Organizational Partnerships
- 2.2.2 Implement the Campaign Locally

Requirements for Tools and Materials to Support Demand Response

- 2.3.1 Enhance or Develop Demand Response Tools and Methods
 - Demand Response Estimation and Prediction Tools
 - Cost effectiveness tools
 - Measurement & Verification tools
 - Cost recovery methods for enabling technology
 - Industry-specific Decisions Support Tools
 - Methodologies for Incorporating Demand Response in Dispatch, Ancillary services, transmission planning and Resource Planning
 - Transparent Price Information
- 2.3.2 Specify Standards and Protocols for Demand Response
 - Communication standards for consumer demand information
 - Consumer data privacy standards
 - Enhanced cyber security protection standards
 - Tools and Standards to support the provision of ancillary services by demand resources
 - Nationwide Plug-in Hybrid Electric Vehicles standards
 - Standard demand response signals
 - Common Specification for Price and Product Definition
- 2.3.3 Provide Information to Design a Pilot Demand Response Program
- 2.3.4 Provide Guidelines on Dynamic Rate Design
- 2.3.5 Distribute Information and Case Studies via the Web
 - Case studies of laws, regulations, tariffs
 - Summaries of lessons learned
 - Database of demand response programs
- 2.3.6 Provide Assistance to Customers with Multiple Building Facilities

Appendix 1: Coalition Examples

The National Action Plan for Energy Efficiency

In 2006, recognizing that energy efficiency remained a critically underutilized resource in the nation's energy portfolio, initially more than 50 leading electric and gas utilities, state utility commissioners, state air and energy agencies, energy service providers, energy consumers, and energy efficiency and consumer advocates (Leadership Group), released the *National Action Plan for Energy Efficiency* (National Action Plan for Energy Efficiency).⁴¹ The Leadership Group is a private-public initiative that operates with a limited budget. DOE and EPA only facilitate the work of the National Action Plan. The Leadership Group neither sets standards or protocols for energy efficiency, nor issues grants for program design, implementation or monitoring. The initial Leadership Group was co-chaired by the then-president of National Association of Regulatory Utility Commissioners, Diane Munns, and the President and Chief Executive Officer of Duke Energy, James Rogers.

The over-arching goal of the Leadership Group, as identified in the National Action Plan for Energy Efficiency, is to create a sustainable, aggressive national commitment to energy efficiency through gas and electric utilities, utility regulators, and partner organizations. The National Action Plan for Energy Efficiency is a call to action to increase investment in energy efficiency. It spells out five key consensus recommendations for promoting energy efficiency:

- Recognize energy efficiency as a high-priority energy resource.
- Make a strong, long-term commitment to implement cost-effective energy efficiency as a resource.
- Broadly communicate the benefits of and opportunities for energy efficiency
- Promote sufficient, timely, and stable program funding to deliver energy efficiency where cost-effective.
- Modify policies to align utility incentives with the delivery of cost-effective energy efficiency and modify ratemaking practices to promote energy efficiency investments.⁴²

The National Action Plan for Energy Efficiency is accompanied by a tool for estimating the benefits of energy efficiency. It also envisioned providing experts and resource materials to

⁴¹ Leadership Group, National Action Plan for Energy Efficiency (2006), available at http://www.epa.gov/cleanenergy/documents/napee/napee_report.pdf.

⁴² *Id.* at ES-2, ES-6 to -9.

parties who are interested in pursuing energy efficiency. The National Action Plan for Energy Efficiency noted that success requires the joint efforts of customers, utilities, regulators, states and other partner organizations.⁴³

As highlighted in the 2008 edition of its *Vision for 2025*, as of November 2008 more than 120 organizations have endorsed these recommendations and/or made commitments to promote energy efficiency within their spheres of influence.⁴⁴

The *Vision for 2025* identifies ten implementation goals, and measures the progress made so far. The goals include, for example, developing regulatory processes to provide utility incentives for investing in energy efficiency; developing cost-effectiveness tests; establishing measurement and verification protocols; developing state policies to ensure robust energy efficiency practices; implementing information sharing and delivery systems; and implementing advanced technologies.⁴⁵ A suite of technical assistance resources are available to help parties achieve all cost-effective energy efficiency by 2025.

The Air Bag and Seat Belt Safety Campaign

In 1993, General Motors and the National Safety Council formed the “Air Bag & Seat Belt Safety Campaign,” a coalition of auto manufacturers, insurance companies and the Insurance Institute for Highway Safety, safety organizations, law enforcement associations and the National Highway Traffic Safety Administration, to address the issue of child air bag deaths and stagnant nationwide seat belt use.⁴⁶ As a coalition, with primary funding from General Motors and the Insurance Institute for Highway Safety, they conducted a national umbrella campaign to encourage parents to restrain their children properly in the back seat, and to encourage all drivers and passengers to buckle up.⁴⁷

The campaign sought to:

1. Form a coalition of diverse interests to oversee and fund the campaign.
2. Choose one target state to kick-off the campaign, letting that state be one of the campaign’s messengers.
3. Engage local leaders and stakeholders as messengers, and bring them in to the coalition.
4. Measure results through rigorous survey methods.

⁴³ *Id.* at 1-2.

⁴⁴ Leadership Group, National Action Plan for Energy Efficiency, *Vision for 2025: A Framework for Change* at ES-1 (2009), available at <http://www.epa.gov/cleanenergy/documents/vision.pdf> (Vision for 2025).

⁴⁵ *Id.* at ES-2 to ES-7.

⁴⁶ For more information about the Air Bag & Seat Belt Safety Campaign, visit <http://www2.nsc.org/airbag.htm>.

⁴⁷ A description of a similar demonstration model program, a later iteration of the seat belt campaign, is available at http://www.nhtsa.dot.gov/portal/nhtsa_static_file_downloader.jsp?file=/staticfiles/DOT/NHTSA/Vehicle%20Safety/Articles/Associated%20Files/811014.pdf.

5. After demonstrating success, expand the program to other states while maintaining a presence in all prior states.
6. After demonstrating success in many states, take the campaign to the national audience.

To raise awareness among the public, the national coalition provided media and organizational outreach materials to states and communities so that they were well-prepared to serve as spokespeople for the effort even if they were not demonstration program states, and provided intensive, on-the-ground support to key demonstration markets.

In the first year of the campaign, the coalition conducted a communications demonstration program in North Carolina, based on a number of factors that made it a suitable launch site, most importantly that it had a supportive governor and law enforcement community, both of whom would be critical to the program's success. Over the next few years, the coalition broadened its outreach into eight Southeastern states based on those states' receptivity, and finally broadened into a fully national campaign as the demonstrable effectiveness of the outreach became convincing. That effectiveness led to Congressional funding of more than \$10 million per year for advertising, to further the public education effort.⁴⁸

As a result of the coalition's work in demonstration states, and then nationally, seat belt use increased more than it ever had during a prior period, from 61 percent in 1996 to a record high of 82 percent in 2005.⁴⁹ Child fatalities from traffic crashes have dropped by 20 percent, and proper restraint use among toddlers has jumped dramatically from 60 to 94 percent.⁵⁰ In addition, in 2004, the fatality rate on the nation's highways was the lowest since record-keeping began 35 years ago.⁵¹

⁴⁸ S. Rep. No. 107-224, at 94-5 (2003) (noting that preliminary results demonstrated the initiative's success in achieving increases in seat belt use).

⁴⁹ Press Release, National Safety Council, National Safety Council Honors Air Bag and Seat Belt Safety Campaign for Lifesaving Achievements (Oct. 30, 2006), available at http://www.csrwire.com/press/press_release/18157-National-Safety-Council-Honors-Air-Bag-and-Seat-Belt-Safety-Campaign-for-Lifesaving-Achievements.

⁵⁰ Welcome to the Air Bag & Seat Belt Safety Campaign, <http://www2.nsc.org/airbag.htm> (last visited Sept. 14, 2009).

⁵¹ *Study: Seat Belt Use at an All-Time High*, CNN, Sept. 16, 2004, <http://www.cnn.com/2004/US/09/16/seat.belts/index.html>.

Appendix 2: Examples of Existing Demand Response Programs

This Appendix presents a few examples of existing demand response retail and wholesale programs around the U.S. To put these case studies in context, Figure 4, which is taken from the Assessment, shows the regional variation in the national potential for demand response.

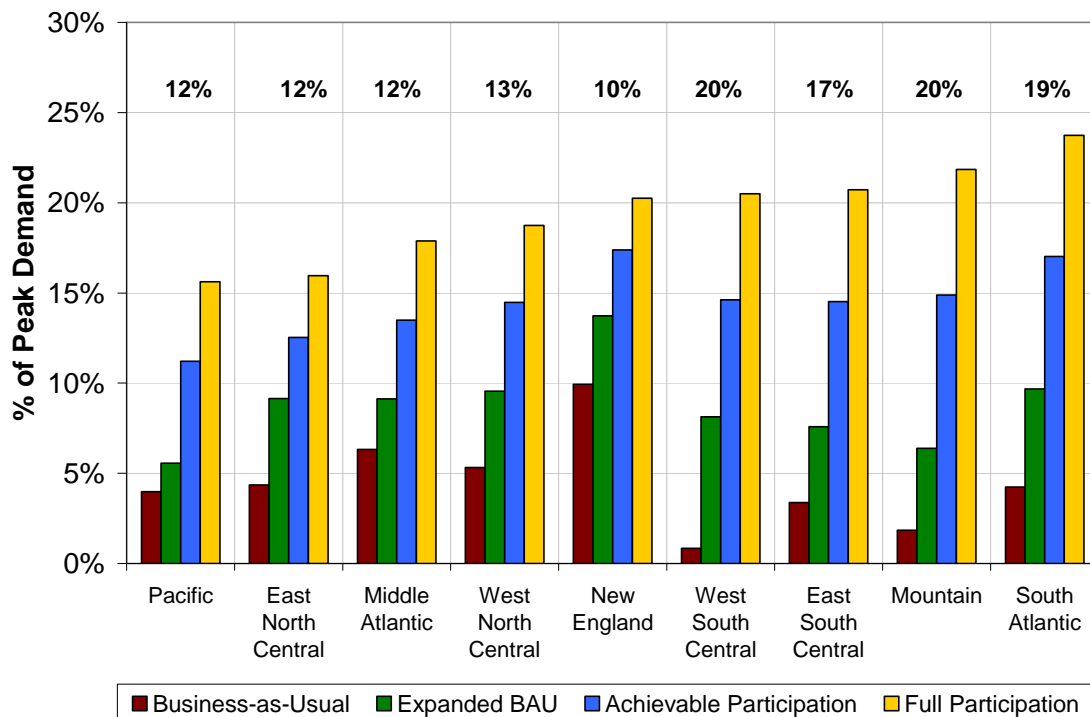


Figure 4: Regional Demand Response Potential

Retail Programs

Arizona

Arizona is a state with vertically-integrated investor-owned and publicly-owned utilities. It has very hot summers that bring with them a large reliance on central air conditioning. In order to curtail growth in peak loads, the two major utilities, Arizona Public Service Company and the Salt River Project, have offered time-of-use pricing programs to their residential customers for over two decades.⁵² During this time, they have attracted some 30 to 40 percent of the residential market.⁵³ For example, the Salt River Project has more than 222,000 TOU customers, or about 25 percent of its electric customers, which is the third-largest TOU initiative in the U.S.⁵⁴ Typical TOU customers on this program lowers their bill 7 percent.⁵⁵ What is noteworthy is that these effects were obtained without the intervention of enabling technologies.

This case study indicates that even without enabling technologies, significant customer participation can be achieved in time-based rates if they are well designed and marketed and that these rates can successfully lower peak demand for many years.

California

California is a leader in exploring and expanding demand response in the nation. For instance, the California Energy Commission issued regulations instituting mandatory time-of-use pricing for large commercial and industrial customers in 1978. In addition, regulations for appliance and building energy consumption⁵⁶ are a major reason that *per capita* electricity use has stayed constant during the past three decades, while the *per capita* consumption in the United States has grown appreciably.⁵⁷ Later, during the Western energy crisis of 2000-01, California developed an Energy National Action Plan which specified a loading order of resources: first, energy efficiency; second, demand response; third, renewable energy sources; and finally, conventional generation options.⁵⁸

The Energy National Action Plan also set a target reduction in peak demand of five percent for 2007.⁵⁹ When the three investor-owned utilities only achieved 40 percent of that target in 2007, the utilities were asked to revamp their efforts. Simultaneously, the California Public

⁵² More information about these programs can be found at <http://www.srpnet.com/prices/home/tou.aspx> (Salt River Project) and http://www.aps.com/aps_services/residential/rateplans/Default.html (Arizona Public Service Company).

⁵³ eMeter, Demand Response: An eMeter White Paper Presentation 26 (2008).

⁵⁴ Salt River Project, Navigating Change: SRP 2009 Annual Report, at 7 (2009), available at <http://www.srpnet.com/about/financial/2009AnnualReport/siteassets/pdfx/2009SRPAnnualReport.pdf>.

⁵⁵ *Id.*

⁵⁶ Cal. Code Regs. tit. 20, §§ 1601-1608 (2009) (efficiency standards for appliances); Cal. Code Regs. tit. 24.

⁵⁷ California Energy Comm'n, 2007 Integrated Energy Policy Report, at 3-4 (2007).

⁵⁸ State of California, Energy National Action Plan, at 4 (2003).

⁵⁹ *Id.*

Utilities Commission approved business cases for the deployment of AMI by all three utilities,⁶⁰ and then issued a landmark ruling making dynamic pricing the default tariff for all non-residential customers who were part of AMI. In addition, California operates the “Flex Your Power” campaign to promote customer awareness on pending energy shortages and to encourage them to curtail use.⁶¹ This program has achieved very high levels of brand recognition since it is featured in a number of prominent places such as billboards, train stations, websites and also on postmarks.

California also carried out the nation’s first comprehensive test with dynamic pricing, known as the Statewide Pricing Pilot, which involved approximately 2,500 residential and small commercial and industrial customers.⁶² The results of the Statewide Pricing Pilot provided information about the likely amount that customers would lower their peak demand at different price levels, both with and without enabling technologies.⁶³ In addition, a large number of participants elected to continue on the experimental rates despite a new metering charge, indicating that participants were satisfied with the experimental rates.⁶⁴ Overall, the experiment showed that if customers are fully informed, they are more likely to participate in dynamic pricing programs.

This case study indicates that if a state makes a strong commitment to dynamic pricing, it can achieve a significant reduction in peak demand, that enabling technologies can further boost impacts and that by making demand response the default option, large numbers of customers can be induced to participate in demand response.

Connecticut

The Connecticut legislature passed legislation that required electric distribution companies to conduct integrated resource planning, beginning January 1, 2008.⁶⁵ Resource needs so determined are required to first be met through all available energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible.⁶⁶ Among other things, the electric distribution companies’ procurement plans must specify the amount of demand-side measures, such as demand response, that can meet the capacity planning needs.⁶⁷

⁶⁰ See, e.g., *Pac. Gas & Elec. Co.*, Decision Adopting Dynamic Pricing Timetable and Rate Design Guidance for Pacific Gas & Electric Company, D. 08-07-045 (July 31, 2008).

⁶¹ For more information about the Flex Your Power campaign, visit <http://www.fypower.org/>.

⁶² For more general information about the pilot program and its results, see Charles River Assoc., Impact Evaluation of the California Statewide Pricing Pilot (2005) available at

http://sites.energetics.com/madri/toolbox/pdfs/pricing/cra_2005_impact_eval_ca_pricing_pilot.pdf.

⁶³ See *id.*

⁶⁴ San Francisco Community Power, Statewide Pricing Pilot – Track B End of Pilot Focus Group Results 2 (2005), available at http://www.sfpower.org/SFCP_TrackB_FocusGroups.pdf (finding strong statistical support that customers wanted to remain on the CPP rates).

⁶⁵ Conn. Gen. Stat. § 16a-3a (2008).

⁶⁶ § 16a-3a(c).

⁶⁷ *Id.*

In the summer of 2009, Connecticut Light & Power ran a pilot program for demand response in order to discover how to most effectively reduce electricity usage during peak periods when demand for electricity reaches a critical level.⁶⁸ The data from the summer is being analyzed and results will be available later in the year.

This case study indicates that legislation can be passed that encourages the use of demand response, and further, how pilot programs are being implemented in response.

Delaware

Legislation in Delaware requires Delaware Power & Light to conduct integrated resource planning, commencing December 1, 2006.⁶⁹ This biennial resource report requires Delaware Power & Light to project a ten-year supply and demand forecast. Additionally, Delaware Power & Light must propose the resource mix it proposes to meet its long-term obligations over the ten-year period, including the use of demand-side management programs.⁷⁰

This case study is an example of legislation that has been passed to encourage the use of demand response for integrated resource planning.

Florida

In the panhandle of the Florida, Gulf Power, a subsidiary of Southern Company, has been operating the Energy *Select* (formerly known as the Good Cents *SELECT* program) since the early 1990s.⁷¹ This includes an automated energy management system for homes that comes along with a critical-peak pricing tariff. The average rate is around 8 cents per kWh and the CPP tariff applied during the top one percent of the hours is four times higher.⁷² The system controls four end-uses: air conditioning, space heating, water heating and swimming pool pumps. Some 8,000 customers subscribe to the program and save up to 15 percent on their monthly energy bill after paying a monthly fee of about \$5 a month.⁷³ Gulf Power estimates that the program induces a drop of 2 kW per participating customer, amounting to approximately 40-50% of customer load during the top one percent of the hours of the year.⁷⁴ The program is generating interest among other Florida utilities as well. One is running a pilot to test customer acceptance and response, which is being closely tracked by the others.

⁶⁸ Connecticut Light & Power's Plan-It Wise Energy Program, <http://www.planitwiseprogram.com/> (last visited Sept. 4, 2009).

⁶⁹ Del. Code Ann. tit. 26, § 1002(4) (2009).

⁷⁰ *Id.*

⁷¹ Energy Select, <http://www.gulfpower.com/energysselect/index.asp> (last visited Sept. 14, 2009).

⁷² Gulf Management Co., Good Cents *SELECT*: Advanced Energy Management Program at slide 6 (2006), available at www.ewh.ieee.org/r3/nwflorida/presentations/01_19_06.ppt.

⁷³ *Id.*

⁷⁴ Jim Thompson, Gulf Power Co., Presentation for the Southeast Energy Efficiency Meeting at 14 (September 28, 2007), available at http://www.epa.gov/RDEE/documents/southeast-meeting/thompson_southeast_energy_efficiency_meeting_atlanta_ga.pdf (discussing real-time pricing and the Good Sense *SELECT* program at Gulf Power Co.).

FPL's demand response program, "On Call," is one of the largest load management systems (LMS) in the nation. At the end of 2008, FPL's goal was to provide 973 MW of load control during times of high demand on its system. The system uses more than 900,000 load control transponders connecting more than 780,000 users, and the load control capability is 984 MW. FPL uses a power line communications system that offers many control strategies enabled by a two-way communications feature. When managed effectively, this system can be an attractive economic alternative when compared to the total cost of adding new peak load power generating plants.

An essential part of the success of the program is to keep customers enrolled in the program and maintain the equipment in the field to ensure the system delivers the demand reduction that is expected by the system operators. About 1.5 percent of the customers who have the LMS field equipment installed in their home call the customer care center with questions. These calls can be as simple as requesting to add additional appliances to the load control program or eliminating the customers' perception that their participating appliances failed because of the installed LMS equipment. Employees specially trained in LMS (including a basic electrical knowledge of air conditioning, water heaters and pool pump operation/wiring) help reduce customer dropouts from the system and ensure continued customer participation.

FPL customers benefit from the On Call load control program because it allows FPL to maintain consistent supply of power generation during times of peak demand. The demand reduction enabled by On Call customers has helped keep electric rates low by deferring the need to build three power plants since the program's inception, which also helps protect the environment.⁷⁵

This case study indicates that dynamic pricing coupled with enabling technologies can bring about substantial savings to both the utility and the customer.

Georgia

Georgia's leading investor-owned utility has operated the nation's largest real-time pricing program directed at large commercial and industrial customers since the mid-nineties.⁷⁶ Its current subscribers include approximately 1,200 medium to large industrial and commercial customers (greater than 250 kW), amounting to more than 4,000 MW of summer peak demand.⁷⁷ Most of the customers participate in the day-ahead program, in which they receive information on the next day's hourly prices on the afternoon of the previous day. About 100 of the largest industrial customers participate in an hour-ahead program, in which customers receive a day-ahead forecast of hourly prices, but only an hour's notice of the firm price in the next hour. Customers are offered a variety of price protection products to shield them from

⁷⁵ E-mail from Julie Kreaflle, Manager, Prod. Mktg., Fla. Power & Light Co., to Ahmad Faruqui (Sep. 16, 2009, 9:47 PM ET) (on file with The Brattle Group).

⁷⁶ Michael O'Sheasy, *How To Buy High And Sell Low: Spot Priced Electricity Offers Financial Rewards*, in *Pricing in Competitive Electricity Markets* 295 (2000).

⁷⁷ Steven Braithwait, *Evaluating Changes in RTP Price Response—The Effect of Market and Environmental Conditions* (2005) (Prepared for the International Energy Program Evaluation Conference Proceedings in New York).

price volatility. They can choose the combination of risk exposure that best matches their attitudes toward risk and their ability to adjust their operations in response to variations in the price of power. The maximum load reductions on the moderate price day are approximately 4 percent for day-ahead customers and 10 percent for hour-ahead customers. On the high price day, estimated load reductions rise to 7 percent for day-ahead customers and 30 percent for hour-ahead customers.⁷⁸

This case study indicates that real-time pricing is feasible and cost effective for medium and large commercial and industrial customers and that well designed programs can recruit large numbers of participants to real-time pricing in this market segment. It also shows that price protection and other risk management products may feasibly be included in demand response programs.

Illinois

In June 2006, Illinois legislation enabled real-time pricing.⁷⁹ Each electric utility servicing at least 100,000 customers was required to file a tariff allowing residential customers to elect real-time pricing by January 2007. In deciding on the real-time setting the tariff, each electric utility was required to, at a minimum, describe its methodology and manner in which real-time customers would be provided with access to hourly and day-ahead prices.

In order to implement real-time pricing, each electric utility was required to install a meter that is capable of recording hourly intervals of energy use for each customer that elects real-time pricing. Each electric utility was entitled to recover incurred costs in implementing real-time pricing. These costs were allowed to be imposed on both consumers who elected and did not elect to participate a real-time pricing rate.

At the end of 2007, the first full year required under the June 2006 law, Commonwealth Edison and Ameren had 3,334 and 500 active participants in their residential real-time pricing programs. In that year, average bill savings for all participants in the Commonwealth Edison program was about 13 percent.⁸⁰ Ameren participants, on the other hand, had a total savings of 16 percent compared to what the same bill would have been under the flat rate.⁸¹

By the end of 2008, Commonwealth Edison and Ameren had both increased their enrollments to 5,838 and 3,147 active participants, respectively, though average bill savings fell to 2.5

⁷⁸ *Id.*

⁷⁹ 2005 Ill. Laws 977 (amending 220 Ill. Comp. Stat. Ann. 5/16-101A, 16-102, 16-107).

⁸⁰ *Comverge, Inc.*, ComEd Residential Real-Time Program – 2007 Annual Report, Illinois Commerce Commission Docket No. 06-0617 (filed on April 30, 2008), available at <http://www.icc.illinois.gov/docket/files.aspx?no=06-0617&docId=123573>.

⁸¹ *Ameren Illinois Utilities*, RSP Rider - Power Smart Pricing – 2007 Annual Report, Illinois Commerce Commission Docket No. 06-0691 (filed April 15, 2008), available at <http://www.icc.illinois.gov/docket/files.aspx?no=06-0691&docId=123030>.

percent for all participants in the Commonwealth Edison program⁸² and nine percent in the Ameren program.⁸³

This case study indicates that legislation can be used to encourage dynamic pricing. Also, real-time pricing rates are feasible for residential customers and that they can achieve significant savings in the residential market.

Massachusetts

In July 2008, Massachusetts Governor Deval Patrick signed the Green Communities Act, a comprehensive energy reform bill.⁸⁴ Among its many features, this law makes energy efficiency programs compete in the market with traditional energy supply. Utility companies are now required to purchase all available energy efficiency improvements that cost less than it does to generate power. Additionally, utility companies are now required to offer rebates and other incentives for customers to upgrade lighting, air conditioning, and industrial equipment to more efficient models, whenever those incentives cost less than generating the electricity it would take to power their older, less-efficient equipment.⁸⁵

Michigan

In January 2007, the Michigan Public Service Commission (PSC) submitted its *21st Century Electric Energy Plan*⁸⁶ in response to an executive order from the Governor the year before. One of the recommendations from this energy plan is that Michigan's PSC be authorized to require the use of active load management measures by utilities (forecasted to reduce demand by 570 MW in 10 years). Additionally, pilot programs employing advanced metering infrastructure to provide real-time price information to customers are also recommended.

Consumers Energy has forecasted in its Balanced Energy Initiative that load management, demand response, and interruptible load programs would provide a reduction of 9.3 percent in retail peak demand by 2030.⁸⁷ This would be implemented through implementation of a comprehensive AMI program that includes central air conditioning load management and

⁸² *Comverge, Inc.*, ComEd Residential Real-Time Pricing Program – 2008 Revised Annual Report, Docket No. 06-0617 (filed on April 28, 2009), available at <http://www.icc.illinois.gov/docket/files.aspx?no=06-0617&docid=136091>.

⁸³ *Ameren Illinois Utilities*, Rider PSP - Power Smart Pricing - 2008 Annual Report, Illinois Commerce Commission Docket No. 06-0621 (filed on April 30, 2009), available at <http://www.icc.illinois.gov/docket/files.aspx?no=06-0621&docid=136151>.

⁸⁴ 2008 Mass. Acts 50 (amending Mass. Gen. Laws ch. 164B, § 116(a) (2009)).

⁸⁵ Press Release, Governor Patrick, Governor Patrick Signs Energy Bill Promoting Cost Savings, Renewable and Clean Energy Technology (July 2, 2008), available at http://www.mass.gov/?pageID=gov3pressrelease&L=1&LO=Home&sid=Agov3&b=pressrelease&f=080702_bill_energy_clean&csid=Agov3.

⁸⁶ J. Peter Lark, Chairman, Michigan Pub. Serv. Comm'n, Michigan's 21st Century Energy Plan (2007), available at http://www.michigan.gov/documents/mpsc/21stcenturyenergyplan_185274_7.pdf.

⁸⁷ Consumer's Energy Co., Electric Generation Alternatives Analysis for Proposed Permit to Install No. 341-07 for an Advanced Supercritical Pulverized Coal Boiler at the Karn-Weadock Generating Station, MPSC Case No. U-15996 (filed with the Mich. Pub. Serv. Commn. June 5, 2009).

demand response programs for residential and small commercial customers that will reduce peak demand as well as on-going energy requirements.⁸⁸

Consumers Energy plans to conduct a demand response and information pilot aimed at assessing customer behavior in the smart grid environment. The centerpiece of this pilot is a randomized program which places AMI-enabled customers into various dynamic pricing and information treatments while comparing them to strategic control groups.

This research aims to distinguish itself from previous demand response pilot programs by (1) careful use of treatment randomization to achieve internal and external validity; and (2) addressing a set of questions that extends beyond a standard investigation of load-shifting behavior.⁸⁹ At a high level, the goals of this research are to:

- Understand how Dynamic Pricing can best be incorporated into Consumers Energy's portfolio
- Understand consumer responses to dynamic electricity pricing, during both peak and off-peak periods (to examine demand shifting vs. demand reduction)
- Evaluate whether automated demand response technology enhances consumer responses to dynamic pricing
- Compare consumer response to CPP against critical peak rebates
- Understand consumer responses to real-time provision of information regarding electricity usage, during both peak and off-peak periods
- Evaluate potential climate change mitigation impacts of demand response programs and information provision
- Evaluate the extent to which participation in demand response and/or information programs motivates lasting energy efficiency improvements
- Evaluate the heterogeneity of responses to these programs across subpopulations

While the CPP and real-time pricing programs may appeal to many of Consumers Energy's customers, a portion of their customer base may prefer a different, potentially less involved program. A program which can provide them with opportunities to reduce their bills while requiring minimal action on their part. To provide these customers with a program of that nature, Consumers Energy will concurrently roll out Load Management and advanced Direct Load Control programs that will leverage the AMI investment.⁹⁰

In addition to these planned future efforts, demand reduction has been conducted in Michigan for many years. Detroit Edison maintains a significant Direct Load Control Interruptible Air

⁸⁸ In 2018, air conditioning load management is projected to be able to reduce peak demand by 308 MW. Customer demand response programs associated with AMI are projected to provide further peak load reduction of 212 MW by 2018.

⁸⁹ E-mail from Mark Lesiw, AMI Senior Program Manager of Load Mgmt., Consumers Energy, to Ahmad Faruqui (Sep. 2, 2009, 1:19 PM ET) (on file with The Brattle Group).

⁹⁰ *Id.*

Conditioning (IAC)⁹¹ program which was established over 20 years ago during the days of demand side management. IAC has grown to over 280,000 (of 1.9 million total customers, with a 79.1 percent central air conditioning saturation)⁹² enrolled customers who receive a \$0.02 rate break during the cooling months of June-October in exchange for the possibility of interruption by the company via remote control relays. This pricing structure is unique because it provides a discount on the hourly rate instead of a fixed amount monthly credit.

The current diversified per customer load reduction is 0.85 kW, which is down considerably from approximately 1.2 kW ten years ago which. This decrease in load reduction is due to the increase in efficiency of central air conditioning units over the years.⁹³

The IAC program is intended to help curtail peak load during emergency or high price periods. It is also utilized as capacity reserve as it is available within 10 minutes. The program is a cycling program at 15 minutes on/off intervals that is capable of shedding up to 230 MW of load on days over 90 degrees Fahrenheit. IAC may be cycled for no more than 8 hours within a 24 hour period.⁹⁴

In addition the program is used for Localized Substation Load Relief (LSLR). Detroit Edison developed a remote control program using IAC customers (identified by the substation serving them) that is capable of interrupting only customers taking service within substation serviced areas.⁹⁵ This program has proved very successful at relieving load on overloaded substations and avoiding localized circuit rotation, brown outs, and in extreme cases the loss of a substation transformer.⁹⁶

This case study is an example of legislation being passed to encourage new types of demand response programs to complement existing, successful programs.

Washington, D.C

It is very expensive and time consuming to change billing systems and processes for sending out bills to customers. Instead of overhauling the entire billing system and the process of mailing out bills, it is possible to include a simple dynamic pricing line item adjustment in the current

⁹¹ DTE Energy, <http://www.dteenergy.com/residentialCustomers/billingPayment/rates/electric/interruptibleRates.html> (last visited Sept. 4, 2009).

⁹² E-mail from Mark Williamson, Manager, Load Research, DTE Energy, to Ahmad Faruqui (Aug. 31, 2009, 1:21 PM ET) (on file with The Brattle Group).

⁹³ *Id.*

⁹⁴ E-mail from Mark Williamson, Manager, Load Research, DTE Energy, to Ahmad Faruqui (Aug. 31, 2009, 9:48 AM ET) (on file with The Brattle Group).

⁹⁵ See Traci MacDonald, The Localized Substation Load Relief (LSLR) Program at Detroit Edison Presentation for AEIC National Conference Presentation for AEIC National Conference (Sept. 10-13, 2006) (A power point of the presentation is available at http://www.aeic.org/load_research/docs/15_2006_09_The_Localized_Substation_Load_Relief_Program_at_Detroit_Edison_presentation.ppt).

⁹⁶ *See id.*

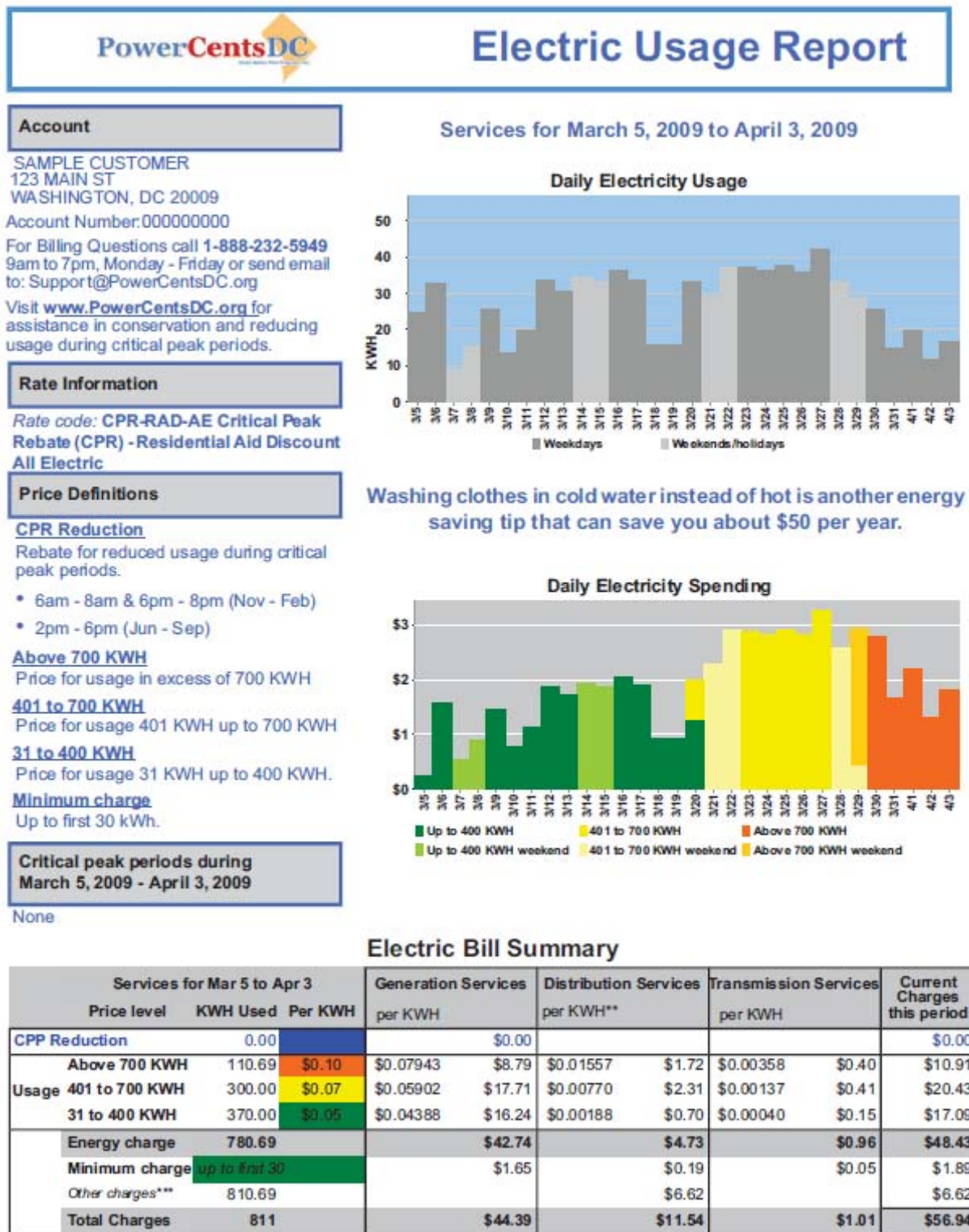
billing system and provide a detailed explanation of this dynamic pricing adjustment in a bill insert. An example of such a demand response bill insert, provided from Washington D.C.'s PowerCentsDC pilot program,⁹⁷ is provided in Figure 5. Again, this example is not the actual bill that pilot program participants receive. Rather, this is supplemental data included as an insert with the actual bill.⁹⁸

This case study provides an example of a billing structure that takes into consideration the many regulatory and information technology considerations surrounding the billing of customers.

⁹⁷ For more information about D.C.'s pilot program, please visit <http://www.powercentsdc.org/>.

⁹⁸ E-mail from Chris King, eMeter to Ahmad Faruqui (Aug. 30, 2009, 2:08 AM ET; Sept. 1, 2009, 10:15 AM ET) (on file with The Brattle Group).

Figure 5: PowerCentsDC pilot program sample bill



Wholesale Programs

A summary of RTO and ISO program offerings is below.⁹⁹

RTO and ISO Demand Response Offerings

<i>Region</i>	<i>Name</i>	<i>Service Type</i>	<i>Trigger</i>	<i>Response Time</i>
CAISO				
CAISO	Participating Load Program	Energy	Market Bid (Energy Price > Offer Price)	1 hour
CAISO	Participating Load Program	Reserve	Market Bid (Capacity Bid and separate Energy Bid > Offer Price)	10 minutes
ERCOT				
ERCOT	Emergency Interruptible Load Service	Capacity	Reliability	10 minutes
ERCOT	Loads Acting as a Resource providing Responsive Reserve Service -- Under Frequency Relay Type	Reserve	Reliability (automatic relay)	0.5 seconds (automatic relay) or 10 minutes (phone)
ERCOT	Loads Acting as a Resource providing Responsive Reserve Service -- Controllable Load Resource Type	Reserve	Reliability	Continuous, similar to governor action by a generator; and 10 min response for remaining obligation to electronic instruction
ERCOT	Loads Acting as a Resource providing Non-Spinning Reserve Service	Reserve	Reliability	30 minutes
ERCOT	Controllable Load Resources providing Regulation Service	Regulation	Reliability	Effectively instantaneous

⁹⁹ The information is adapted from the ISO/RTO Council's North American Wholesale Electricity Demand Response Program Comparison, available at [http://www.isorto.org/atf/cf/%7B5B4E85C6-7EAC-40A0-8DC3-003829518EBD%7D/IRC%20DR%20M&V%20Standards%20Implementation%20Comparison%20\(2009-04-28\).xls](http://www.isorto.org/atf/cf/%7B5B4E85C6-7EAC-40A0-8DC3-003829518EBD%7D/IRC%20DR%20M&V%20Standards%20Implementation%20Comparison%20(2009-04-28).xls).

RTO and ISO Demand Response Offerings (Continued)

<i>Region</i>	<i>Name</i>	<i>Service Type</i>	<i>Trigger</i>	<i>Response Time</i>
ISO-NE				
ISO-NE	Real Time Demand Response Program [Capacity Component]	Capacity	Reliability	10 Minutes/ 30 Minutes
ISO-NE	Real Time Demand Response Program [Energy Component]	Energy	Reliability	10 Minutes/ 30 Minutes
ISO-NE	Day-Ahead Load Response Program for RTDRP	Energy	Market Bid (Day-Ahead LMP = or > Offer Price)	Effectively Instantaneous
ISO-NE	Day-Ahead Load Response Program for RTPR	Energy	Market Bid (Day-Ahead LMP = or > Offer Price)	Effectively Instantaneous
ISO-NE	Demand Response Reserves Pilot	Reserve	Reliability	30 Minutes
ISO-NE	Real Time Price Response Program	Energy	Market Bid (Day-Ahead or Forecast Real-Time LMP = or > \$100/MWh)	Effectively Instantaneous
ISO-NE	Real Time Demand Response Resource	Capacity	Reliability	30 Minutes
ISO-NE	FCM: On-Peak, Seasonal Peak Resources	Capacity	Reliability	Effectively Instantaneous
ISO-NE	Real Time Emergency Generation Resource	Capacity	Reliability	Effectively Instantaneous
MISO				
MISO	Emergency Demand Response	Energy	Reliability	Resource-Specific (Biddable Parameter)
MISO	Demand Response Resource Type I	Energy	Market Bid (Energy Price > Offer Price)	5 Minutes
MISO	Demand Response Resource Type-I	Reserve	Market Bid (Energy Price > Offer Price)	10 Minutes
MISO	Demand Response Resource Type II	Energy	Market Bid (Energy Price > Offer Price)	5 Minutes

RTO and ISO Demand Response Offerings (Continued)

<i>Region</i>	<i>Name</i>	<i>Service Type</i>	<i>Trigger</i>	<i>Response Time</i>
MISO	Demand Response Resource Type-II	Reserve	Market Bid (Energy Price > Offer Price)	10 Minutes
MISO	Demand Response Resource Type-II	Regulation	Market Bid (Energy Price > Offer Price)	Effectively Instantaneous
MISO	Load Modifying Resource	Capacity	Reliability	-
NYISO				
NYISO	Day-Ahead Demand Response Program	Energy	Market Bid (Energy Price > Offer Price) (Security Constrained Unit Commitment)	-
NYISO	Demand Side Ancillary Services Program	Reserve	Market Bid (Energy Price > Offer Price) (Security Constrained Economic Dispatch) (10 minute ramp)	10 Minutes
NYISO	Demand Side Ancillary Services Program	Reserve	Market Bid (Energy Price > Offer Price) (Security Constrained Economic Dispatch) (10 minute /30 minute ramp)	10 minutes/ 30 minutes
NYISO	Demand Side Ancillary Services Program	Regulation	Market Bid (Energy Price > Offer Price) (Security Constrained Economic Dispatch)	Effectively Instantaneous
NYISO	Emergency Demand Response Program	Energy	Reliability	2 Hours
NYISO	Installed Capacity Special Case Resources (Energy Component)	Energy	Reliability	2 Hours
NYISO	Installed Capacity Special Case Resources (Capacity Component)	Capacity	Reliability	2 Hours
PJM				
PJM	Economic Load Response	Energy	Market Bid (Self-Scheduled, Cleared Day-Ahead Bid, or Real-Time Dispatch)	Resource Specific
PJM	Economic Load Response	Reserve	Reliability (one hour notice)	10 Minutes
PJM	Economic Load Response	Reserve	Reliability (day-ahead notice)	30 Minutes
PJM	Economic Load Response	Regulation	Reliability	Effectively Instantaneous

RTO and ISO Demand Response Offerings (Continued)

<i>Region</i>	<i>Name</i>	<i>Service Type</i>	<i>Trigger</i>	<i>Response Time</i>
PJM	Emergency Load Response - Energy Only	Energy	Reliability	1 Hour or 2 Hours (Participant Selected)
PJM	Full Emergency Load Response (Capacity Component)	Capacity	Reliability	1 Hour or 2 Hours (Participant Selected)
PJM	Full Emergency Load Response (Energy Component)	Energy	Reliability	1 Hour or 2 Hours (Participant Selected)
SPP				
SPP	Variable Dispatch Demand Response	Energy	Market Bid (Energy Price > Offer Price) (Security Constrained Economic Dispatch)	5 Minutes