

**Draft for Comment of the**

# **National Action Plan on Demand Response**

**The Federal Energy Regulatory Commission Staff**

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**Prepared with the support of**

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The opinions and views expressed in this staff report do not necessarily represent those of the Federal Energy Regulatory Commission, its Chairman, or individual Commissioners, and are not binding on the Commission.



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# Executive Summary

## ***Introduction***

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The Federal Energy Regulatory Commission (FERC or Commission) is required to develop the ***National Action Plan on Demand Response*** (National Action Plan) as outlined in section 529 of the Energy Independence and Security Act of 2007 (EISA), entitled “Electricity Sector Demand Response.”<sup>1</sup> This National Action Plan is designed to meet three objectives:

1. Identify 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 identify requirements for implementation of a national communications program that includes broad-based customer education and support.
3. Develop or identify 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 is intended to be an action plan for the nation for implementation by states, localities, and regions. Although its recommended actions apply to the entire country, the National Action Plan recognizes, as Congress intended, the important role that state and local governments play in developing demand response. The coordinated efforts of federal, state, and local lawmakers and regulators are needed to enable achievement of the nation’s demand response potential.

To develop an action plan for the nation, FERC staff and their consultants solicited and accepted input and participation from a broad range of industry stakeholders; local, state and federal governing officials including state regulatory utility commissioners; and non-governmental groups including trade associations. FERC staff conducted extensive outreach to a broad range of entities and used the input to develop *A Discussion Draft on Possible Elements for the National Action Plan*<sup>2</sup> for public comment. A nationally webcast technical conference was held to encourage further input and participation from all interested entities. After the conference, written comments were accepted by the Commission.<sup>3</sup> This draft of the National Action Plan

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<sup>1</sup> Energy Independence and Security Act of 2007, 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).

<sup>2</sup> *Discussion Draft on Possible Elements for the National Action Plan* (Oct. 2008), available at <http://www.ferc.gov/EventCalendar/Files/20091028124306-AD09-10-000-Discussion.pdf> (Discussion Draft).

<sup>3</sup> Docket No. AD09-10.

was prepared after reviewing the many ideas that reflect the diverse views of a broad range of entities. The draft is now being offered for a final round of comments.

## ***Strategic Vision***

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This National Action Plan recommends the formation of a Coalition to provide assistance to the federal government in implementing the National Action Plan. Coalitions represent a way of harnessing the collective energy of a variety of individual organizations and yielding outcomes that have greater reach and depth than those organizations would achieve on their own. This National Action Plan recommends that an agency of the federal government would lead and fund implementation of the National Action Plan with assistance from a panel of Coalition members. The federal agency would coordinate the creation and operation of the panel and federal agency staff would manage the implementation of the National Action Plan. The federal agency would be tasked with making strategic and day-to-day decisions such as setting priorities and managing the budget. The Coalition would provide assistance to the federal agency. The panel of coalition members would consist of volunteer leaders from individual companies, organizations, and state and local governments providing advice, strategic insights and expertise to the federal agency. The Coalition would be funded through non-federal sources,<sup>4</sup> but some Coalition meetings and activities could be eligible for federal funding, depending upon the availability of federal funds and relevant legal restrictions.

## ***Strategies and Activities***

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The National Action Plan consists of strategies and activities to achieve three objectives: technical assistance to states, a national communications program, and the identification or development of tools and materials for use by customers, states and demand response providers.

### *1) Technical Assistance to States*

Subject to funding, the National Action Plan is to provide technical assistance to states as follows:

First, the Coalition would organize a panel of demand response experts to help inform various constituencies about demand response programs, products, technologies, and incentives and their benefits. Ideally, these experts would be identified as those persons having conducted primary and secondary research in the field (as evidenced by authorship of technical papers) and with knowledge of local and regional issues.

Second, subject to funding and identified need, the federal agency would fund several activities: primary and secondary research targeted to various practical aspects of demand response implementation (e.g., sponsorship of technical papers or pilots), establishment of a

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<sup>4</sup> Non-federal funding means that participating organizations would directly fund Coalition activities or arrange for additional funding from other sources.

program to provide technical assistance for demand response, and the establishment of a demand response grant program.

Third, state, local officials and interested stakeholders would partner with the federal agency (with input from the Coalition). National and regional forums and sessions would provide information on the National Action Plan and research conducted under the National Action Plan while providing the federal agency and the Coalition with feedback on key issues and lessons learned.

These steps are meant to be complementary, but the federal agency and Coalition could implement them as needed, picking and choosing the actions that have the greatest value.

## *2) National Communications Program*

EISA requires that the National Action Plan on Demand Response design and identify requirements for implementation of a national communications program that includes broad-based customer education and support. The national communications program would have a multi-faceted structure, meaning it would develop and support communications through multiple channels and media to communicate as appropriate with the many audiences for demand response. This plan for a national communications program includes three elements: a Communications Umbrella, local implementation, and direct outreach to states, policymakers, and partners.

The Communications Umbrella, as a national platform, would create and provide a consistent, yet flexible, research-based message framework. This platform would include communications tools, support and advice, that could be adapted for use by interested local demand response implementers.<sup>5</sup> It would also communicate directly with large commercial and industrial customers to inform them of opportunities to participate in demand response programs and the benefits of doing so.

A local implementation strategy would be designed based upon this platform to inform residential and commercial customers about the availability and possible benefits of demand response programs, products, technologies, and incentives. Interested local demand response implementers would use the research-based message framework and communications tools and tactics developed by the Communications Umbrella to tailor messages and materials and conduct outreach toward their particular customers.

The national communications program would also have a broad national mission to provide outreach to states, policymakers, and national partners whose support will be needed to

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<sup>5</sup> Local demand response implementers are entities, such as state or local governing officials, utilities, load-serving entities, and other demand response providers, interested in providing demand response programs, services, rates, incentives, etc. at a local level.

develop demand response in every region but particularly in areas where there are no existing demand response programs or current plans to implement such programs.

These strategies, national and local, should occur concurrently based both on their priority level and on the steps that must occur prior to each stage of the program rollout. Many of the tasks undertaken by the Communications Umbrella such as, foundational market research, would necessarily precede local implementation and direct outreach. However, the experiences of local demand response implementers, national partners, and policymakers will also inform future program development and message framework development under the Communications Umbrella.

### *3) Tools and Materials*

The plan for the development, enhancement, or dissemination of tools and materials involves two general categories of action: 1) a web-based clearinghouse and 2) tools and methods for assessing the impacts, costs, benefits, and operation of demand response programs.

A web-based clearinghouse would be established to provide stakeholders with the most current information and analyses on demand response. The web-based clearinghouse would include existing research as well as new research sponsored by the federal agency under the National Action Plan. The web-based clearinghouse would serve as a centralized location for collecting all publicly available information on demand response, including regulatory documents, program reports, and other general information. The federal agency would oversee management of the clearinghouse and dissemination of information and analyses rather than conduct and report its own analyses. The clearinghouse would also provide information that stakeholders can use to make their own evaluations and judgments about the reports and data that they are able to access through the clearinghouse.

Existing analytical tools and methods will need to be enhanced or developed to aid the expansion of existing demand response programs and the creation of new programs, to advance the use of demand response to support reliable and efficient operations of wholesale transmission, energy, capacity, and ancillary services markets, and to better enable end-use consumers to act optimally while enrolled in a demand response program. The federal agency's role, with input from the Coalition, would be to oversee organizations in enhancing or developing tools and methods. These organizations could engage in new research identifying beneficial characteristics of existing tools or meet through conference venues specifically set up to foster information-sharing on current successful examples. Based on the outcomes of either of these options, research decisions would be made by the federal agency with support from the Coalition to modify existing tools and methods or develop new ones.



## Introduction

Demand response is a valuable resource for meeting the nation’s energy needs. By lowering the peak demand for energy, demand response programs reduce the need to construct new, expensive generation units. However, according to a Federal Energy Regulatory Commission (FERC or Commission) staff report — *A National Assessment of Demand Response Potential* (National Assessment), submitted to Congress in June 2009 — current demand response programs tap less than a quarter of the total market potential for demand response.<sup>6</sup> Because current efforts have missed a significant portion of the cost-effective demand response potential, it is evident that action needs to be taken to either create new programs or expand existing ones.

FERC staff has worked with stakeholders to develop this *National Action Plan on Demand Response* (National Action Plan), which will recommend actions that could be taken to achieve the demand response potential in the United States. Congress required FERC staff to develop such a plan in the Energy Independence and Security Act (EISA) of 2007.<sup>7</sup> As such, the National Action Plan is intended to be an action plan for the nation, for implementation by states, localities and regions. Although its recommended actions apply to the entire country, the National Action Plan recognizes, as Congress intended, the important role state and local governments play in developing demand response. The coordinated efforts of federal, state, and local lawmakers and regulators are needed to enable achievement of the nation’s demand response potential.

To develop an action plan for the nation, FERC staff and their consultants solicited and accepted input and participation from a broad range of industry stakeholders; local, state and federal governing officials including state regulatory utility commissioners; and non-governmental groups including trade associations. FERC staff conducted extensive outreach to a broad range of entities and used the input to develop *A Discussion Draft on Possible Elements for the National Action Plan*<sup>8</sup> for public comment. A nationally webcast technical conference was held to encourage further input and participation from all interested entities. After the conference, written comments were accepted by the Commission.<sup>9</sup> This draft of the National Action Plan

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<sup>6</sup> *A National Assessment of Demand Response Potential* (June 2009), available at <http://www.ferc.gov/legal/staff-reports/06-09-demand-response.pdf> (Assessment).

<sup>7</sup> Energy Independence and Security Act of 2007, 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).

<sup>8</sup> *Discussion Draft on Possible Elements for the National Action Plan* (Oct. 2008), available at <http://www.ferc.gov/EventCalendar/Files/20091028124306-AD09-10-000-Discussion.pdf> (Discussion Draft).

<sup>9</sup> Docket No. AD09-10.

was prepared after reviewing the many ideas that reflect the diverse views of a broad range of entities. This draft is now being offered for a final round of comments.

This introduction provides an overview of the National Action Plan, the process behind its development, and context for understanding the National Action Plan.

## ***Legislative Mandate***

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Congress required FERC to develop the National Action Plan as the second stage of a three-stage process that is outlined in section 529 of EISA, entitled “Electricity Sector Demand Response.”<sup>10</sup>

The three-stage process began with the National Assessment, which was submitted to Congress in June 2009. The National Assessment evaluated the national- and state-level potential for demand response that can be achieved within five and 10 years.<sup>11</sup> Additionally, the National Assessment identified barriers that have limited the deployment of demand response. The National Assessment also included specific policy recommendations that, if implemented, could overcome these barriers.

In the second stage, FERC is following Congressional direction to develop the National Action Plan. This document is designed to meet three objectives:

1. Identify 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 identify requirements for implementation of a national communications program that includes broad-based customer education and support.
3. Develop or identify analytical tools, information, model regulatory provisions, model contracts, and other support materials for use by customers, states, utilities, and demand response providers.

In the third stage, which will commence once the National Action Plan has been developed, EISA requires “the Commission, together with the Secretary of Energy” to submit a proposal to implement the National Action Plan to Congress. EISA requires the implementation proposal to “include specific proposed assignments of responsibility, proposed budget amounts, and any agreements secured for participation from state and other participants.”<sup>12</sup>

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<sup>10</sup> EISA section 529.

<sup>11</sup> National Assessment, *supra* note 5.

<sup>12</sup> EISA section 529(c).

## ***Background on Demand Response***

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### Defining Demand Response

Before discussing the recommended actions of the National Action Plan, it is necessary to define the term “demand response,” as it is used here.

The Commission uses “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.”<sup>13</sup>

Demand response can be both dispatchable and non-dispatchable. “Dispatchable demand response” refers to planned changes in consumption that the customer agrees to make in response to direction from someone other than 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 reduce demand when directed for either reliability or economic reasons. This direction to reduce load can be in response to acceptance of the consumer’s bid to sell its demand reduction at a price in an organized market (a wholesale price-responsive demand response) or 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 document, 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, 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 utility, 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

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<sup>13</sup> 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)).

the smart integration of changeable consumption with variable generation to enable the addition of new technologies (such as wind farms and rooftop 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 manage power flows into and out of energy storage devices such as plug-in hybrid electric vehicle (PHEV) 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 enabled through the use of time-of-use rates<sup>14</sup> that encourage nighttime charging of home energy storage systems, PHEVs, and all-electric vehicles.

## The Geography of Demand Response

To understand the objectives of the National Action Plan, it is useful to review the current state of demand response in the United States and identify the regions where there are opportunities for growth. Such information is contained in the National Assessment, which found that existing demand response programs in the United States have the capacity to offset 4 percent of current U.S. peak demand.<sup>15</sup> The existing programs are mostly reliability-driven programs — e.g., direct control of end-use loads such as residential air conditioning and curtailable and interruptible rates for large commercial and industrial customers.<sup>16</sup> These programs have been in place for decades.

There is considerable geographical variation in the amount of existing demand response. This variation is driven by several factors, including the rate of load growth, the cost of avoided capacity, and the regulatory disposition toward demand-side programs. Some areas, such as California, Florida, and New England, have significant demand response activity; others, such as Alaska, Montana, and Wyoming, have little.<sup>17</sup>

If the current level of demand response is preserved through the next decade, the National Assessment estimates that demand response would shave 38,000 megawatts (MW) off U.S. peak demand in the year 2019.<sup>18</sup> If the existing mix of programs were to expand geographically to include regions that currently have little demand response activity and if customer participation rates in every region were to reach the levels representing today's best industry practices, the potential impact of demand response programs would be significantly higher, reaching 82,000 MW, or 9 percent of U.S. peak demand.<sup>19</sup>

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<sup>14</sup> Time-of-use rates 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 National Assessment as a demand response program. However, they are being included here as an element of the expanded array of opportunities for customers to reduce demand in response to signals.

<sup>15</sup> National Assessment, *supra* note 5, at 27.

<sup>16</sup> FERC Staff, *Assessment of Demand Response and Advanced Metering* (2008), available at <http://www.ferc.gov/legal/staff-reports/12-08-demand-response.pdf>.

<sup>17</sup> National Assessment, *supra* note 5, at 42–44.

<sup>18</sup> *Id.* at 27.

<sup>19</sup> *Id.*

Indeed, an even more diverse approach to demand response might be pursued in the future. In October 2009, the U.S. Department of Energy (DOE) issued 100 awards totaling \$3.4 billion to stimulate the development of the smart grid.<sup>20</sup> The awards, chosen from a list of some 400 proposals, encompass a variety of projects. Some of these projects use demand response based on pricing concepts such as dynamic pricing.

Dynamic pricing has relatively little market penetration today. In 35 of the 50 states (plus the District of Columbia), the National Assessment found that dynamic pricing currently has no impact.<sup>21</sup> Either dynamic pricing rates are not being offered in those states or customer participation rates are too low to produce significant impacts. In 15 states, dynamic pricing is estimated to have an impact of 1 to 2 percent; in one state, it has an impact of 3 percent.<sup>22</sup> However, the National Assessment also found that, with greater inclusion of these price-based demand response programs in the mix of possible options, the total potential for demand response would be far greater. The total potential could range between 14 and 20 percent of peak demand, or 138,000 to 188,000 MW, depending on whether dynamic pricing was deployed on an opt-out basis or a universal basis.<sup>23</sup>

This snapshot of the state of demand response leads to the conclusion that there is a significant gap between today's levels of demand response and the total potential that resides in the full portfolio of cost-effective options. The clear challenge — and opportunity — is to establish a path forward for realizing this potential.

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<sup>20</sup> Office of Electricity Delivery and Energy Reliability at DOE, *Smart Grid Investment Grant Awards*, <http://www.oe.energy.gov/recovery/1249.htm>.

<sup>21</sup> The National Assessment provides a state-level analysis of demand response, including a snapshot of existing programs. See Appendix A of the National Assessment for this information.

<sup>22</sup> National Assessment, *supra* note 5.

<sup>23</sup> *Id.* at 27.

## Sidebar 1: Demand Response in Organized Markets

During the past decade, demand response resources have increased their market share in organized markets. 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.<sup>1</sup> Furthermore, demand response resources may offer operating reserves and regulation service in the New York ISO, participate in the 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 current opportunities for demand response resources to participate in RTO/ISO markets.

As a means of supporting these initiatives, FERC issued Order No. 719 on October 17, 2008. Through this order, 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.<sup>2</sup> Also, unless prohibited by state or local law, Order No. 719 permitted aggregators of retail customers to bid demand response on behalf of retail customers directly into the organized markets.<sup>3</sup>

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.<sup>4</sup> Demand response capacity resources have nearly tripled in the New England ISO and PJM territories, 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.<sup>5</sup> Moreover, permitting aggregators of retail customers 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.

<sup>1</sup> FERC Staff, *Assessment of Demand Response and Advanced Metering*, at 41 (2008), available at <http://www.ferc.gov/legal/staff-reports/12-08-demand-response.pdf>.

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

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

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

<sup>5</sup> *Id.*, at 18.

## ***The Objective of the National Action Plan***

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The National Action Plan aspires to maximize the amount of cost-effective demand response resources that can be developed and deployed in the United States. To achieve this objective, the National Action Plan calls for two simultaneous, compatible paths of action: 1) enabling price-responsive demand response and 2) facilitating market penetration of newly developing “smart grid” technologies and programs.

With respect to the first path, the National Action Plan seeks to identify technical assistance, communications strategies, and other tools to achieve deployment of the maximum amount of price-responsive demand response identified in the National Assessment. The focus of this path is driven by the realization in the Assessment that the greatest potential for peak load reductions is in price-driven demand response, such as retail dynamic pricing rate designs enabled through advanced metering. The success of these programs will require the approval and full partnership of state and local regulators.

With respect to the second path, the National Action Plan sets forth technical assistance, communications strategies, and other tools to be used to develop and deploy emerging smart grid technologies and resources (such as dispatchable and automated demand response) that enable customers to respond to price or other signals. This includes development and deployment of dispatchable demand response as a versatile resource for a variety of applications besides lowering peak demand. Examples include automating demand response during 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 that go beyond those that would be derived from the potential estimates in the National Assessment. Further, these technologies can bring the benefits of demand response to all consumers. They also may be helpful by serving as a bridge or facilitating the transition to some form of retail rate design, such as dynamic pricing, for states that choose that path. Therefore, the National Action Plan proposes to build on the successes of demand response initiatives by developing more dispatchable demand response (dispatchable to price and non-price directions), fostering the full deployment of advanced metering initiatives (AMI) and dynamic pricing, employing competitive market forces to develop more customer demand response, and planning 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 should allow business and other customers to make better choices about consumption, which in turn will allow power markets to work better, lower costs, and benefit the environment.

The National Action Plan is a plan for all parties with a stake in demand response. Stakeholders that have either started to design or already established demand response programs, as well as stakeholders that have an interest in demand response but have not established programs, can

benefit from the National Action Plan. The need to appeal to consumers, states, utilities and a broad range of stakeholders can be met through extensive involvement of these groups throughout the implementation of the National Action Plan.

## ***Process for Developing the National Action Plan***

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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.”<sup>24</sup> Also, the Commission is directed to “seek consensus where possible, and decide on optimum solutions to issues that defy consensus.”<sup>25</sup> As a result, the process for developing the National Action Plan was designed to gather feedback from interested parties and the final document reflects feedback from a broad range of industry stakeholders.

Specifically, development of the National Action Plan consisted of the following steps:

### **1. Review existing literature**

To initiate the research process and avoid duplication of efforts, FERC staff and contractors reviewed the existing literature on demand response, national communications programs, and similar action plans in other areas and industries. The review produced a number of “lessons learned” from these programs. Additionally, this review identified a number of research gaps that have become the focus of some of the specific elements of the National Action Plan.

### **2. Conduct stakeholder outreach**

In summer 2008, FERC staff initiated a year-long informal outreach effort involving a diverse group of stakeholders on possible elements of the National Action Plan that would meet the objectives of EISA. This outreach effort consisted of informal interviews with regulators, utilities, consumers, trade organizations, and other stakeholders. The feedback that was received through these efforts contributed to the Discussion Draft.

### **3. Develop the Discussion Draft**

This document contained an overarching strategy for the National Action Plan, centered on the creation of a Coalition of stakeholders to steer the effort forward. It also discussed a wide range of possible tactical elements that could be included in the National Action Plan. The Discussion Draft was designed to provide concrete ideas and information to which the various stakeholders could react and provide additional comments. It was made available for public comment when it was posted on the FERC website on October 28, 2009.

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<sup>24</sup> EISA section 529.

<sup>25</sup> *Id.*



#### 4. Hold a technical conference

As another means for gathering feedback on the Discussion Draft, FERC staff held a technical conference on November 19–20 in Washington, D.C. The first day of the conference consisted of two panel sessions. A dozen speakers drawn from different facets of the demand response community, including state regulatory utility commissioners and non-governmental groups, presented their views on the Discussion Draft. The next day, three breakout sessions (moderated by FERC staff) were held on specific elements of the Discussion Draft. The conference closed with a plenary session in which summaries of the breakout sessions were presented. The panel presentations and a summary discussion of the breakout sessions were publicly broadcast over the Internet.<sup>26</sup>

#### 5. Gather written comments

In addition to providing feedback at the technical conference, interested parties were encouraged to provide written comments. They filed comments reflecting many points of agreement and some differing opinions.<sup>27</sup> The comments are summarized under “Overview of Stakeholder Feedback” below. Appendix 4 lists the organizations who commented during the technical conference or through written comments.

All of these activities contributed to the development of the National Action Plan. To further elicit stakeholder feedback, FERC seeks comment on this draft of the National Action Plan. These comments will be considered in developing the final National Action Plan to be published in June 2010.

### ***Overview of Stakeholder Feedback***

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With few exceptions, comments were generally supportive as to the appropriateness and effectiveness of the strategies and activities described in the Discussion Draft. There also appeared to be broad support for the development of a Coalition to implement the national action plan. Many comments suggested that this Coalition leverage the experience of existing organizations and coalitions. They also recommended that the initiatives it implements allow individual states and local regions enough flexibility to tailor demand response programs and messages to suit the needs of their customers.

Commenters also supported the proposal to establish a national forum to develop a national message regarding the benefits of demand response. Most concerns about establishing a national forum focused on funding. To encourage broad participation, commenters suggested that the Coalition offer federal grants to offset travel expenses and also consider hosting the national forum in tandem with an existing event such as a meeting of the National Association of Regulatory Utility Commissioners. There was also broad support for the development of

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<sup>26</sup> A transcript of this conference, along with materials provided by speakers, is available on the FERC website at <http://www.ferc.gov/industries/electric/indus-act/demand-response.asp>.

<sup>27</sup> These comments are available in Docket No. AD09-10, which is the docket for the National Action Plan on Demand Response.

regional workshops to encourage the participation of local policymakers and stakeholders and to tailor demand response education to their needs.

There appeared to be broad support for the development of technical assistance to states. Commenters generally supported the development of informational and educational sessions for policymakers and demand response providers. Commenters also supported the creation of a panel of demand response experts to be available as a resource for state and local governing officials during policy development or regulatory proceedings and a clearinghouse of technical research to increased awareness of existing demand response experiences and their reported benefits and lessons learned to facilitate development of demand response programs. Subject to available funding, comments reflected broad support for the establishment of a demand response grant program.

Comments reflected support for the proposal to develop a national communication campaign to communicate opportunities and benefits of demand response to consumers. However, many comments suggested that the Coalition should not develop a single national message. Instead, commenters recommended that the Coalition create a broad, flexible message that could complement existing efforts by states and regional and local entities to educate consumers.

As a first step in developing a communications campaign, comments supported the performance of foundational market research to assess the needs of specific states and regions. A few comments supported the development of a message targeted for commercial and industrial customers. Commenters were split as to the appropriateness of developing a new demand response brand. Their principal concern seemed to be developing a message that would resonate with consumers in individual localities, states and regions. Comments generally supported coordinating efforts with existing energy conservation and efficiency programs. They also supported dissemination of communications assistance and toolkits to policymakers and stakeholders.

Comments reflected broad support for the development of demand response estimation tools and methods. Commenters appeared most interested in the development of measurement and verification tools to allow utilities to apply consistent formulas for calculating baselines, peak-load reductions, and demand response savings. There was some support for developing standards and protocols for demand response, but commenters urged that these standards and protocols be flexible enough for states to incorporate into existing programs. Commenters suggested that the North American Energy Standards Board and the National Institute of Standards and Technology, among others, would be qualified to develop these tools and the associated standards and protocols. Commenters also supported development of guidelines on rate design for dynamic pricing as long as such programs do not interfere with existing competitive alternatives such as interruptible load.

## ***Structure of the National Action Plan***

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The rest of the National Action Plan is divided into two main parts.

Part 1 provides an overview of the strategic vision of the National Action Plan. It begins with a description of the Coalition-based approach that has been recommended as the framework for implementing the elements of the National Action Plan. It then describes basic principles of establishing and funding the Coalition. Finally, Part 1 presents case studies of how the Coalition approach has succeeded in other applications.

Part 2 outlines the recommended actions of the National Action Plan. These policy actions are organized into three categories: technical assistance to states, the national communications program, and develop or identify tools and materials for use by customers, states and demand response providers.



# Part 1: Strategic Vision of the National Action Plan

## ***1.1 The Coalition***

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This National Action Plan recommends the formation of a Coalition to assist the federal government in implementing the National Action Plan. Coalitions represent a way to harness the collective energy of a variety of individual organizations, yielding outcomes that have greater reach and depth than those organizations would achieve on their own.

FERC received many comments in favor of the involvement of a Coalition in implementing the National Action Plan. Additional recommendations included ensuring that consumers and other organizations involved in either electricity generation or use are represented in the Coalition, that the Coalition's role be clear, and that existing coalitions be included and utilized and work not duplicated. Comments opposed to the Coalition stemmed from concern that consumers may not be adequately represented or that the Coalition could usurp local entities' work in communicating with customers. These comments have been addressed below.

### Why Should a Coalition Be Involved in Implementing the National Action Plan?

The process of generating electricity and delivering it to end-use customers is complex, varies by locality, state, and region, and involves many different actors and interests. Likewise, how demand response is used today also varies greatly by locality, state, and region. These differences should be acknowledged so that the framework of the National Action Plan is inclusive and can be tailored to each locality, state and region.

Encouraging the participation of local, state, and federal government actors as well as utilities, RTOs, ISOs, and customers (both industrial and end-use customers) will help ensure that the Plan reflects regional differences and taps into the expertise and experience of various groups. A Coalition will give these stakeholders an opportunity to work together and build support for a comprehensive national strategy and ensure its success.

## Who Should Be Involved?

For the effort to be a success, the Coalition should be composed of volunteers from:

- Federal, state, and local governments
- Utilities, load-serving entities and other demand response providers
- RTOs/ISOs
- Commercial and industrial customers
- Consumer advocates
- Interest groups and other stakeholders

Table 1 describes the Coalition’s participants in more detail. Figures 1 and 2 show the role of these participants and their potential interactions under two proposed scenarios.

**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 (federal, state, and local), industry (utilities, load-serving entities, other demand response providers, wholesalers, vendors), consumer groups/consumer advocates, and nonprofit foundations.
State and local governing officials	Includes governors, state energy offices, public utility 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, municipal utilities, and other demand response providers.
Other stakeholders	Product and service providers (hardware, software, program administration/implementation, measurement and verification, networking and communications), consumer advocates, consumer groups, residential customers and small medium and large commercial and industrial customers, foundations (nonprofits, non-government organizations), the renewable industry, the electric vehicle interests, consumer products interests, and others.

## What Elements Make a Coalition Successful?

There are many factors that help a Coalition succeed:

1. **Clear goals.** The Coalition members need to have a clear understanding and agreement on the goals they are trying to meet.

2. **A clear organizational structure.** Members of the Coalition need to understand how decisions are made, how work will be completed, and how accountability for achieving the goals of the organization will be measured.
3. **Good leadership.** An effective Coalition is composed of effective volunteers and, depending on the nature of the work, strong staff or consultants who provide assistance and direction to help the volunteers achieve their goals.
  - a. **Effective volunteers:** First and foremost, stakeholder members should be cooperative and support the Coalition’s goals. These members should be leaders who are empowered to make decisions for their respective organizations. They must also have time to commit to the duties of the Coalition.<sup>28</sup>
  - b. **Effective volunteer leaders:** A smaller subset of stakeholders who are dedicated to the work of the Coalition and well-versed in working with other volunteers can provide leadership and vision to the overall organization.
  - c. **Strong staff:** Given that stakeholders will be volunteering their time in support of the Coalition’s goals, it will be important to have staff or consultants who could help facilitate the work to accomplish the organization’s goals. It is also important that staff (and consultants, as needed) be able to manage a diverse range of opinions and help facilitate the work of the volunteer leaders.
4. **Clear funding structure.** To achieve its goals in a timely fashion, the Coalition must have a budget commensurate with its goals and the ability to spend it as needed.

## How Should the Coalition Be Established?

In the development of the implementation proposal to be submitted to Congress the Coalition could be established under a number of different scenarios. FERC staff proposes that the federal government should lead and fund implementation of the National Action Plan with assistance from a panel of Coalition members. This panel would consist of volunteer leaders from individual companies, organizations, and state and local governments who could provide advice, strategic insights and expertise. As discussed here, the Coalition will be funded by non-federal sources. However after the Coalition is a legal entity, it would potentially be eligible to obtain funding for some Coalition meetings or activities from the federal agency consistent with funding availability and relevant legal restrictions.

The federal agency would fund and the agency’s staff would manage the implementation of the National Action Plan. It would be tasked with making strategic and day-to-day decisions such as setting priorities and managing the budget. To ensure accountability, short-term, mid-term, and long-term goals would be established by the federal agency staff with assistance from the Coalition on achievable goals.

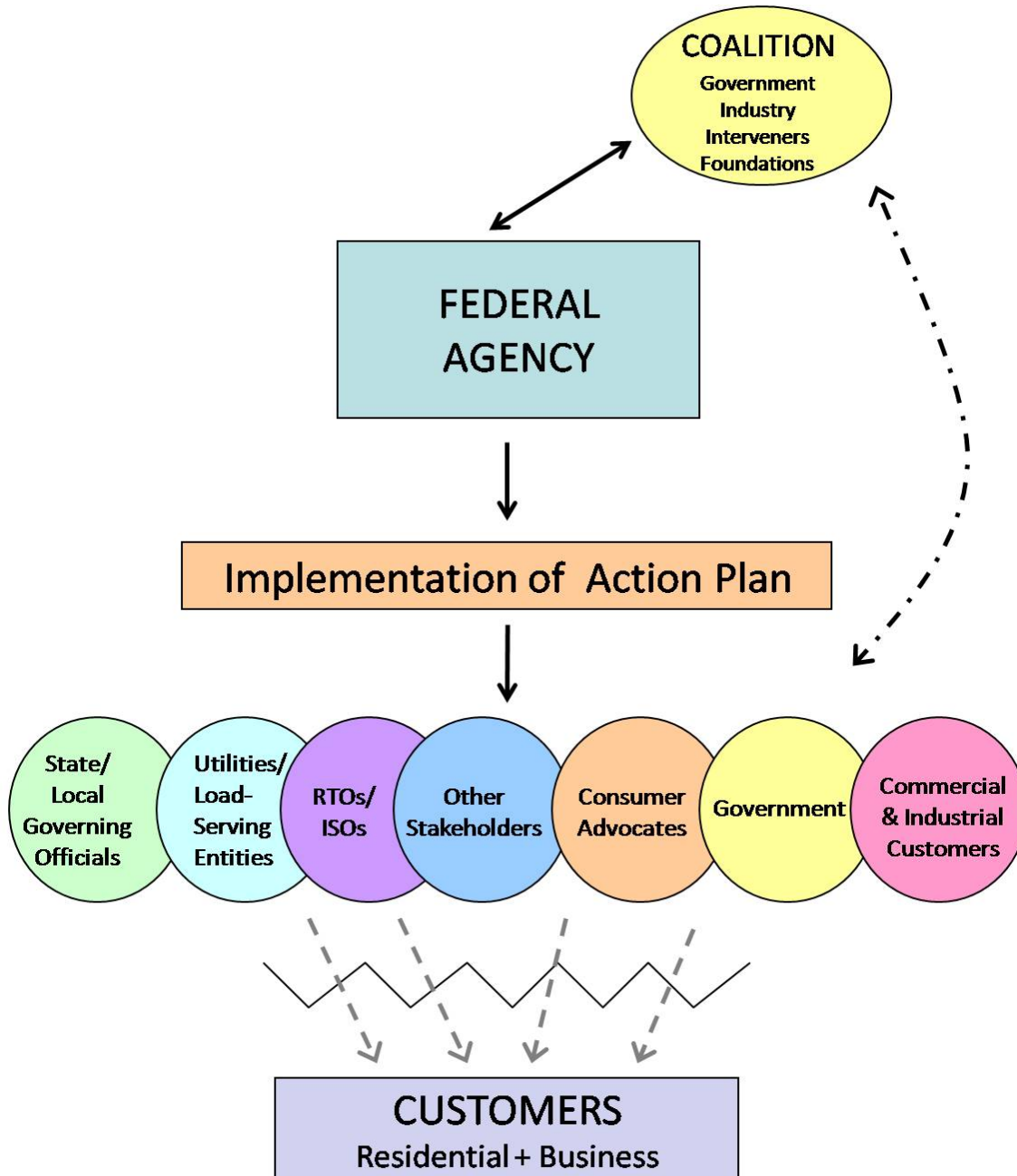
The federal agency implementing the National Action Plan would provide a strong level of engagement and drive, as well as funding. Stakeholders, as represented by Coalition panel

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<sup>28</sup> Larry Cohen et al., *Developing Effective Coalitions: An Eight Step Guide*, in *Community Health Education & Promotion: A Guide to Program Design and Evaluation*, 144-161 (Mary Ellen Wurzbach ed., 2d ed. 2002).

members, would have a voice in the process and would be able to provide the federal agency the benefit of their expertise.

Figure 1 shows the structure of the National Action Plan effort.



**Figure 1: National Action Plan Structure**

Figure 1 above illustrates how the federal government and participants in the Coalition would interact to maximize demand response. A Coalition panel would be formed from stakeholders. A federal agency would coordinate creation and operation of the panel. The Coalition would help the federal agency determine how best to shape the activities and the implementation of



the National Action Plan, which would help stakeholders nationwide implement demand response locally with customers. Stakeholders also would communicate with and provide feedback to the Coalition on how they could best maximize demand response.

## **1.2 Examples of the Coalition Approach**

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The use of a Coalition has been successful in other policy areas. Two examples, differing in objectives and approach, illustrate the Coalition approach to communicating the benefits and opportunities for demand response and to developing the methods and tools that states, utilities, demand response providers, and others involved find useful and beneficial to consumers. Appendix 1 contains more information on these two examples.

### **The National Action Plan for Energy Efficiency**

In 2006, a Leadership Group composed 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*.<sup>29</sup> This report is a call to action to increase investment in energy efficiency; it lays out a vision for providing experts and resource materials to parties who are interested in pursuing energy efficiency. In 2008, the *National Action Plan for Energy Efficiency* was updated with the *Vision for 2025*,<sup>30</sup> which identifies 10 implementation goals and measures the progress made so far. Recently, the Leadership Group has undertaken further activities regarding the coordination of demand response and energy efficiency that are described in Sidebar 2.

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 U.S. Environmental Protection Agency (EPA) participation in the Leadership Group is limited to facilitation. As of January 2010, more than 120 organizations have endorsed the *National Action Plan for Energy Efficiency* 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 and Seat Belt Safety Campaign, a coalition of automobile manufacturers, insurance companies, 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

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<sup>29</sup> National Action Plan for Energy Efficiency, *National Action Plan for Energy Efficiency* (2006), available at [http://www.epa.gov/cleanenergy/documents/napee/napee\\_report.pdf](http://www.epa.gov/cleanenergy/documents/napee/napee_report.pdf).

<sup>30</sup> National Action Plan for Energy Efficiency, *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>.

stagnant nationwide seat belt use.<sup>31</sup> 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 also provided media and organizational outreach materials to states and communities so they were well-prepared to serve as spokespeople for the effort even if they were not demonstration program states.

As a result of the Air Bag and Seat Belt Safety Campaign’s work in demonstration states and then nationwide, 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.<sup>32</sup> Child fatalities from traffic crashes dropped by 20 percent, and proper restraint use among toddlers jumped dramatically from 60 to 94 percent.<sup>33</sup>

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<sup>31</sup> For more information about the Air Bag and Seat Belt Safety Campaign, visit <http://www2.nsc.org/airbag.htm>. General Motors and the Insurance Institute for Highway Safety provided the primary funding.

<sup>32</sup> National Safety Council, *National Safety Council Honors Air Bag and Seat Belt Safety Campaign for Lifesaving Achievements* (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](http://www.csrwire.com/press/press_release/18157-National-Safety-Council-Honors-Air-Bag-and-Seat-Belt-Safety-Campaign-for-Lifesaving-Achievements).

<sup>33</sup> National Safety Council, *Welcome to the Air Bag & Seat Belt Safety Campaign* (2004), available at <http://www2.nsc.org/airbag.htm>.

## Sidebar 2: Coordination of Energy Efficiency and Demand Response

In support of the ten implementation goals outlined in the *National Action Plan for Energy Efficiency's Vision for 2025*,<sup>1</sup> the National Energy Action Plan for Energy Efficiency, with input from the Leadership Group, released a paper discussing the coordination of energy efficiency and demand response in January 2010.<sup>2</sup> The paper defines energy efficiency as “using less energy to provide the same or improved level of service to the energy consumer in an economically efficient way.”<sup>3</sup> On the other hand, demand response “entails customers changing their normal consumption patterns in response to changes in the price of energy over time or to incentive payments designed to induce lower electricity use when prices are high or system reliability is in jeopardy.”<sup>4</sup> The paper also recognizes that energy efficiency and demand response currently have significant differences in how they are measured, what organizations offer them, how they are delivered to customers, and how they are rewarded in the marketplace. In order to reduce these differences and achieve possible benefits, the paper outlines ways in which energy efficiency and demand response can be coordinated. It discusses the concerns and barriers affecting the coordination of energy efficiency and demand response, and articulates steps that can be taken to achieve better coordination.

Energy efficiency and demand response programs are rarely combined into an integrated program. The paper states that “in December 2009, out of 2,016 U.S. and Canadian energy efficiency, demand response, and load management programs in the E Source database, only 56 were identified as serving both energy efficiency and demand response purposes.”<sup>5</sup> Therefore, one way in which to better coordinate energy efficiency and demand response is to offer combined offerings in the future. Even if energy efficiency and demand response programs are not combined, program sponsors could provide marketing and education on these programs in a more unified way. Furthermore, both private firms, via finding customers interested in reducing their energy costs, and the government, via building codes and appliance standards, can contribute to the simultaneous achievement of energy efficiency and demand response goals.

Nevertheless, the integration of energy efficiency and demand response programs remains a difficult and complex endeavor for several reasons. First, the funding for energy efficiency and demand response can sometimes come from different sources. Second, some energy efficiency managers have expressed reservations about demand response interfering with their programmatic goals. Third, retail rates need to be designed with energy efficiency and demand response objectives in mind, i.e. dynamic or time-varying rates may be best offered with inclining block rates. Finally, it will take time to develop the capabilities of utility staff and contractors in both energy efficiency and demand response.

Many actions can be taken in order to encourage better coordination of energy efficiency and demand response. Examples include clear regulatory signals that encourage utilities and grid operators to coordinate energy efficiency and demand response activities, better articulated demand-side management program goals that target both energy savings (energy efficiency) and peak demand reductions (demand response), and a new set of consumer education activities that simultaneously explicate energy efficiency and demand response benefits.

<sup>1</sup> National Action Plan for Energy Efficiency, supra note 28.

<sup>2</sup> National Action Plan for Energy Efficiency, Coordination of Energy Efficiency and Demand Response (2010) (Prepared by Charles Goldman (Lawrence Berkeley National Laboratory), Michael Reid (E Source), Roger Levy, and Alison Silverstein), available at [www.epa.gov/eeactionplan](http://www.epa.gov/eeactionplan).

<sup>3</sup> *Id.* at ES-1.

<sup>4</sup> *Id.*

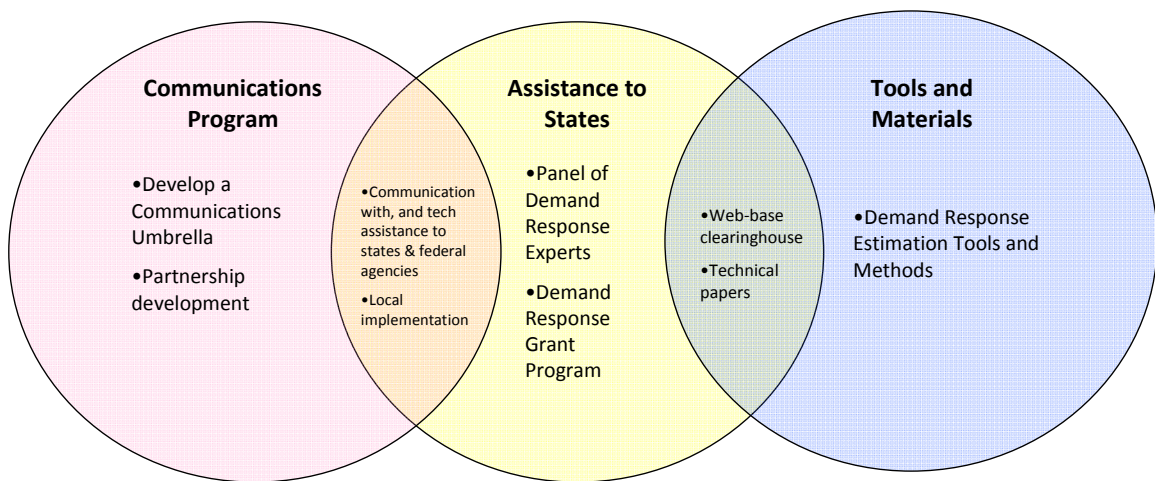
<sup>5</sup> *Id.* at ES-3.



## Part 2: Strategies and Activities

This section sets out a number of strategies and activities that will be pursued through the National Action Plan to fulfill the objectives in EISA section 529.

The activities are organized into three categories: technical assistance to states, the national communications program, and develop or identify tools and materials for use by customers, states and demand response providers. However, there will be significant, inherent overlap between these categories of activity. Requirements for tools and materials can be developed and coordinated at the same time as requirements for technical assistance and the national communications plan. Similarly, providing messages and talking points to states that implement demand response would be a component both of the communications program and of technical assistance to states. For the sake of simplicity, action items are listed under the statutory objective areas that are most closely related to each activity. 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. It should be noted that the degree to which all elements of the National Action Plan are developed is heavily dependent on the level of funding and organization that the Coalition

achieves. The options presented in the following sections could be pursued more or less aggressively than as they are currently described, depending on how these factors unfold in the implementation phase of 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, and technologies, and it also will be applicable to various stages of development and deployment of demand response implementation.

## **2.1 Technical Assistance to States**

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### Introduction

Section 529 of EISA requires that the National Action Plan identify what technical assistance<sup>34</sup> states need to maximize the amount of demand response resources that can be developed and deployed. For the purposes of this National Action Plan, targets for state assistance include governors, state regulators, state energy offices, state legislators, and state consumer advocates. 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 all 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. Therefore, this section’s discussion of most types of technical assistance is geared toward the needs of state and local governing officials.

In many states, a variety of entities are already providing demand response resources. (See Appendix 3 for examples.) 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.<sup>35</sup> In some states, RTOs and ISOs operate organized energy and capacity markets into which demand response can be bid as a resource. Appendix 3 also lists current opportunities for demand response to participate in RTO/ISO markets.

Several states have taken regulatory or legislative actions to encourage demand response and energy efficiency.<sup>36</sup> For example, the Michigan Public Service Commission’s *Michigan’s 21<sup>st</sup>*

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<sup>34</sup> FERC staff defines technical assistance to include, for example, the provision of information, supporting research, funding, and onsite assistance.

<sup>35</sup> Conn. Gen. Stat. § 16a-3a (2008).

<sup>36</sup> For example, see FERC Staff, *2009 Assessment of Demand Response & Advanced Metering*, at 12 (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).

*Century Energy Plan*<sup>37</sup> and the New Jersey Board of Public Utilities' *Energy Master Plan*<sup>38</sup> 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,<sup>39</sup> Maryland's EmPOWER Maryland Energy Efficiency Act of 2009,<sup>40</sup> and Pennsylvania's Act 129<sup>41</sup> 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 to promote energy efficiency.<sup>42</sup> In Iowa, utilities are required to develop energy efficiency programs,<sup>43</sup> which include demand response.<sup>44</sup>

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 increase participation and expand their deployment.<sup>45</sup> However, as discussed at the FERC staff technical conference on November 19–20, 2009, inadequate training, time constraints, and staffing or resource limitations can impede effective implementation and deployment of demand response programs. While wholesale markets are seeing increasing participation by providers of demand response resources, customers who participate in these programs are primarily in the commercial and industrial sectors and represent a relatively small fraction of all retail customers.

Several organizations, such as load-serving entities, RTOs/ISOs, and other demand response providers, are developing ways to enable demand response to be utilized more broadly as a resource in energy, capacity, and ancillary services markets. These novel approaches will also help foster the full deployment of AMI and dynamic pricing. In addition, they will release competitive market forces to 1) develop more customer demand response and 2) plan for the

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<sup>37</sup> JP Lark, *Michigan's 21<sup>st</sup> Century Electric Energy Plan* (2007), available at

[http://www.michigan.gov/documents/mpsc/21stcenturyenergyplan\\_185274\\_7.pdf](http://www.michigan.gov/documents/mpsc/21stcenturyenergyplan_185274_7.pdf).

<sup>38</sup> New Jersey Board of Public Utilities, *New Jersey Energy Master Plan* (2008), available at

[http://www.state.nj.us/emp/docs/pdf/081022\\_emp.pdf](http://www.state.nj.us/emp/docs/pdf/081022_emp.pdf).

<sup>39</sup> 2008 Mass. Acts 50 (amending Mass. Gen. Laws ch. 164B, § 116(a) (2009)).

<sup>40</sup> 2008 Md. Laws 131 (amending MD Code Ann., Pub. Util. Cos. § 7-211(b)(2) (2009)).

<sup>41</sup> 2008 Pa. Laws 129 (amending 66 Pa. Cons. Stat. § 2806.1 (2009)).

<sup>42</sup> S. 39, 67<sup>th</sup> 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.”)

<sup>43</sup> Iowa Code § 476.6.16 (2009). See Iowa Utilities Board, *Energy Efficiency in Iowa's Electric and Natural Gas Sectors*, Report to the Iowa General Assembly (2009); Iowa Utilities Board, *Overview of Energy Efficiency Plans and Programs in Iowa* (2009), [http://www.state.ia.us/government/com/util/energy/energy\\_efficiency.html](http://www.state.ia.us/government/com/util/energy/energy_efficiency.html).

<sup>44</sup> “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).

<sup>45</sup> Several states have already implemented demand response programs, from which useful lessons can be drawn. Appendix 3 discusses specific case studies of demand response programs and policies in various states and regions.

deployment of many innovative demand response applications that create greater consumer control over energy usage and create new cost-saving opportunities for consumers.

### Technical Assistance Actions

Section 529 of EISA requires that the National Action Plan identify the requirements for technical assistance to states. Assistance to other entities — such as utility and non-utility demand response providers and consumers — is discussed in sections 2.2 and 2.3 of this document. The overall goal of technical assistance is to provide high-quality information and research to states. States will use this information to make decisions regarding demand response policy, regulation, and investments.

The actions identified in this section are the result of the outreach and stakeholder processes described above, which included significant input from state agencies themselves. Overall, the actions associated with technical assistance to states in the Discussion Draft received favorable comments. No additional actions were recommended, and no recommendations were made to remove any actions. Most comments during the Discussion Draft process, including the technical conference, focused on how to implement these actions. The key changes recommended in the comments focused on disseminating information and education through online media channels, leveraging the infrastructure of existing organizations to disseminate information and education, and focusing more on regional events than on national events. In light of these comments, the technical assistance actions included in the National Action Plan focus more on disseminating information, providing direct assistance, and leveraging existing efforts.

The technical assistance elements identified below are meant to be complementary, but the lead federal agency, with input from the Coalition, would oversee dissemination of useful information and support to state policymakers. With additional funding, research, and monetary support, the federal agency, with input from the Coalition, would oversee the development, implementation, and evaluation of innovative demand response solutions.

### Establish a National Forum

<b>Purpose</b>	Give federal, state, and local leaders, as well as key stakeholders, a venue to introduce the National Action Plan.
<b>Expected Outcome</b>	Awareness of and support from policymakers for accomplishing the activities identified in the National Action Plan.

As the first step in providing technical assistance, a national forum on demand response would be held for federal agencies, state public utility commissioners, state energy offices, gubernatorial offices, state legislators, state consumer counsels, utilities, and other key stakeholders. A forum of this scale focused on the National Action Plan would provide a useful opportunity for the federal agency, with input from the Coalition, to present the overall vision



of the National Action Plan to key decision-makers on demand response. The national forum also would provide an opportunity to share ideas, examine barriers, and explore solutions.

The forum should be a stand-alone, one-day session, likely in Washington, D.C., or following another national conference (e.g., a meeting of the National Association of Regulatory Utility Commissioners). The forum also could be integrated with an existing third-party forum to leverage existing infrastructure, marketing, and name recognition to attract broad participation. The national forum also could take a blended approach that allows for in-person participation as well as online participation, e.g., webcasting to reach the widest possible audience.

After the initial national forum, and subject to funding availability, the federal agency, with input from the Coalition, would oversee the development of a series of annual meetings. The purpose of these meetings would be to review results that have been achieved, share information on the latest developments in demand response, and continue the provision of targeted assistance to states as needed. If annual meetings are determined to be useful, the locations of these national meetings should rotate between regions (e.g., East Coast, Midwest, West Coast) to foster greater in-person participation. If the forum is held once per year, the ideal time would be in the fall, when the results of summer demand response efforts would be known. The forum should run no longer than two days. Subject to funding availability, the federal agency, with input from the Coalition, would oversee awards of stipends or scholarships — based on a person’s involvement in regional or state education sessions — to encourage in-person participation by offsetting travel costs. In addition, these meetings could be designed as webinars to encourage broad participation.

### Conduct Informational and Educational Sessions for Policymakers and Regulators

<b>Purpose</b>	For state and federal regulators, legislators, and other policymakers to share and learn about the attributes, uses, and benefits of effective demand response and opportunities to implement demand response.
<b>Expected Outcome</b>	State and local governing officials are better prepared to implement demand response.

Following the national forum, multiple regional and state sessions could be held, targeted to a broader set of state employees, regulators, and other stakeholders. Regional and state sessions may be more convenient for other interested retail regulators such as city councils and rural cooperative boards. The objectives of the regional sessions would include those of the national forum but also should seek to coordinate and implement applicable activities proposed in the National Action Plan for the deployment of demand response in the region.

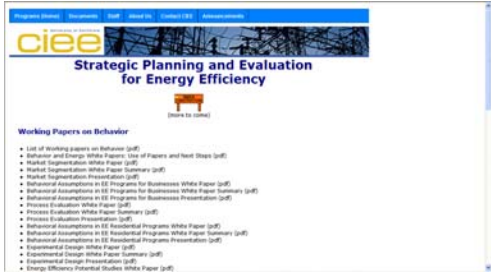

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Regional sessions would allow more targeted discussion and input from state officials and local utilities on demand response issues specific to each region — for example, demand resource participation in wholesale organized markets in regions served by RTOs or ISOs, and use of demand response to meet ancillary service needs associated with integration of renewables. The sessions could address the various services provided by demand response and the associated costs and potential benefits of demand response programs, products, technologies, and incentives to the states and their electric customers. These sessions also could help stakeholders develop strategies for deployment.

It is expected that the informational and educational sessions should promote knowledge and skills related to:

- The various services provided to enable demand response.
- The associated costs and potential benefits of demand response programs.
- Products, technologies, and incentives available to states and their electric customers.
- Strategies for deployment.
- Practical aspects of demand response implementation.
- Just-in-time results and best practices from demand response implementation.
- Relationship of demand response to the smart grid and the deployment of smart meters.

The federal agency, with input from the Coalition, should oversee the recruitment of speakers and facilitators for these sessions. In addition to conducting the workshops, these speakers and facilitators should be responsible for developing workshop materials and customizing these materials to address specific regional and state issues.

<b>Examples</b>	
	<p><b>California Public Utilities Commission (CPUC) and California Institute for Energy and Environment</b></p> <p>CPUC and the California Institute for Energy and Environment have developed a series of white papers on various behavioral topics and conducted two-hour webinars to present the papers and discuss the results. CPUC funds the working papers and the Institute selects the experts to prepare and present the papers. Papers and presentations are then posted to the Institute’s website.</p> <p><a href="http://uc-ciee.org/energyeff/energyeff.html">http://uc-ciee.org/energyeff/energyeff.html</a></p>
	<p><b>National Regulatory Research Institute</b></p> <p>The National Regulatory Research Institute provides education sessions for various topics, such as smart grid issues and dynamic pricing. Slide decks and information related to these presentations are posted to their website.</p> <p><a href="http://www.nrri2.org/">http://www.nrri2.org/</a></p>

## Conduct Communications Training for State and Local Governing Officials

<b>Purpose</b>	Educate state and local governing officials on how to communicate with customers about demand response.
<b>Expected Outcome</b>	Enhanced knowledge and skills on the best means to communicate with customers and stakeholders about demand response benefits, economics, markets, and legislative initiatives.

Communications training programs or meetings should be provided to state and local governing officials, possibly as a part of regional workshops. This communications training is described in greater detail in section 2.2. Such training would offer an opportunity to 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.

<i>Example</i>	
	<p><b>Covering Kids &amp; Families</b></p> <p>As a part of the Robert Wood Johnson Foundation’s “Covering Kids &amp; 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 levels to advocate on behalf of children’s health coverage. The 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.</p>

## Build a Panel of Demand Response Experts

<b>Purpose</b>	Deliver lectures on and generate interest in demand response social and technical topics at national and regional conferences; consult on demand response programs and projects.
<b>Expected Outcome</b>	Enhanced knowledge, skills, and attitudes of stakeholders regarding demand response programs, technologies, markets, statutes and/or ordinances, benefits, and economics.

Through this action, the federal agency, with input from the Coalition, would oversee the recruitment of experts to help inform various constituencies about demand response programs, products, technologies, and incentives and their benefits. These experts could be available as contacts for state and local governing officials during policy development or regulatory proceedings.

The federal agency, with input from the Coalition, would oversee the development of a model and a process to populate and manage a panel (or directory) of demand response experts. One means to manage this panel would be through a web-searchable database through which states and other entities could identify a short list of experts for a specific topic. For example, a user could use this database to find someone with expertise related to customer education for small/medium commercial entities, or to find someone with expertise related to automated demand response in aluminum manufacturing facilities.

The initial panel of experts could be developed by soliciting recommendations from the federal agency as well as Coalition members, and by identifying experts who have spoken at industry conferences and published in relevant journals. Additional experts could then be identified through recommendations from existing panelists. All experts would need to disclose conflicts of interest, which is a best practice found in healthcare-oriented conferences and coalitions such as the American Public Health Association. To encourage freedom of expression and diversity of thought, the messages communicated by experts should flow freely. Therefore, the views presented by these experts should not be construed to represent the opinion or policy of the federal agency or the Coalition.

The panel of experts could serve as a resource for state and local government officials as they consider demand response programs. The experts should provide information about the types of demand response programs and assist state and local government officials in assessing demand response. In addition, experts could be speakers at events. The Coalition could provide speakers through both “push” and “pull” methods. Push methods involve the federal agency Coalition members proactively recommending a panelist to participate in an event. Pull methods reflect states or entities in need of panelists for events searching the panelist database themselves to identify experts for speaking engagements, or asking the Coalition to recommend an appropriate expert. Regardless of the method, the entity sponsoring an event in which a panelist will participate would be responsible for selecting the appropriate panelists for their event.

## Sponsor Technical Papers

<b>Purpose</b>	Generate new knowledge or synthesize existing knowledge to inform the design of demand response programs, products, technologies, incentives, markets, and legislation.
<b>Expected Outcome</b>	Peer-reviewed or similar-quality papers and their distribution through an online database with clear summaries/abstracts.

Technical knowledge about demand response is underdeveloped, underfunded, limited in scope, decentralized, disorganized, and in some cases proprietary and thus hidden from public view. There exists no peer-reviewed journal for demand response research, no online database of demand response research citations, and no shared agenda and prioritization for ongoing demand response research. Published research is generally limited to trade press (such as *The Electricity Journal* and *Public Utilities Fortnightly*), reports independently developed by utilities and research organizations, and peer-reviewed journals that are not specifically dedicated to demand-side issues (such as *Energy*, *Energy Economics*, *Energy Policy*, *The Energy Journal*, *The Journal of Regulatory Economics*, and *Utilities Policy*). Some state organizations such as the California Energy Commission’s Research, Development, and Demonstration Division (formerly PIER) set research agendas, solicit proposals, and award funding (collected from public interest funds) for research.

To promote the development of technical knowledge about demand response, the federal agency, with input from the Coalition, would oversee the development of a series of informational, technical, research, or policy papers targeted to various practical aspects of demand response implementation. These papers should be disseminated through the clearinghouse discussed below in section 2.3. Overall, the primary purpose of the technical papers would be to highlight and address questions that require new research to address barriers to demand response.

Though the federal agency would oversee the development of this research, neither the federal agency nor the Coalition should perform this research. Rather, the primary role for the Coalition should be to assist the federal agency in developing and prioritizing topics of interest. Subject to funding availability, the federal agency, with help from the Coalition, also could solicit research proposals from national laboratories, academic institutions, utilities, independent researchers, consultants, and other entities; and then award funding to proposals that have merit. Proposal solicitation should embrace both primary (original) research and secondary (meta-analysis-type) research, with an emphasis on the latter to bring forward existing proprietary research commissioned by utilities. Subject to funding, the federal agency, with input from the Coalition, should oversee the review of proposals and funding of grants possibly in partnership with an organization already involved in this type of work, such as a university or national laboratory. There also could be crossover between a demand response research agenda and an energy efficiency research agenda (for example, in the social-behavioral area), so there should be an attempt to align research with these other areas.

In developing a list of possible areas for further research, some potential resource and research gaps have been identified. To fill these resource and research gaps, research topics are listed in Appendix 2, where they are organized by whether the research topic relates more to social science<sup>46</sup> research or technical issues. The federal agency, with input from the Coalition, should oversee the prioritization of topics, identification of additional topics, and selection of a subset as candidates for further research.

### Establish a Program for Technical Assistance for Demand Response

<b>Purpose</b>	Provide support to states for implementing demand response.
<b>Expected Outcome</b>	Demand response expertise is provided to states requesting assistance in the development and deployment of any and all forms of demand response.

The provision of research and technical support in response to requests is a core activity in any effort to provide technical assistance to states. The DOE has provided federal support for this type of technical assistance for many years. As part of their support, DOE supports research and technical assistance activities to ISOs, utilities, and state and regional policymakers that support and enhance the development of demand response programs, technologies, services infrastructure, and dynamic pricing tariffs.

This activity involves establishing a program under which qualifying state agencies (e.g., state regulatory commissions or state energy offices), consumer advocacy groups, and utilities may apply for specific virtual or on-site technical assistance with demand response implementation. Subject to available funding, the federal government, with input from the Coalition, could oversee the provision of appropriate technical assistance to stakeholders. The nature of this assistance could range from referring a caller to a website, to providing the applicable reference material, or to providing on-site technical help (for a day, a week, or longer). Depending upon the nature of the services requested, experts may provide assistance through a variety of compensation approaches (fee, barter, or professional requirements such as pro bono in the legal field). This program should be coordinated with ongoing DOE technical assistance programs.

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.

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<sup>46</sup> 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.

- 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 specializing in demand response communications and marketing.
- Other knowledgeable individuals.

### Establish a Demand Response Grant Program

<b>Purpose</b>	Provide funding for demand response innovations (subject to available funding).
<b>Expected Outcome</b>	Innovative solutions to demand response problems.

Some states provide grants through regulatory entities — for example, the California Energy Commission’s Research, Development, and Demonstration Division (which administers \$83.5 million in public interest energy research funds). However, many states are not structured for distributing grants. In addition, demand response related topics are not the focus of existing funding vehicles, such as DOE’s Small Business Innovation Research (SBIR) grants, which does not include in its technical list topics related to demand response.<sup>47</sup> In contrast, the American Reinvestment and Recovery Act<sup>48</sup> has awarded \$3.4 billion for smart grid investments (and other awards for demonstration projects which together add up to \$4.5 billion), which include demand response programs.



In recognition of these challenges, and subject to funding availability, the federal agency, with input from the Coalition, could oversee a national demand response grant program.<sup>49</sup> The purpose of the demand response grant program would be to fund the development, testing through pilots, implementation, and evaluation of demand response innovations. Because innovations can emerge from a variety of sources, any legal entity, public or private, should be eligible to apply for a grant. The federal agency, with Coalition input, should oversee the grant review process, in alignment with the DOE programs already in existence, including recruiting qualified people to serve as reviewers. Reviewers could evaluate and score grants based upon criteria established by the Coalition. The criteria should favor programs, products, services, and technologies that have the potential for maximum, sustained deployment of cost-effective demand response. Other criteria could include significant potential as established by scientific evidence, work in untested areas with strong potential, compliance with existing standards, and novel demand response applications that address climate change issues.

<sup>47</sup> For more information about DOE’s Small Business Innovation Research and Small Business Technology Transfer Programs Technical Topic Descriptions, visit [http://www.sc.doe.gov/sbir/Solicitations/FY%202010/Table\\_of\\_contents\\_sub.htm](http://www.sc.doe.gov/sbir/Solicitations/FY%202010/Table_of_contents_sub.htm) (last visited Feb. 16, 2010).

<sup>48</sup> Pub. L. 111-5, 123 Stat. 115 (2009).

<sup>49</sup> This grant program could either be a stand-alone program or be developed within the existing ARRA grant program.

Once grant winners are announced, an entity that has an existing grants administration infrastructure, working in conjunction with the Coalition or a national laboratory, should oversee the relationship with the grantee, from award to final report. The grant program should be subject to Congressional authorization.

<b>Examples</b>	
	<p><b>DOE’s SBIR/STTR Program</b></p> <p>Each year (typically around the beginning of October), DOE issues a solicitation inviting small businesses to apply for SBIR/STTR Phase I grants. This program covers technical topics in such research areas as energy production (fossil, nuclear, renewable, and fusion energy), energy use (in buildings, vehicles, and industry), fundamental energy sciences (materials, life, environmental, and computational sciences and nuclear and high energy physics), environmental management, and nuclear nonproliferation. Grant applications submitted by small businesses must respond to a specific topic and subtopic during an open solicitation.</p> <p><a href="http://www.er.doe.gov/sbir/">http://www.er.doe.gov/sbir/</a></p>
	<p><b>California Energy Commission</b></p> <p>The California Energy Commission's Research Development and Demonstration (RD&amp;D) Division supports public interest energy research, development, and demonstration. RD&amp;D activities include providing contracts and grants for research and development of energy technologies and related scientific activities.</p> <p>The RD&amp;D Division administers a total of \$83.5 million in public interest energy research funds annually — \$62.5 million for electricity and \$21 million for natural gas.</p> <p><a href="http://www.energy.ca.gov/research/index.html">http://www.energy.ca.gov/research/index.html</a></p>

## 2.2 National Communications Program

### Introduction

Section 529 of EISA requires that the National Action Plan on Demand Response design and identify requirements for implementation of a national communications program that includes broad-based customer education and support. This section describes the design of, and identifies the requirements for, a national communications program that includes three elements: a Communications Umbrella, local implementation, and direct outreach to states, policymakers, and national partners.

A national communications program should be multi-faceted to facilitate widespread acceptance and implementation of demand response to achieve the highest potential peak load reduction identified in the National Assessment. To account for the various approaches undertaken and considered for demand response implementation by states and localities, a national communications program also must be highly adaptable and scalable to individual



states, utilities, load-serving entities, and other demand response providers. Simultaneously, the program would benefit from the coordinated research and insight that only a nationwide program can provide. It must not dictate a single message, which may not apply to all customers or electricity stakeholders; instead, it should provide a framework of messages that universally appeals to customers, but which can be employed in part or whole — as deemed appropriate by local demand response implementers — to each region, state or locality.

Accordingly, this national communications plan provides the roadmap for a communications program that will educate residential, commercial, and industrial electricity customers, and support those customers as well as electricity providers, regulators, policymakers, and all others involved in implementing demand response programs. Designing the plan as a flexible roadmap for the national communications program enables communications around a variety of applications. These applications include incorporating price responsive demand, 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 renewable resources.

This plan for a national communications program reflects the input of a broad range of industry stakeholders received through extensive outreach, a staff technical conference, and formally filed comments in response to the Discussion Draft for this National Action Plan. In their comments, many stakeholders strongly supported local implementation of the national communications program and stated that the federal government, or a national organization, should not communicate directly with residential and small commercial customers about demand response. These stakeholders believed that states, load-serving entities, utilities, and other demand response providers are best positioned to communicate directly with customers. In response to this advice, this section has been revised to clarify that the federal agency, with input from the Coalition, would support local implementation through oversight of the development of research-based messages, communications tools, and case studies for interested local demand response implementers<sup>50</sup> to use in their own communications with customers. Stakeholders largely supported conducting foundational customer research as a critical first step in the national communications program, but many recommended that the national communications program should first compile and examine existing market research. A new step, compiling case studies, has been added in response. Stakeholders supported providing communications assistance to states and policymakers, and developing communications toolkit materials for local demand response implementers, so these sections have been expanded and elaborated upon accordingly.

The multi-faceted structure of the national communications program would mean that it would develop and support communications through multiple channels and media to communicate as

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<sup>50</sup> Local demand response implementers are entities, such as state or local governing officials, utilities, load-serving entities, and other demand response providers, interested in providing demand response programs, services, rates, incentives, etc. at a local level.

appropriate with the many audiences for demand response. The national communications program would provide broad-based customer education and support through coordinated national and local action. At the national level, the program would develop a Communications Umbrella to provide the research-based message framework, communications tools, support and advice, as requested, to local demand response implementers.

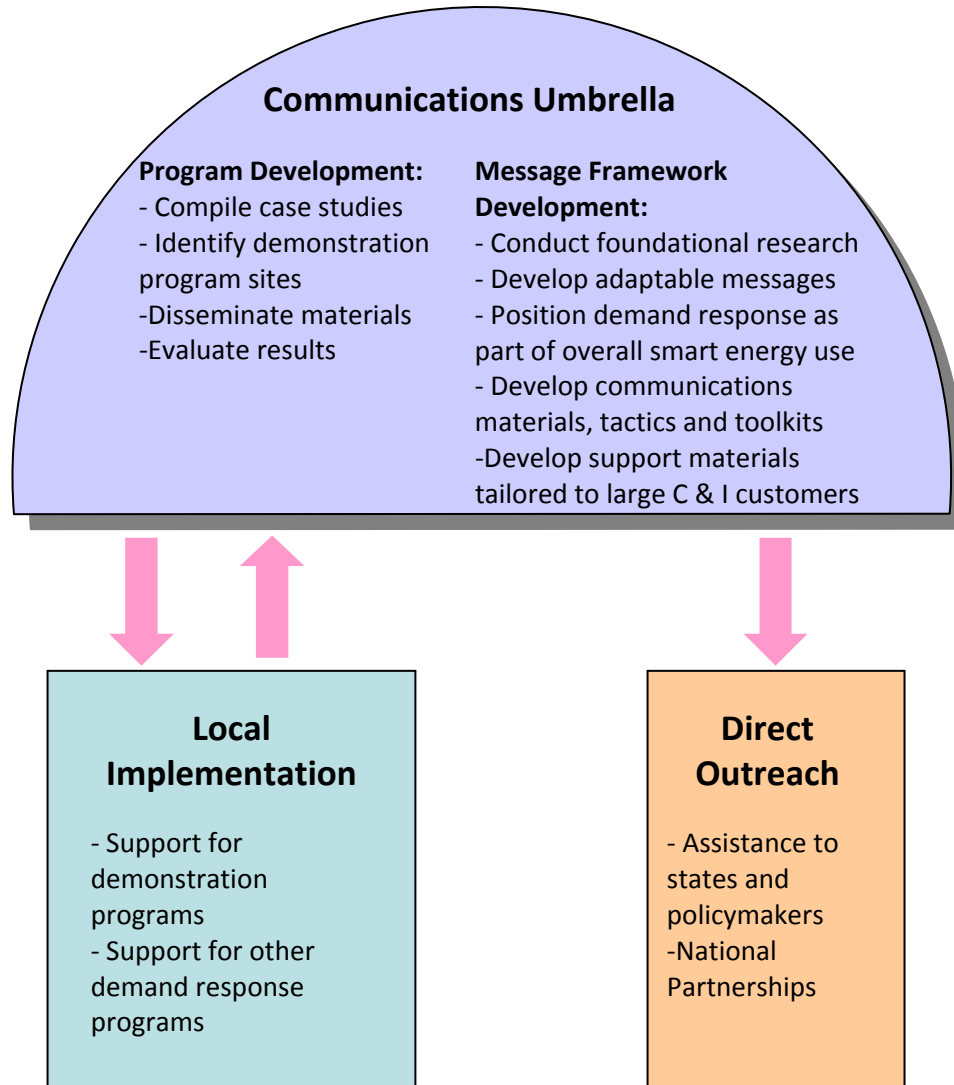
In addition, the federal agency, with input from the Coalition, would oversee direct outreach at the national level to states, policymakers, and national partners to build support for demand response. By communicating with states, policymakers, and national partners, the national communications program would help build support for demand response in areas where there are no existing demand response programs or current plans to implement such programs.

At the local level, the national communications program would include an implementation strategy to inform residential and commercial customers about the availability and possible benefits of demand response programs, products, technologies, and incentives. Interested local demand response implementers would use the research-based message framework and communications tools and tactics developed at the national level to tailor messages and materials to conduct outreach to their particular customers. Local implementation includes demand response provided in regional RTO/ISO markets, states and localities. The local implementation strategy would have two components, a demonstration program approach and support for other demand response programs. Under the demonstration program approach, local demand response implementers could volunteer to participate as demonstration programs to receive “hands-on” implementation message support and tactical advice. The demonstration programs could thereafter serve as successful program models or case studies that could then further inform the national message framework.

The other component of local implementation would be support for other demand response programs. Local demand response implementers would not need to participate as demonstration programs to utilize resources developed at the national level. Local stakeholders who wish to take a more autonomous approach to demand response implementation, using only certain communications tools or resources as they determine appropriate, would fall into this category. All local demand response implementers could access available toolkit materials to supplement their demand response efforts. As discussed later in this section, these materials would be customizable so that implementers could modify and tailor them to meet their particular needs and achieve their specific objectives. By targeting the program at the local, regional, and state levels, the communications messages would be more effective, and feedback on what works best could be used to influence the national effort.

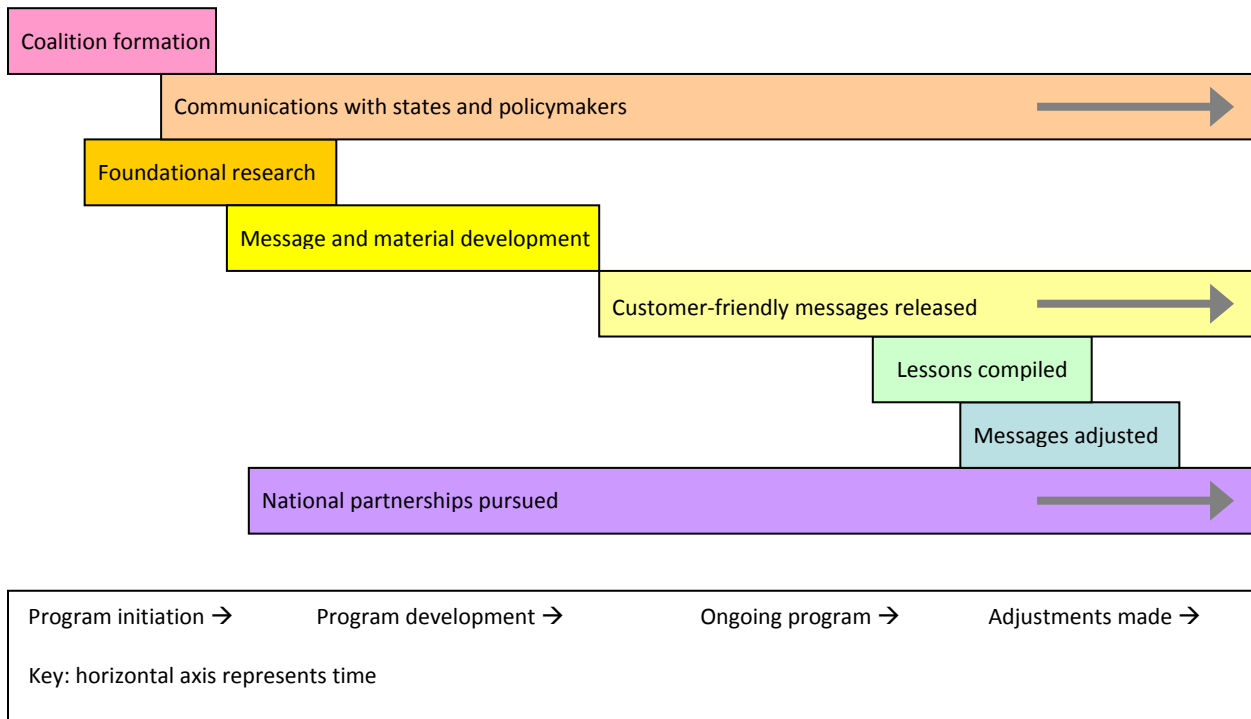
Figure 3 shows the proposed national communications program structure, outlining the program and message development tasks to be overseen by the federal agency with input from the Coalition in the Communications Umbrella. The research and messages developed in the Communications Umbrella would then be used to 1) support local demand response implementers involved in demonstration programs and other demand response programs and

2) reach out to states, policymakers and national partners to educate them about demand response. Later in this section, the structure and elements of the national communications program are discussed more extensively.



**Figure 3: Program Structure**

Figure 4 shows the approximate sequence in which major tasks would be undertaken, indicating the overlap between some tasks and the ongoing nature of many. The diagram indicates that certain tasks, such as communications with states and policymakers, would occur over a long duration, while other tasks, such as foundational customer research and message development, would be more limited in duration in the initial stages (though possibly repeated at a later time if warranted). Multiple tasks would occur concurrently based both on their priority level and on the steps that must occur prior to each stage of the rollout.



**Figure 4: Program Development and Rollout Sequence Over Time**

### Challenges in Designing a National Communications Program

The national communications program could face several challenges. First, no single nationwide demand response program is currently in place. Many different demand response programs, products, technologies, and incentives are being considered or implemented. Customer knowledge pertaining to demand response also varies greatly. In addition, because demand response implementation varies depending upon the circumstances faced in various regions, it may be difficult and inappropriate to develop a “one-size-fits-all” message.<sup>51</sup> Other challenges that a national communications program must consider include the diversity of stakeholder interests, the lack of broad-based knowledge about customer perceptions and motivations, the various energy initiatives competing for customers’ attention and federal funds, and the degree of receptivity to demand response and technical assistance among local entities. A national mass media campaign directly targeting residential and small commercial customers could be undertaken, depending upon the availability of financial resources.

<sup>51</sup> For example, in some localities, the action step for the customer 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 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.

However, stakeholder comments reflected strong opposition to such an effort. Such opposition included undertaking such an effort would be premature at the outset given the limited opportunity for such customers to participate in and capture the potential value of demand response programs, as well as the fact that one single message may not resonate equally with all customers nationwide. This more conventional approach might confuse customers because many load-serving entities and other demand response providers have already been communicating (in some cases for years) with customers about demand response with differing messages and under different program names. Load-serving entities and other demand response providers have also noted that, generally, industrial electricity customers are already well-versed in demand response and therefore do not require the extensive outreach and education that residential and some commercial customers do.

For these reasons, a national communications program overseen by a federal agency, with Coalition input, and that supports local implementation efforts rather than initiating a national mass media campaign has the greatest potential for success. By supporting local efforts, the program would ensure that resources are spent to reach customers only when demand response programs are available to them. This feature helps ensure that a national communications program does not expose customers to confusing or conflicting messages, because local utilities, load-serving entities, other demand response providers, governors, state energy offices and public utility commissions would serve as the chief communicators. By reaching out only to customers who, according to research, are receptive and can act on the information, the program will be more likely to be effective. However, this discussion should not be seen as limiting future efforts to reach more customers using the lessons learned from the National Action Plan effort.

## Objectives of the National Communications Program

With these challenges in mind, the national communications program has the following objectives:

- 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.
- Increase commercial and residential electricity customers' awareness and understanding of demand response as it relates to other smart energy use principles such as energy conservation and energy efficiency. (Research and outreach have shown that many large industrial customers are already largely aware of the potential benefits of demand response as well as how to implement demand response initiatives.)
- Provide information to relevant states and policymakers (including, but not limited to, state and local governing officials, such as state legislators) about the potential benefits and costs associated with demand response, including peak reduction and ancillary services to reliably integrate variable resources.
- Inform policymakers about the potential benefits of having a demand response policy that could complement their smart grid, renewable energy, and environmental goals.

- Inform renewable resource developers of the benefits of “partnering” with demand response to improve reliability and provide needed ancillary services.
- Support local utility, load-serving entity and other demand response providers’ activities that 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.
- Establish clearly defined objectives and measurable goals, the development of which would be overseen by the federal agency with input from the Coalition, with benchmarks to facilitate program evaluation and accountability.
- Address concerns about negative effects on low-income, elderly, and disabled customers.

## National Communications Program Structure

The national communications program would function as a forum for communications development and as a supporter and resource for regional and local outreach to residential, commercial, and industrial customers. By compiling research on existing communications and marketing programs across the country and internationally, and conducting foundational research among electricity customers, the Communications Umbrella approach would be used to develop a message framework that local utilities, load-serving entities, and other demand response providers could employ at the local level. It would not take a top-down approach. Rather, it would look to the experience of local demand response implementers as the foundation of the Communications Umbrella approach, and conduct research only after understanding customers’ existing base of knowledge. Foundational customer research and analysis of the existing body of research would then proceed concurrently.

This national communications plan outlines the specific roadmap for the national communications program that includes broad-based customer education and support. This program should have the following structural elements:

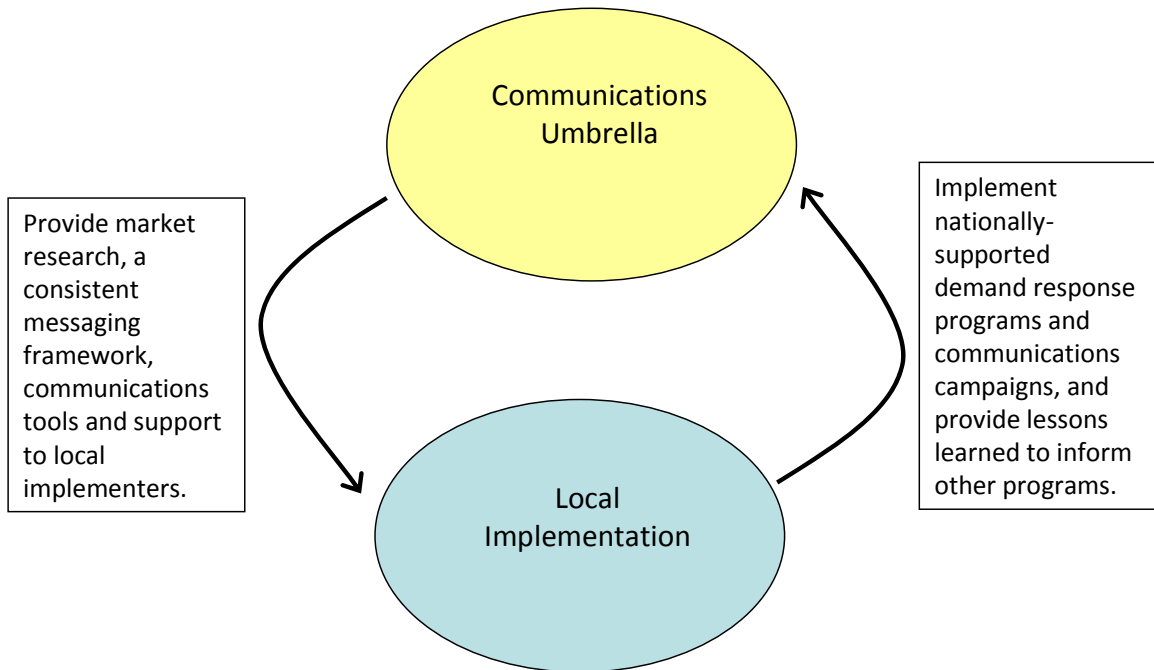
- Communications Umbrella
  - Program development
  - Message framework development
- Local implementation
  - Support for demonstration programs
  - Support for other demand response programs
- Direct outreach
  - Communications assistance to states and policymakers
  - Partnership development

Each of these elements will be discussed in further detail below.

## Communications Umbrella

<b>Purpose</b>	Provide a consistent communications program message framework, based on research and case studies that can be tailored to meet the unique needs of localities, states, and regions. Provide a well-researched strategic framework for communicating about demand response in localities, states, and regions.
<b>Expected Outcome</b>	A body of customer research, a clear message framework, customizable message and communications materials, and a strategic communications roadmap for demand response implementation.

A Communications Umbrella would provide a foundation for successful future communications about demand response, by leading the way on market research, creating a message framework, and providing outreach strategies and tactics upon which to base national, regional, state, and local communications efforts. Figure 5 illustrates this relationship.



**Figure 5: Interaction Between the Communications Umbrella and Local Implementation**

The Communications Umbrella would create a consistent message framework that local demand response implementers (especially utilities, load-serving entities, and other demand response providers) can customize and use to develop their own message and materials. More specifically, the Communications Umbrella would:

1. Provide communications support and advice to local demand response implementers as new or enhanced demand response programs, markets, and products are developed at the local, state, and regional level, as discussed in greater detail later in this section.
2. Develop a consistent message framework based on foundational market research that utilities, load-serving entities, or other demand response providers and stakeholders can independently tailor to their own local audiences to foster greater demand response participation. Messages could include information on the versatility of demand response resources for a variety of applications beyond lowering peak demand, such as automating demand response at 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 renewable resources.
3. Give local demand response implementers the information they need to disseminate communications locally to residential and small commercial customers in areas that are implementing new or improved demand response programs, products, technologies, and incentives.
4. Leverage the success of the demonstration programs to spread information and successful program and product models that can be replicated in areas that plan to implement demand response in the near term.
5. Eventually disseminate communications to all localities, states and regions as opportunities for demand response become more widespread.

The Communications Umbrella would focus on three target groups: 1) states, policymakers, and national partners who will make decisions about demand response implementation; 2) local demonstration program sites that have implemented or are implementing demand response and wish to have hands-on assistance in their outreach to customers; and 3) other demand response programs, including programs that are implementing demand response and wish to be fully autonomous in their communications with customers. The program would be most effective if it first helps stakeholders build decision-maker support and technical capacity for demand response implementation, 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. Education would be conducted both in partnership with local demonstration program sites and by providing support materials to any sites that are not demonstration sites but want to implement demand response or supplement existing communications.

The responsibilities of the Communications Umbrella fall into two subsets: program development and message framework development. Communications Umbrella program development would involve compiling case studies and successful outreach tactics, identifying demonstration program sites, and conducting program evaluation. Message framework development involves conducting foundational market research, developing adaptable customer-friendly messages, positioning demand response as a component of smart energy use, developing communications materials and toolkits, and developing support materials tailored to large commercial and industrial customers. As explained previously in Figure 5, some of these tasks will occur concurrently.



## PROGRAM DEVELOPMENT

The Communications Umbrella, would first study how local entities have communicated about demand response implementation across the country and internationally. This step might include messages, focus group feedback, advertisements, and other components. From there, the federal agency, with input from the Coalition, would oversee the selection of demonstration program sites from among those states, local load-serving entities, utilities, and other demand response providers that have requested support and — once their work begins — evaluate their success.

### Compile case studies

Though several entities have already compiled some data on demand response program implementation,<sup>52</sup> there is no single repository for customer research, message testing, behavioral data, and the like. The federal agency, with Coalition input, would oversee the collection of such data from as many sources as possible, given resource availability, and would make the data available through the web-based clearinghouse, as discussed in section 2.3. The best practices compiled through the clearinghouse would aid local programs in their own implementation efforts and, more importantly, inform the foundational customer research.

While compiling this research, the Communications Umbrella would work with the entities that had conducted the research to ensure that no data would be released within the Coalition or to a broader audience that violates customer privacy or confidentiality. Further, the federal agency would oversee redaction (as necessary) of any information deemed proprietary to a particular stakeholder to encourage the sharing of research to inform the national communications program.

### Identify demonstration program sites

Identifying demonstration program sites or markets is essential to the structure of the Communications Umbrella development process whereby the results, experiences and successes in one location provides input and feedback to inform others. The federal agency, with input from the Coalition, would oversee the development of a method for choosing sites from a pool of applicants; it would consider factors such as the willingness of local stakeholders to be vocal demand response leaders, the receptivity of local customers to participate in programs, and the availability of local resources that can be used to fund communications related to demand response. Demonstration programs will be discussed more fully in the “Local Implementation” section.

### Conduct program evaluation

Because the federal agency would be accountable to Congress for the results of implementing the National Action Plan, the Communications Umbrella would engage in ongoing program

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<sup>52</sup> Entities that have already begun compiling data and research from existing demand response programs include the Peak Load Management Alliance and the Demand Response Coordinating Committee, among others.

evaluation. The federal agency, with input from the Coalition, would oversee the development of metrics to evaluate the impact of particular outreach tactics and adjust the best practices and recommendations moving forward.

## MESSAGE FRAMEWORK DEVELOPMENT

The Communications Umbrella would develop the broad message framework and outreach strategies for the national communications program, which could then be customized by local stakeholders. For example, as discussed below, the Communications Umbrella could provide a template one-page message document outlining to customers what demand response is and how it impacts them, and stakeholders would have the ability to edit the document, change the wording as necessary for their circumstances, and add their own program logos to it.

### Conduct foundational market research

Foundational market research would be used to develop a nationally consistent message framework for demand response, similar to the ENERGY STAR® program.<sup>53</sup> The national message framework would facilitate customers' understanding of demand response and its possible benefits. Regardless of the eventual funding level available for implementation of the National Action Plan, foundational market research should be considered a priority item, because it would inform the national communications program of the most effective demand response messages and outreach tactics. Additionally, numerous stakeholders commented that conducting foundational market research should be a high priority for the national communications program.

As a starting point, research would look at the success or failure of existing demand response programs and identify lessons learned. It would also involve original research with residential and commercial electricity customers to identify which incentives and messages each customer class would find most persuasive to modify their energy usage. Much of this research would be relevant nationwide. However, research would also help to identify how best to tailor the messages to account for regional differences in the structure of electricity markets, critical peak periods, demand response program design, pricing models, and structure of utilities.

Formative research would help in assessing customer assumptions, understanding of key issues, conscious behavior, and what motivates customers to change their behavior. This foundational market research could include quantitative surveys of residential, commercial, and industrial customers as well as qualitative research such as focus groups in numerous locations across the country, among varying customer classes. Key research questions that could be explored include:

- How might messages be tailored to reach different classes of potential demand response customers with different demand response capability?

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<sup>53</sup> 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>.

- What messages are most effective to help customers understand what demand response is?
- What messages are most effective to help customers understand demand response’s benefits?
- What level of understanding of demand response do customers need in order to participate? Do they need to understand the concept fully, or is it enough to give them easy tools and instructions and inform them of demand response’s potential benefits?
- Are financial incentives such as electric bill savings or rebates the most powerful motivators? Are customers more inclined to change their behavior if they learn 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 they continue to consume) and building in a discount that the customer surrenders if they do not respond (peak time rebate vs. critical peak pricing (CPP))?
- How much inconvenience are customers willing to endure if their provider asks them to be 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?
- Do customers react differently to messages that talk about demand response as preventing crises versus messages that frame it as a purely positive step as we increase the use of renewable energy sources?

Customers’ answers would help the national communications program shape its messages in all outreach support materials, and ensure that the right messengers deliver those messages. In addition, having the answers to these and other research questions would benefit entities interested in investing in demand response programs, products, technologies, incentives, and infrastructure.

Foundational customer research would also provide insight on the effectiveness of linking the concept of demand response to other smart energy use concepts (e.g., state renewable portfolio standards, climate change, energy efficiency, regional markets), compared with the effectiveness of educating customers about demand response as a wholly separate concept in order to achieve peak use reductions.

Finally, the research would 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 program is the entire adult population, which would be prohibitively expensive for any program to reach. Therefore, “zeroing in” on smaller groups would help to ensure efficient message delivery and avoid wasting time and resources on audiences who are unlikely to change their behavior.<sup>54</sup> This knowledge would

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<sup>54</sup> For example, the California Statewide Pricing Pilot found that residential, medium commercial and industrial, and large commercial and industrial customers are more responsive to dynamic rates than are small commercial and industrial customers in the absence of automating technologies. See Charles River Associates,

inform the overall strategic and tactical recommendations developed through the Communications Umbrella for use by local programs.

Develop adaptable, customer-friendly messages

The majority of stakeholder comments stated that “demand response” is not a customer-friendly term. Another objective of the Communications Umbrella would be to reframe demand response with new, more customer-friendly terminology that would better explain the concepts of energy use reduction, load shifting, and managing energy usage in response to price or non-price signals, in conjunction with other smart energy use principles. The federal agency, with input from the Coalition, would oversee research to help determine the terminology that best conveys to customers what demand response is and how it can benefit them.

In addition to reframing the demand response concept, the Communications Umbrella would develop a message framework with persuasive, adaptable messages aimed at various audience segments, all of which could be tailored by interested local stakeholders. The program would segment the audience into discrete groups, based upon their varying motivations and circumstances, and messages would differ slightly for each segment. Messages must first define the problem that demand response programs could help to resolve; messages could then establish the urgent need for demand response implementation and explain appropriate ways to modify behavior. How best to communicate the problem and its solution may vary by audience. To simplify this notion, Table 2 provides examples of message categories for diverse audiences. The federal agency, with input from the Coalition, would oversee the development of messages for various audience segments within the message framework, with research providing insight into the most persuasive ways to convey the content listed in the Table.<sup>55</sup>

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

<sup>55</sup> Note that the technical assistance would help to provide the underlying factual basis for the content of the message.

**Table 2: Segmentation of Message Framework**

<b>Audience/“Who”</b>	<b>Message Content/“What”</b>	<b>Messenger</b>	<b>Delivery/“When”</b>
Key stakeholders	Be a part of the Coalition to lead the demand response program	Federal Agency	Immediately/ continually (as outreach begins in new states)
All stakeholder leadership	Implement your demand response goals with our support	Federal Agency/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	Federal Agency/Coalition	Short-term/ongoing (continually 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	Federal Agency/Coalition	Short-term, medium-term, long-term
Stakeholder leadership in non-demand response states	Look at success in other states and localities as a potential roadmap; we can help you achieve your unique goals	Federal Agency/Coalition	Medium-term, long-term (continually as success stories and best practices emerge)
State and local governing officials	Support customer interest in implementing and receiving benefits of demand response	Federal Agency/Coalition	Short-term/ongoing
Utilities, load-serving entities, and other demand response providers	Use our support to communicate with customers and provide additional sources of ancillary services and tools to reliably integrate variable resources	Federal Agency/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	Federal Agency/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 program because it can provide widespread benefits (e.g., you could earn a cash rebate, protect our power supply, and promote the use of clean energy)	Utilities/load-serving entities, public utility commissions, Federal Agency/Coalition, other demand response providers	Medium-term, long-term (continual roll-out as new states and localities adopt demand response)
Low-income, elderly, and disabled customers with access to demand response programs	Join the program because it will provide you with benefits (it could save you money and could protect your power supply) and will not raise your costs or hurt your quality of life	Utilities/load-serving entities, public utility commissions, Federal Agency/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 way to reduce energy use during peak periods, protect the environment, and promote the use of clean energy	Federal Agency/Coalition, utilities, load-serving entities, schools, other demand response providers	Medium-term, long-term
Customer advocates	Support demand response nationwide because of its widespread benefits (e.g., less need for future power plants, safer power supply, potential money savings)	Federal Agency/Coalition, other demand response providers	Short-term/ongoing
Renewable resource developers	Partner with demand response for ancillary services	Federal Agency/Coalition	Short-term, medium-term, long-term

The Communications Umbrella would develop comprehensible, research-based messages aimed at the audience segments outlined above. It would also craft messages that would increase awareness, encourage customers to modify how they consume electricity, and assist customers that want to participate in available demand response programs.

For example, when addressing residential customers in areas with available demand response programs, products, or markets, a generic message framework might inform them about the following topics:

- **Variability of electric prices and sources.** Inform customers that the cost of generating electricity varies by time. During “peak periods” when there is high electricity demand, electricity is more expensive to produce. Also inform customers about which generation sources are used by time of day and during peak periods.
- **Urgency of demand response.** Communicate the urgency of the need for demand response, load shifting, energy efficiency, energy conservation, etc.
- **Actions to take.** Educate customers about specific actions they could take at critical peak periods to reduce electricity use, and publicize the potential benefits of participating in demand response. These messages would highlight the importance and value of taking action by tying that action to the most effective customer motivations, such as potential electricity bill savings or environmental benefits.
- **Minimizing negative impacts.** Provide reassurance to customers that any negative consequences of demand response implementation have been anticipated and would not pose a threat to them. These messages would lessen customers’ concerns and prevent 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 customers that their actions can not only reduce bills, but — in some parts of the country — result in compensation opportunities.
- **Opportunities.** Educate large commercial customers about the role they may be able to play by participating in local utility programs or in regional markets (such as participating in demand response programs that could help to integrate variable energy resources like wind generation into the system), if applicable.

Foundational research, message testing, and federal agency and Coalition input will help to determine whether these messages or others are appropriate and whether they motivate customers to change their behavior.

The Communications Umbrella could also work with a sampling of local demand response implementers to develop messages to educate customers about specific actions they could take at critical peak periods to reduce electricity use.

The intended outcome of the message development and testing process is to create a message framework that local stakeholders can adopt to communicate with customers, or that they can use to supplement or modify their own communications.

Following the finalization of the message framework, the Communications Umbrella communications would develop template advertising materials — including a template TV advertisement, a template radio advertisement, a template online advertisement, a template print advertisement, and template direct mail — that local stakeholders could use in their outreach efforts. To save costs, the materials could be designed so they would be produced once, but still be customizable with graphics and website URLs for a specific state, load-serving entity, utility, or other demand response provider’s demand response program.

#### Position demand response as part of overall smart energy use

A core question in the development of messages for the program is 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. Which relationship best aids customer understanding? In addition, messages should consider providing linkages to known, evolving, and emerging technologies (e.g., automated demand response such as Auto-DR for commercial and industrial facilities) and opportunities in retail and wholesale energy markets. Anecdotal market research to date shows that consumers already confuse these concepts of energy conservation and energy efficiency, so positioning demand response as a new twist on existing concepts may create further confusion. Though foundational customer research would provide the best insight, it may be necessary to link demand response with other smart energy use principles to increase customer understanding, or even to use other smart energy use terms to describe demand response.

Linking the *concept* of demand response with other smart energy practices 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 service by using fewer kilowatt-hours of electricity, saving money and reducing carbon emissions.

The federal agency could work with existing renewable energy, energy efficiency, smart grid, and other related initiatives to oversee the development a comprehensive message. Doing so could persuade customers to take action and alter their energy use patterns, while meeting the communications objectives of each of the individual programs.

#### Develop communications materials, tactics and toolkits

To support all stakeholders implementing demand response initiatives, the Communications Umbrella would develop a suite of toolkit materials that they could use to create their communications programs or to supplement local communications. Toolkit materials (explained in greater detail in the “Support for Other Demand Response Programs” section

following) would include message research data and analysis, guidance on demand response messages, strategies and tactics for effective audience targeting and outreach, and customizable advertisements and other communications materials.

Develop support materials tailored to large commercial and industrial customers

Residential and small commercial customers are a very important part of the audience for demand response, and reaching this audience segment effectively would have the greatest positive impact on broad public opinion surrounding demand response. But 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.

Working at the national and local levels, depending on the customer, the federal agency, with Coalition input, would oversee outreach to large companies to inform them of opportunities to provide demand response and receive bill savings or direct payments for doing so. This outreach would showcase how demand response can be made available through distinct messages and template materials geared toward large-scale customers. These materials would be available to national chain retailers, Coalition members, and state and local stakeholders (e.g., utilities, load-serving entities, and other demand response providers), interested in distributing them to large local customers.

Materials would include best practices and model program guides that help large customers participate in demand response programs offered by a utility, load-serving entity, other demand response providers or RTO/ISO markets. Template slide show presentations could be used to inform customers and enlist their support. A template press release could be customized to congratulate and thank large commercial and industrial customers for investing in demand response.

## Local Implementation

### SUPPORT FOR DEMONSTRATION PROGRAMS

<b>Purpose</b>	Advise states and localities on communications best practices as they adapt the Communications Umbrella to increase exposure of and participation in demand response in their own localities. Provide logistical support and coordination for communications around local demand response implementation.
<b>Expected Outcome</b>	Tailored communications that integrate the broad, national messages with the local program’s needs and unique characteristics.

A core element of the national communications program is the implementation of a broad strategic and message framework through a local demonstration program approach.

This local implementation demonstration program approach would first roll out in areas that have requested the national communications program’s support and have already



implemented or are on the verge of implementing pilot or full-scale demand response programs and products. The demonstration program approach would then spread (as requested) to areas that plan to implement programs and products in the near term, and would eventually become national in scope as implementation becomes more widespread. The national communications program could coordinate with DOE's American Recovery and Reinvestment Act of 2009<sup>56</sup> stimulus smart grid grants. For instance, recipients of stimulus grants could serve as examples within the demonstration program approach.

Using broad, nationally developed messages, the Communications Umbrella would advise local load-serving entities, utilities, and other demand response providers that have agreed to participate and have been selected as demonstration programs on how to translate the Communications Umbrella messages and strategies to their local demand response initiatives, seasonal peak load patterns, and any other regional factors.

The strategy recommended for communicating messages around local demand response implementation would be an integrated communications program, not reliant on one particular communication method or medium. The integrated marketing elements recommended and supported by the national communications program for a sample demonstration program could include:

- **Public relations.** An important tactical component of a local communications program would be a comprehensive news media outreach and public relations strategy. This strategy would build public and policymaker support for demand response in conjunction with direct communications outreach to states and policymakers (discussed later in the Direct Outreach to States, Policymakers and Partners subsection) and the technical assistance to states discussed in section 2.1. It would also educate customers by garnering news coverage about demand response. 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 give more customers a better understanding of demand response.
- **Advertising.** If local resources allow, advertising or public service announcements (PSAs) could be a key part of local communications efforts, with the national communications program providing the template advertisements or PSAs that could be tailored to reference local programs and information. Media buys for paid advertising could be funded by states or localities, utilities, load-serving entities, other demand response providers, or a combination of these groups. If paid advertising funding is unavailable, the PSA version can be used to attain free placements of the same messages. To reach the broadest range of customers in each market, depending on which customer segments the foundational research indicates offer the best opportunity, advertising might run on:

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<sup>56</sup> Pub. L. No. 111-5, 123 Stat. 115 (2009).

- Television
- Radio
- Outdoor media such as billboards and advertisements on buses
- Direct mail
- Internet
- Emerging media technologies, such as cell phone text messaging

The Communications Umbrella would also develop attractive, customer-focused educational support materials, which could be tailored with local information and which would be available digitally for stakeholders' use (e.g., brochures, videos, PSAs, and a reference website).

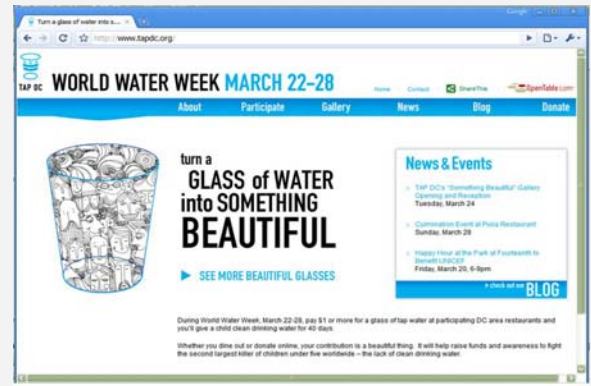
- **Viral<sup>57</sup> and grassroots marketing.** In addition to a local mass media program, a fully integrated communications program could also include a grassroots approach that leverages emerging social networks in the digital space. A viral and grassroots marketing outreach might include:
  - The creation of groups within social media sites like Facebook and Twitter, as well as new sites as they gain popularity.
  - The engagement of third-party “demand response champions” who can blog or tweet 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 communications program over time, as the social network around the groups, champions, and videos grows larger and more geographically diverse.

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<sup>57</sup> “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 produced with the intent that people within the target audience would view it and then share it with their friends and associates, who would in turn 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.

**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.

### SUPPORT FOR OTHER DEMAND RESPONSE PROGRAMS

<b>Purpose</b>	Provide tools adapted from the Communications Umbrella so regions, states, and localities can employ the messages and tools most useful to them in informing customers and stakeholders about demand response.
<b>Expected Outcome</b>	A broad spectrum of toolkit materials that can supplement an entity’s existing communications efforts, add an additional program layer, or serve as a new program where previously there was none. Guidance on strategies for effective customer outreach.

To support the efforts of utilities, load-serving entities, and other demand response providers that do not directly participate as demonstration programs, the federal agency, with input from the Coalition, would oversee the development of template toolkit materials, as mentioned earlier in this section, enabling those entities to manage their own local demand response communications programs. The materials in the toolkit would be customizable to account for a local program’s name, logo, website URL, and needs. The toolkit materials would be designed to be “plug and play” so that local entities would be able to use all available messages and materials or choose which elements to use. Local stakeholders, federal grants (as described in section 2.1), states, or localities could fund local implementation of toolkit-based communications efforts; however, the federal agency would fund initial development of the tools in the toolkit.

Toolkit materials could include:

- A foundational customer research primer covering customer behavior, responses to various terms and messages around demand response, findings on how best to position

demand response as a part of smart energy use, and analysis of how best to segment audiences to achieve maximum results.

- Sample messages, which can be tailored with local program information and segmented by audience type, seasonal peak load pattern, general demand response program and pricing design, and other variables.
- Template talking points for local utilities, load-serving entities, and other demand response providers, segmented by the variables outlined above.
- Template PSAs that can be run on local television without charge, as well as guidance on how to get PSAs placed on local broadcast and cable networks.
- Template press materials, including press releases introducing a new program or announcing the introduction of new technology or pricing, frequently asked questions for journalists about demand response, and how-to guides for media outreach;
- Print-ready materials such as brochures and flyers, designed to be printed with local logos, program names, and website URLs inserted.
- Advertising for TV, print, radio, outdoor, and online media, all of which can be tagged with local program information.
- A sample integrated communications program plan, outlining how best to maximize the local program’s impact with a combination of various outreach methods, as well as guidance on how to select media to reach the most receptive audience segments.

### 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 even enabled organizations that were not official grantees or demonstration programs to be a part of the larger campaign and get the message out in the most convenient way.

## Direct Outreach to States, Policymakers, and Partners

<b>Purpose</b>	Provide a general framework of support for demand response implementation programs taking place across the country.
<b>Expected Outcome</b>	Broader education for policymakers and stakeholders necessary to the successful implementation of demand response, and national and regional partnerships supporting local efforts.

Although the bulk of the national communications program activities — particularly public education — would take place at the regional and local levels, there is an important role for certain national activities that would amplify the impact of local communications.

### COMMUNICATIONS ASSISTANCE TO STATES AND POLICYMAKERS

Support to states, localities, and regions would be another key part of the national communications program. As discussed in section 2.1, communications training for state and local governing officials would help achieve the National Action Plan’s objectives and support the national communications program. Because support from state and local governing officials is important for demand response implementation, efforts to implement demand response programs and products locally may benefit from the federal agency overseeing, with Coalition input, the provision of communications assistance to state and local governing officials and stakeholders to allow them to properly assess and understand demand response. Such communications assistance might 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. This assistance would enable policymakers and others to inform customer groups about demand response opportunities and capabilities they can incorporate into their businesses, industries, and homes, ultimately boosting customer acceptance of demand response.

### PARTNERSHIP DEVELOPMENT

The national communications program would foster development of national and local partnerships between the federal agency and 1) corporate partners whose customers are making decisions about electricity usage; 2) organizations representing various customer classes such as commercial and industrial customers, certain subsets of residents, etc.; and 3) trade associations or other groups that would benefit from partnerships, e.g., the pairing of variable resource development with dispatchable demand response.

Both manufacturers and retail sellers of large home appliances that could be demand response– or smart grid–enabled would be ideal partners for the program. Because these corporations regularly interact with the public (e.g., when customers consider purchasing new appliances), achieving some program and message visibility at the point of purchase would be extremely advantageous, and would reach the audience when it is most receptive. Similarly,

partnerships among trade associations like those representing industrial customers and those representing wind resources might help states meet renewable portfolio standards.

Partnerships between for-profit corporations and nonprofit cause-related programs are common. Corporations are eager to participate in such partnerships if they believe that such participation could have positive business repercussions or improve their image through association with a worthy cause. For example, a home improvement retailer chain may be interested in partnering with the national demand response program to 1) associate the company with an energy-saving initiative that shows its customers that it is forward looking and concerned with environmental health, and 2) increase sales of demand response– or smart grid–enabled appliances. Partnering with such a company could make demand response issues more visible to customers and create additional touchpoints between the customer and the issue beyond traditional media outlets.

In terms of organizational partnerships, groups that represent businesses, industrial customers, and subsets of the public at large would be excellent program partners, as they provide access to millions of key business and household decision-makers through their communications networks. Such groups include trade associations and consumer advocacy organizations. These types of partnerships would allow the Communications Umbrella to target the groups or geographic regions that can make the best 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 increase the effectiveness of a communications strategy while reducing costs.

Corporate and organizational partners would be selected on the basis of their reach within key audience segments, their relevance to advancing the issue, and their ability to commit resources to support the effort. However, in some cases, such as partnerships aimed at reaching low-income, elderly, or disabled electricity customers, the federal agency may decide to oversee funding offered to selected nonprofit partners. It would do so to fund outreach of messages to groups that might not otherwise learn about the benefits of demand response programs, or that might not have the information necessary to improve their lives by participating in demand response programs.

**Example**



The Covering Kids & Families campaign sought to enroll eligible children and families in public health insurance programs. To get these children 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 retail environments where parents are most likely to be thinking about their children. In a partnership with Giant Foods on the East Coast, the campaign secured placement of an enrollment PSA on the sides 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.

## 2.3 Tools and Materials For Use by Customers, States and Demand Response Providers

Section 529 of EISA requires that the National Action Plan develop or identify analytical tools, information, model regulatory provisions, model contracts, and other support materials for use by customers, states, utilities, and demand response providers. Therefore, in this section, the National Action Plan identifies tools and materials that can be used by customers, states and demand response providers. The federal agency with input from the Coalition would oversee the development and management of these tools and materials. The level of effort put into these tools and materials will depend on the funding and other resources available for implementation. With limited resources, the elements proposed in this section would largely be enhancements of existing tools and support of ongoing efforts. New and innovative tools and materials would be developed if more resources can be applied.

The development and enhancement of tools and materials will serve several objectives. For instance, states not currently engaged in demand response will have access to a comprehensive source of information that could help them decide what types of demand response programs are appropriate. States that are already engaged in demand response will be able to share their experiences and gather more information about how to measure results and improve their programs. Utilities will be able to examine other pilot program design and results, while consumers will have tools to help them decide if they would benefit from demand response programs. All of this information will help optimize program benefits.

Based upon stakeholder input to the Discussion Draft and further research, the National Action Plan contains two general categories of action for the development of tools and materials:

1. Develop a web-based clearinghouse of demand response materials.
2. Develop or enhance demand response estimation tools and methods.

### Develop a Web-based Clearinghouse of Demand Response Materials

<b>Purpose</b>	Provide easily accessible, accurate information on demand response for stakeholders.
<b>Expected Outcome</b>	Increased awareness of existing demand response experiences and their reported benefits and lessons learned, resulting in additional use of well-designed demand response programs.

There is strong support for developing an easily accessible website database, or “web-based clearinghouse,” to serve as the centralized location for collecting all publicly available information on demand response, including regulatory documents, program reports, general demand response information, and communications material. The goal for the web-based clearinghouse will be to provide stakeholders with the most current information and analyses on demand response.

With input from the Coalition, the federal agency should oversee the management of the web-based clearinghouse for demand response and the dissemination of information and analyses rather than conducting and reporting independent analyses. However, the web-based clearinghouse for demand response should include information that stakeholders can use to make their own evaluations and judgments on the reports and information that the web-based clearinghouse contains. For example, in addition to posting a report on a demand response pilot program, it would present guidelines, criteria, and metrics that can be considered when evaluating pilots.

The web-based clearinghouse should build on and collaborate with existing efforts to collect data on demand response programs and reports. The most relevant ongoing effort in this area is the new DOE-sponsored Smart Grid Information Clearinghouse.<sup>58</sup> The web-based clearinghouse for demand response could be coordinated with this effort, which was launched with a \$1.3 million budget (provided from the American Recovery and Reinvestment Act) in September 2009.<sup>59</sup> Based on preliminary information, the Smart Grid Information Clearinghouse may include a significant amount of the demand response materials recommended for the web-based clearinghouse in the National Action Plan.<sup>60</sup> The Smart Grid Information Clearinghouse is expected to launch publicly in September 2010.<sup>61</sup>

<sup>58</sup> DOE, *DOE Announces Funding Opportunity to Develop the Smart Grid Information Clearinghouse* (2009), available at [http://www.oe.energy.gov/news\\_room\\_and\\_events/1223.htm](http://www.oe.energy.gov/news_room_and_events/1223.htm).

<sup>59</sup> Rich Sedano, *Smart Grid Information Clearinghouse*, Presentation to NARUC-FERC Smart Grid Collaborative, available at [http://www.narucmeetings.org/Presentations/FercSmartGrid\\_Sedano.pdf](http://www.narucmeetings.org/Presentations/FercSmartGrid_Sedano.pdf).

<sup>60</sup> *Id.*

<sup>61</sup> *Id.*



This web-based clearinghouse can use other efforts as a model. One is DSIRE, the Database of State Incentives for Renewable Energy — another DOE-funded project for collecting and distributing information about renewable energy and energy efficiency efforts. The DSIRE website provides users with visual tools for 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. This information allows for easy comparisons of programs and policies across states and provides a simple means for understanding the “landscape” of energy efficiency and renewable energy policy in the United States. Stakeholders have identified DSIRE as a useful example of an online clearinghouse for information.

The California Measurement Advisory Council (CALMAC) maintains a website containing information on demand-side programs in California. The purpose of the CALMAC website is to provide “...a forum for the development, implementation, presentation, discussion, and review of regional and statewide market assessment and evaluation studies for California energy efficiency programs and demand response...”<sup>62</sup> The site’s searchable database is helpful for finding relevant, up-to-date materials, particularly impact evaluations conducted by utilities and independent consulting firms. This type of information could be included in the web-based clearinghouse.

The objectives of the web-based clearinghouse should change over time. In the short term, the effort would be focused more on assembling the results of pilots and studies on the impacts and benefits of new dynamic pricing and smart grid-enabled programs. This information would help to establish confidence in the ability of these new programs to provide reliable benefits. In the long term, as programs become established through full-scale implementation, the focus should shift to identifying model programs and policies as well as prioritizing findings from the research that has been conducted.

The following sub-sections describe the types of content that the web-based clearinghouse should include.

### **Case Studies of State Laws, Regulations, and Tariffs**

The web-based clearinghouse would provide access to comprehensive case studies that include specifics about demand response programs. For example, information regarding state laws, regulations, tariffs, generation mix, forecasted load, technology employed, communications strategy, and retail cost recovery would provide helpful contextual information for understanding and comparing demand response programs. To the extent possible, actual laws, regulations, and tariff language would be provided.

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<sup>62</sup> See California Measurement Advisory Council, <http://www.calmac.org/> (last visited Jan. 21, 2010).

State laws, regulations and tariff language included in the web-based clearinghouse could be used as a sample or template that stakeholders can adapt, based on their unique goals, preferences, and needs, in developing their programs and policies. Furthermore, any contextual information that is included would help stakeholders adapt the state laws, regulations and tariff language to their unique circumstances.

For example, California’s Energy Action Plan includes a model regulation for preferred loading order of resources: energy efficiency; demand response; renewable energy sources; and conventional generation options that could be included in the web-based clearinghouse for other states to use as a model for similar legislation.<sup>63</sup> Also, California’s Energy Action Plan set a target reduction in peak demand of 5 percent for 2007.<sup>64</sup> When the three investor-owned electric utilities only achieved 40 percent of that target in 2007, the utilities were asked to revamp their efforts. Simultaneously, the California Public Utilities Commission approved business cases for the deployment of AMI by all three utilities<sup>65</sup> and then issued a landmark ruling making dynamic pricing the default tariff for all non-residential customers who were part of AMI. Information about California’s Energy Action Plan, coupled with up-dates about how it is being carried out, would help other states if they undertake similar efforts.

Connecticut provides another example of a regulation-related case study. The Connecticut state legislature passed legislation that required electric distribution companies to conduct integrated resource planning beginning on January 1, 2008.<sup>66</sup> The identified resource needs must first be met through all available energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible.<sup>67</sup> 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.<sup>68</sup>

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<sup>63</sup> *Id.*

<sup>64</sup> *Id.*

<sup>65</sup> *See, e.g.,* California Public Utilities Commission, *Decision Adopting Dynamic Pricing Timetable and Rate Design Guidance for Pacific Gas & Electric Company*, D. 08-07-045 (2008).

<sup>66</sup> Conn. Gen. Stat. § 16a-3a (2008).

<sup>67</sup> *Id.*, § 16a-3a(c).

<sup>68</sup> *Id.*

## Database of Pilots, Programs, and Markets

Different types of demand response programs exist across the country. The web-based clearinghouse should include a database of both pilot and fully implemented demand response programs. The database should include general descriptions of each of these programs and, to the extent possible, reports that summarize each program's results, lessons learned, and benefits and drawbacks.

Information on the programs should be supplemented with marketing materials, surveys of customer satisfaction, and the names of contractors or vendors that provided enabling technology and devices that supported demand response. These materials would provide useful qualitative information that stakeholders could use to enhance their own programs. Furthermore, the lessons learned from this information could supplement the communications materials that are developed as part of the communications program (see section 2.2).<sup>69</sup>

The existence of a central collection of reported impacts from existing demand response programs and products would help 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.

The web-based clearinghouse should include a broad mix of programs to serve as case studies in program design, implementation, and evaluation. Examples include new pilot programs run by utilities such as Consumers Energy in Michigan, Commonwealth Edison in Illinois, Baltimore Gas & Electric in Maryland, and Northeast Utilities in Connecticut, as well as mature programs such as Detroit Edison's Direct Load Control Interruptible Air Conditioning<sup>70</sup> program and California's "Flex Your Power" campaign to promote customer awareness of pending energy shortages and encourage reduced energy use.<sup>71</sup> Users of the web-based clearinghouse would be able to find information on each of these programs and, if they exist, reports evaluating the impacts of each program. With this information, users would be able to compare and contrast the value of each program, which would help to inform their decisions on how to implement their own programs.

## Quantitative and Qualitative Summaries

Detailed supply-side information is contained on the U.S. Energy Information Administration's website. The web-based clearinghouse will aspire to provide a similar level of granularity in demand-side information. Examples of data that could be collected include a listing of each demand response program and product being offered, peak demand impacts from demand

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<sup>69</sup> The web-based clearinghouse should serve as a central location for communications materials as well. For information on these materials, see section 2.2.

<sup>70</sup> DTE Energy, *Interruptible Air Conditioning Rate* (2009), <http://www.dteenergy.com/residentialCustomers/billingPayment/rates/electric/interruptibleRates.html>.

<sup>71</sup> For more information about the Flex Your Power campaign, visit <http://www.fypower.org/>.

response, costs of the programs, and participation rates. One useful way to organize these data would be by utility, load-serving entity, state, and RTO/ISO.

Recently, FERC has been collecting some of this information through its survey of demand response programs. The results of this publicly available survey provide the basis of FERC's *Assessment of Demand Response and Advanced Metering* reports.<sup>72</sup> Additionally, the North American Electric Reliability Corporation (NERC) collects related data at the wholesale level and recently initiated an effort to improve its demand response data collection methodology.<sup>73</sup> The results of these efforts should be included as part of the web-based clearinghouse.

In addition to quantitative data, the clearinghouse would also collect detailed qualitative information. For example, the clearinghouse should provide a profile of the regulatory environment in which the programs are being offered, showing whether the demand response program is implemented in a state that has rate decoupling and whether the demand response program is being driven by the utility, regulatory commission, RTO/ISO, other demand response provider, or other party. Another example is information on the variations in RTO and ISO demand response, such as what requirements the provider must meet in order to bid and the incentives to participate. Other helpful qualitative information could include the amounts and types of demand response being incorporated into transmission planning and resource planning, a summary of marketing and customer recruitment efforts, and key lessons learned.

The clearinghouse could also include or provide linkages to quantitative and qualitative information on demand response developed by other entities. For example, the U.S. EPA could share information to help states and other stakeholders understand the potential effects demand response may have on emissions.

## **Measuring Program Results with Criteria and Metrics**

The wide variety of demand response programs across the country leads to wide variation in the reports on the results and lessons learned. The web-based clearinghouse should include criteria and metrics that help stakeholders understand and evaluate these reports, make informed judgments about the results the reports present, and make meaningful comparisons across the reports. For example, principles of pilot program design — internal and external validity, control and treatment groups, selection of participants, measurement of load and other data, and payment or other incentives—would be valuable to clearinghouse users.

## **Information for Program Implementation**

The web-based clearinghouse should provide information for stakeholders interested in implementing their own demand response programs. Unlike case studies and pilot results, which consider historical events and remain static, the information for program implementation could be updated with the results of case studies and pilot results to highlight

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<sup>72</sup> Assessment of Demand Response and Advanced Metering, *supra* note 11

<sup>73</sup> NERC, *Data Collection for Demand-Side Management for Quantifying Its Influence on Reliability: Results and Recommendations* (2007).

current and future issues in program design and implementation. Information would be provided on how to implement both dynamic rate design and non-rate-based demand response programs. The clearinghouse also should include information on available smart grid technologies, which will play a crucial role in demand response implementation.

A stakeholder must consider many options if planning to implement demand response using a dynamic rate.<sup>74</sup> The web-based clearinghouse would provide information on options for both the dynamic rate selection and its specific design. For example, the strength of the price signal to customers (i.e., the differential between the peak and off-peak prices) indicates to the customer the magnitude of the incentive to reduce consumption when the price is high and relates to the customer's opportunity for significant bill savings. Program enrollment and peak reductions likely are dependent on the opportunity for bill savings. Finally, the complexity of the rate design will play an important role in a customer's ability and willingness to respond to a dynamic rate.

The clearinghouse would provide non-rate-based demand response information as well. For example, when designing direct load control programs, it is important to consider how signals will be sent to the load control devices. Furthermore, the devices can be both one-way (i.e., only receiving the signal to be controlled) or two-way (i.e., the device receives the signal to be controlled and sends a signal back to the dispatcher confirming receipt). The duration and frequency with which the controlled devices cease to operate are another example of useful information in this context.

The foundation of much of this type of information is publicly available through filings with state commissions. However, there is no central location for easily locating the most up-to-date materials on demand response program implementation and design stemming from prior efforts. Therefore, a coordinated effort to collect and organize these data, beginning with a comprehensive assessment of the data that are already available, would facilitate discussion of the issues facing stakeholders who are currently designing and implementing their own demand response programs.

### **Online Message Board Capability**

In addition to serving as a central location for demand response reports and resources, the web-based clearinghouse also should serve as an online message board where qualifying state agencies (e.g., state regulatory commissions or state energy offices), consumer advocacy groups, and utilities may ask for specific virtual or onsite demand response assistance with regard to program design, implementation, and/or evaluation. In conjunction with the demand response assistance program discussed in Section 2.1, experts could review the message board posts and offer assistance. The nature of this assistance might involve referring a caller to a

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<sup>74</sup> For more detailed information on dynamic rate design see, for example, Faruqui A, Hledik R, "Transition to Dynamic Pricing," *Public Utilities Fortnightly* (March 2009), and Faruqui A et al., *Rethinking Rate Design Demand Response* (2007) (issue paper prepared for the Demand Response Research Center, Lawrence Berkeley National Laboratory).

website, providing applicable reference materials, or perhaps providing onsite technical help (for a day, a week, or longer).

## Information About the Development of Standards and Protocols

The development of standards and protocols is important for creating an interoperable electric grid. However, because other organizations have already taken the lead in developing standards and protocols, the federal agency, with input from the Coalition, will oversee the tracking of the standards development process. Up-to-date information on progress in the standards development process would be made available through the web-based clearinghouse.

The National Institute of Standards and Technology (NIST) has established a process and plan that are designed to establish smart grid interoperability standards per its mandate from EISA.<sup>75</sup> NIST has allocated \$5 million of its American Recovery and Reinvestment Act funding for this purpose.<sup>76</sup> Over the past year, NIST has launched the initial stages of its broad effort, including creating Domain Expert Working Groups (in conjunction with DOE) to focus on areas of focus and developing an Interoperability Knowledge Base to promote shared understanding and terminology.<sup>77</sup> In addition, the North American Energy Standards Board (NAESB) and NERC have already undertaken standard and protocol efforts for the smart grid. The Coalition should use its web-based clearinghouse to track the efforts to develop standards and protocols.

There are many examples of standards and protocols that should be developed to support demand response. These include communication protocols for consumer demand information, data privacy and cyber-security standards, standards for plug-in hybrid electric vehicles (PHEVs) and fully electric vehicles, and measurement and verification standards.

Standard communication protocols would allow information on electricity demand and prices to flow unimpeded from consumers to a utility, demand response provider, or wholesale market operator. All transmitted information also should be readily available to consumers because these signals (which traditionally came in the form of calling or paging facility managers) instruct customers to reduce their load in response to market prices or grid reliability concerns. Current technology, such as the automated demand response program, 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.<sup>78</sup> 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

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<sup>75</sup> More information and a summary of recent activity can be found at <http://www.nist.gov/smartgrid/>.

<sup>76</sup> *See id.*

<sup>77</sup> *See id.*

<sup>78</sup> *See* Lawrence Berkeley National Laboratory, *Open Automated Demand Response Communication Specification* (Version 1.0), (2009), available at <http://drrc.lbl.gov/openadr/pdf/cec-500-2009-063.pdf> (prepared for the California Energy Commission, Public Energy Research Program). This report “outlines a communications exchange signals specification to enable demand response in end-use participant or customer systems.”

example of such a standard could be the Open Automated Demand Response (OpenADR) specification, developed by the Demand Response Research Center. OpenADR provides a standardized demand response communications and signaling infrastructure using open, industry-approved data models.

Demand response activities will generate a significant amount of new data about consumers' actions and energy usage. Protocols would be developed for the appropriate protection of this information, including standards for the entities that should, or may, have access to this information and specific conditions for accessing this information. Furthermore, it will be crucial for all newly generated data to be transmitted over secure lines of communication between system operators and demand response providers. 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 products or other enabling technologies.

Nationwide standards for charging stations for PHEVs and electric vehicles also should be adopted.<sup>79</sup> These charging stations should have appropriate communications, metering and electric flow control, and standardized plug interface. These actions would facilitate the use of PHEV and electric vehicles for their variable storage potential to provide ancillary services to the electric grid. Nationwide standards would also reduce barriers to interoperability, such as the need to develop PHEVs and electric vehicles that meet standards that vary state-by-state.

Finally, development of measurement and verification standards is needed at both the wholesale and retail levels. Methods for measuring and verifying demand response reductions vary significantly across the country at present, and measurement and verification standards will increase confidence in markets. Efforts to standardize measurement and verification are already underway. NAESB is currently leading an effort that has produced a document describing model business practices for the measurement and verification of demand response.<sup>80</sup> NAESB is also working with NERC to ensure that NERC's demand response data collection effort 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.

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<sup>79</sup> For instance, SAE International has released a standard that provides a standard interface between plug-in hybrid and battery-electric vehicles, and electrical charging systems. See SAE International, *New SAE International Standard Defines Electric-Vehicle Charging Coupler* (2010), available at [http://www.sae.org/servlets/pressRoom?OBJECT\\_TYPE=PressReleases&PAGE=showRelease&RELEASE\\_ID=114](http://www.sae.org/servlets/pressRoom?OBJECT_TYPE=PressReleases&PAGE=showRelease&RELEASE_ID=114)

<sup>80</sup> NAESB, *M&V for Demand Response Programs* (2009), available at [http://naesb.org/pdf4/dsmee\\_group2\\_070709reqcom\\_attach.doc](http://naesb.org/pdf4/dsmee_group2_070709reqcom_attach.doc).

## Develop or Enhance Demand Response Estimation Tools and Methods

<b>Purpose</b>	Determine the potential value and benefits of demand response solutions. Assess whether demand response solutions deliver value and benefits once deployed.
<b>Expected Outcome</b>	A set of tools and methods provided to regulators, operators, utilities, load-serving entities, other demand response providers, and consumers for conducting simulations, analyses, and evaluations of demand response programs that will lead to more cost-effective programs and optimal participation by consumers.

Analytical tools and methods would be developed or enhanced to: 1) help in the expansion of existing demand response programs and in the creation of new programs by valuating each program’s benefits and costs; 2) advance the use of demand response to support reliable and efficient operations of wholesale transmission, energy, capacity, and ancillary services markets; and 3) better enable end-use consumers to optimize savings, possibly through automation, while enrolled in a demand response program.

With input from the Coalition, the federal agency would oversee assistance to organizations that are developing or enhancing tools and methods. These organizations would begin by identifying well-established tools and methods already being used to evaluate program impacts and cost-effectiveness. Next, organizations would consider how these tools could be enhanced or consider areas where the development of additional tools would be beneficial. To do this, organizations should engage in new research identifying beneficial characteristics of existing tools or meet through conference venues to foster information-sharing on current successful examples. Based on the outcomes of either of these options, projects to modify existing tools and methods or develop new ones would be identified. The Coalition would help identify options such as the degree of customization. For instance, it might be better that some tools be developed at a generic level and then customized at user expense, while other tools include pre-developed options that allow users to customize them without additional expense.

These tools and materials would be tailored to circumstances in wholesale and retail markets, and tailored to restructured markets and non-restructured markets with vertically integrated utilities, so as to capture the differing sets of incentives and rules for pursuing demand response. For instance, tools for analyzing retail demand response programs must reflect that these programs are run through load-serving entities or other demand response providers, and that consumers are usually faced with a tariff or contractual obligation for participation in demand response programs. Conversely, tools for analyzing wholesale demand response programs must be built to reflect that participants are bidding resources into a market, possibly setting the RTO’s locational price.

In addition to helping to maximize the amount of demand response resources in deployment, these tools and methods also could be structured to support energy efficiency programs. This could be achieved by making the tools and methods more flexible and not focused solely on demand response. In particular, the tools and methods could include the option to calculate



the impacts, benefits, costs, etc., of utilizing more energy-efficient equipment. The integration of energy efficiency with demand response in the creation of tools and methods will advance the objectives of both types of demand side resources.

The following sub-sections suggest the types of tools and methods that could be developed to support demand response.

### **System Impact Estimation and Prediction Tools**

System impact estimation and prediction tools are important because they allow stakeholders and policymakers to estimate the effects of demand response programs, products, technologies, and incentives on system resource requirements, wholesale prices, and emissions of carbon dioxide and other air pollutants before spending money on pilots and/or full implementation. For some types of demand response programs, baseline predictions on consumer demand would need to be calculated. Tools and methods for conducting these calculations should be developed.

Tools that can analyze some aspects of potential demand response impacts already exist. As part of the resource planning process, most utilities and RTOs operate capacity expansion models through which demand response and energy efficiency measures can “compete” with supply-side resources to determine the optimal mix of resources for the system. In this case, the federal agency, with input from the Coalition, should facilitate a deeper understanding of how demand-side programs should be accurately integrated into what have traditionally been more supply-side-centric modeling frameworks.

Additionally, through the National Assessment, FERC staff and contractors developed a tool for estimating the state-level potential for demand response under a variety of scenarios.<sup>81</sup> This tool was the basis for the estimates of demand response potential provided in the National Assessment and has served as a valuable starting point for individual states and other entities to conduct more detailed and tailored assessments of their own.

To support the National Action Plan and to bridge the gap between estimates of demand response potential and existing capacity expansion plans, FERC staff and contractors are in the process of developing a quantitative estimation tool that, given a capacity expansion plan, will yield information on plant dispatch and energy margins, reserve margins, and unused supply. For a brief description of the tool under development, see Sidebar 3 at the end of this section.

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 free online tool is available to any large customer (200 kilowatts [kW] or greater) with 15-minute-interval load shape data and temperature readings to guide decisions related to demand response. InterAct’s Energy and Cost Analysis module provides customers with tools to create graphs and charts, conduct

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<sup>81</sup> The model is available at <http://www.ferc.gov/industries/electric/indus-act/demand-response/dr-potential.asp>.

statistical analyses, and export data. These options allow the consumer to closely track and understand their electric demand and usage. This tool helps consumers optimize their participation in demand response programs by notifying them of events via multiple media, allows consumers to easily accept or decline a curtailment notice, and gives consumers actual demand reductions and incentive payments after the event day.<sup>82</sup>

Another example comes from the Building Energy Software Tools Directory.<sup>83</sup> The Demand Response Quick Assessment Tool, developed by Lawrence Berkeley National Laboratory, 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.<sup>84</sup>

A final example of an analysis tool comes from the Rocky Mountain Institute (RMI). RMI developed a dispatch model of what they call the Next Generation Utility.<sup>85</sup> The model is 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. 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.

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<sup>82</sup> For more information about the InterAct tool, visit

<http://www.pge.com/mybusiness/energysavingsrebates/demandresponse/tools/>.

<sup>83</sup> DOE developed this directory because its Office of Building Technology, State and Community Program develops 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/](http://apps1.eere.energy.gov/buildings/tools_directory/).

<sup>84</sup> To learn more about the Demand Response Quick Assessment Tool, visit

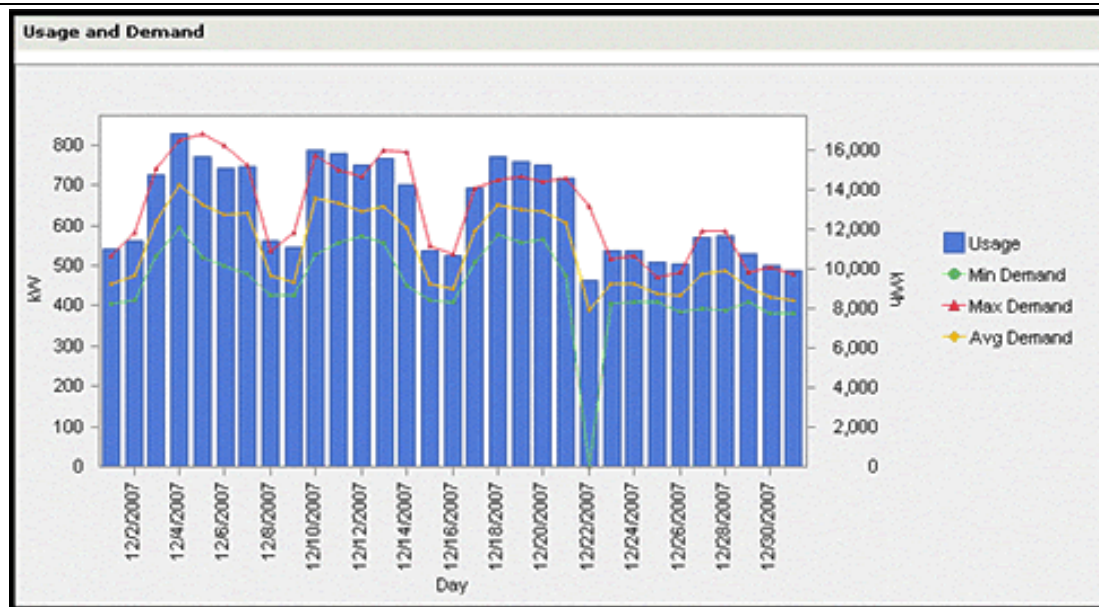
[http://apps1.eere.energy.gov/buildings/tools\\_directory/software.cfm/ID=522/pagename=alpha\\_list](http://apps1.eere.energy.gov/buildings/tools_directory/software.cfm/ID=522/pagename=alpha_list).

<sup>85</sup> For more information about RMI's dispatch model, visit <http://ert.rmi.org/research/next-generation-utility.html>.

**Example**

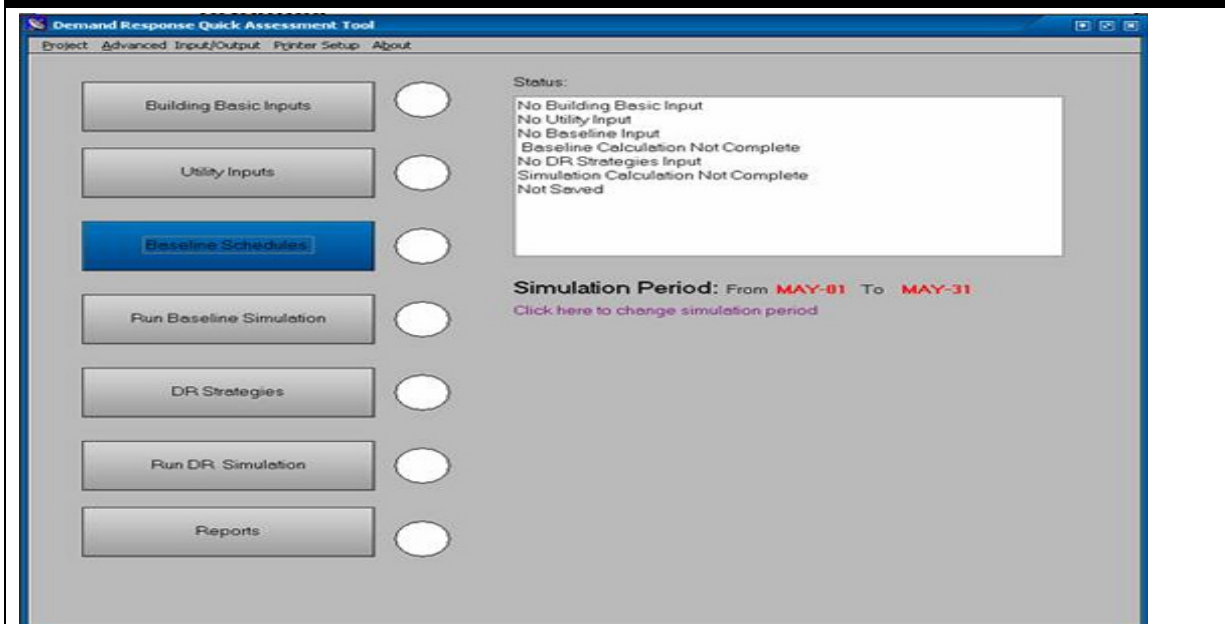
Summary Statistics	
Energy Statistic	Value
Weekday Energy Usage (kWh)	283,533.36
Weekend Energy Usage (kWh)	117,903.12
Total Energy Usage (kWh)	401,436.48
Load Statistic	Value
Load Factor	65.16
Weekend Load Factor	69.02
Weekday Load Factor	71.34
Avg Demand (kW)	539.57
Min Demand (kW)	0.00
Max Demand (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.

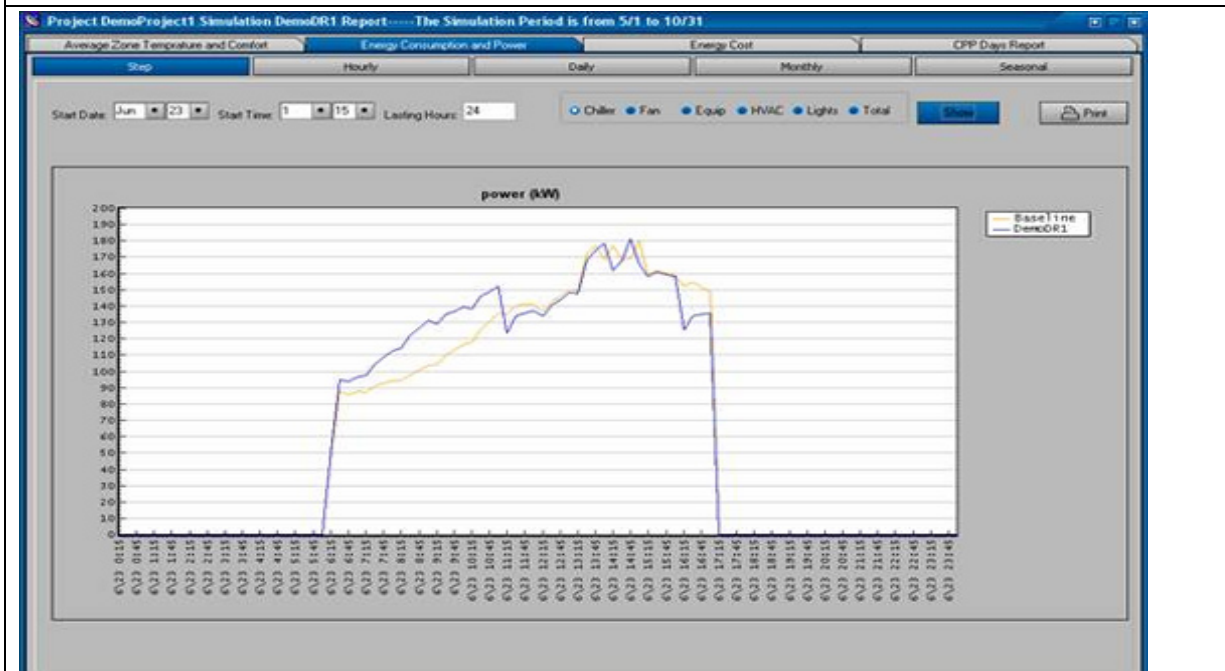


The InterAct tool summarizes usage and demand data in graphical form with temperatures overlaid.

**Example**



The Demand Response Quick Assessment Tool has an interface that allows users to set the assumptions and variables associated with a building.



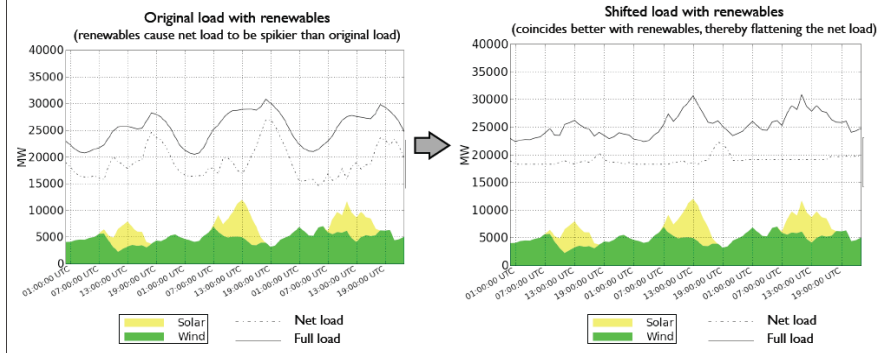
Results of the Demand Response Quick Assessment Tool simulation are presented graphically and textually for analysis.

Example

### 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.

**Resource List:**

Resource Name	Fuel	Capacity
1 Gas generators	gas	50044.0
2 Distributed Wind	wind	50000.0
3 ERCOT Solar PV fixed	solar	14000.0
4 Residential TES	Thermal Sto	0.0
5 Commercial TES	Thermal Sto	0.0
6 PHEV - Chevy Volt	Vehicles	40000.0

**Capacity Mix Pie Chart:**

- Gas: 32%
- Wind: 32%
- Vehicles: 25%
- Thermal Storage: 9%

**Dispatch Report:**

Generator name	Capacity factor, %	Utilized capacity, MW	Peak reserve
1 Gas generators	22.10	19483.14	74.88
2 Distributed Wind	35.06	40165.00	59.73
3 ERCOT Solar PV fixed	30.65	13988.80	53.07
4 Residential TES	0.00	0.00	0.00
5 Commercial TES	0.00	0.00	0.00
6 PHEV - Chevy Volt	0.36	5867.70	100.00

**Summary Metrics:**

- CO2 Emitted: 1.40 million tonnes
- Cost Incurred: \$1.17 billion
- LOLE: 0.00 days in 10 years
- Spilled energy: 0 GWh, 0.0 %

The RMI dispatch model can simulate the capacity mix for alternative scenarios and resources.

## Cost-Effectiveness Tools

Determining the cost-effective mix of demand response programs is a central challenge to any demand response provider, regulator, or policymaker. Projections of long-term benefit streams (such as avoided resource costs), identification of relevant costs, and the accurate characterization of these costs are examples of the types of calculations that must be made in assessing a program's cost-effectiveness. The creation of cost-effectiveness tools is essential to determining the most efficient mix of demand response programs for a given service territory or region.

Methods for evaluating the cost-effectiveness of demand-side management programs have been in use for many years. For example, the California Standard Practice Manual provides detailed guidelines for assessing the cost-effectiveness of demand side programs from several different perspectives.<sup>86</sup> The cost-effectiveness tests defined in the report are used by utilities and regulators across the United States and abroad. The federal agency, with input from the Coalition, could oversee and support efforts, such as national workshops or further research, to develop new methods or tailor existing methods for analyzing demand response.

A tool to help retail electricity consumers assess the net financial benefits of participating in demand response programs would be valuable, particularly for commercial and industrial consumers. The Demand Response Quick Assessment Tool discussed earlier in this section is a step in this direction. Ideally, such a tool would use the best available information to show customers how their electricity bill would change if they were to participate in a given demand response program.

A final example is a tool that aids 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. Case studies of AMI business case filings should be placed in the previously discussed web-based clearinghouse. Such filings exist for any utility that has sought regulatory approval for an investment in smart meters, and could guide cost-effectiveness analysis in a different region. Beyond case studies, a more detailed tool that would allow the user to customize analysis for a given set of system conditions and cost assumptions would further improve understanding of a given program's potential cost-effectiveness.

## Decision Tools for End-Use Consumers

Decision tools are crucial to help end-use customers understand how to change their consumption patterns to achieve bill savings and provide system benefits while enrolled in a demand response program. The federal agency, with input from the Coalition, should oversee the identification of new tools that each customer class needs, as well as support the development of selected tools. These tools should draw on past experience and case studies

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<sup>86</sup> CPUC, *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects* (2002), available at <http://drrc.lbl.gov/pubs/CA-SPManual-7-02.pdf>.

to help customers in specific industries or with specific types of facilities (e.g., warehousing, health care, or retailing) select appropriate demand response providers, programs, and technologies.

Some customers manage multiple facilities, each varying in size and relative location. Examples of such consumers include university campuses, national retailers, and federal or military sites. The development of demand response-related tools and plans to engage these existing customers with special circumstances may help achieve the maximum amount of demand response that can be developed and deployed.

Information in these tools would be updated as market, economic, and regulatory factors change.

### **Cost Recovery Tools and Methods for Enabling Technology**

Tools and methods need to be provided to develop the business case and examine options for recovering costs of installing approved, cost-effective new technologies that enable demand response. Each cost recovery option should include an assessment of the impact on customer rates. Such tools could assist utilities and state and local governing officials that are considering demand response programs by providing important information on the financial impacts of each demand response investment. The federal agency, with input from the Coalition, could facilitate discussions between utilities and state and local governing officials so that they can learn best practices from each other with regard to cost recovery.

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.

### **Tools and Methods for Incorporating Demand Response in Dispatch, Ancillary Services, Transmission, and Resource Planning**

New tools and methods should be developed to directly incorporate demand response into dispatch algorithms and resource planning models. These tools and methods are important to better capture the capability of demand response to serve as an alternative to building new generation and transmission and to act as a resource to alleviate transmission congestion. FERC's Order No. 890 could be instructive in the development of these tools and methods. In Order No. 890, FERC stated that “where demand resources are capable of providing the functions assessed in a transmission planning process, and can be relied upon on a long-term basis, they should be permitted to participate in that process on a comparable basis.”<sup>87</sup> With

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<sup>87</sup> *Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890, FERC Stats. & Regs. ¶ 31,241, at P 479, *order on reh'g*, Order No. 890-A, FERC Stats. & Regs. ¶ 31,261 (2007), *order on reh'g*, Order

input from the Coalition, the federal agency should oversee the development and implementation of a methodology to facilitate the incorporation of demand resources in these processes.

Also needed are better methods to forecast and model the capability of demand resources to adjust consumption in near real-time. Finally, hardware and software tools that allow customer appliances or vehicles to autonomously provide reliability services, such as frequency response service, should be developed.

## Transparency of Price Information

In order for large customers and policymakers to make decisions about the types of economic and business opportunities available in demand response programs, they need access to real-time or near-real-time energy prices. Therefore, there is value in developing tools that provide access to real-time or near-real-time energy prices, ancillary service prices, capacity payments, and congestion costs.

To a certain extent, real-time pricing (RTP) programs already provide information about the price of energy to participants. Many utilities have websites that provide information about the next day's hourly prices. However, additional means are often taken to alert customers about unusually high prices. In Commonwealth Edison's residential RTP program, customers are alerted via email or text message if hourly energy prices are about to exceed a pre-specified threshold. Other dynamic pricing programs will use similar means to convey information to customers about upcoming event days. However, customers do not always use these tools, and some are not aware that they even exist. The federal agency, with input from the Coalition, should oversee and support efforts to improve the effectiveness of tool design.

A different example of a tool for providing price information in an innovative way is the Energy Orb. The Energy Orb is a spherical glass lamp that emits different colors to signal off-peak, peak, and critical peak hours of the day. This is a visual aid that enhances a customer's ability to respond to price signals. Several recent dynamic pricing experiments have used the Energy Orb in conjunction with dynamic rates to assess its impacts. The results have been somewhat mixed. In the California Statewide Pricing Pilot, the Energy Orb led to greater conservation and demand response impacts among residential customers.<sup>88</sup> At Baltimore Gas & Electric Company, peak demand reductions increased from 18 to 21 percent without the Energy Orb to 23 to 27 percent when it was provided.<sup>89</sup> However, Connecticut Light & Power's recent pilot had different results: the Energy Orb did not provide any incremental demand response

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No. 890-B, 123 FERC ¶ 61,299 (2008), *order on reh'g*, Order No. 890-C, 126 FERC ¶ 61,228 (2009), Order No. 890-D, 129 FERC ¶ 61,126 (2009).

<sup>88</sup> Nexus Energy Software et al., *Information Display Pilot* (2005).

<sup>89</sup> The Brattle Group, *BGE's Smart Energy Pricing Pilot: Summer 2008 Impact Evaluation*, (2009) (prepared for Baltimore Gas & Electric Company).



benefits.<sup>90</sup> Regardless, the device serves as an example of a tool that could be used to provide information about price signals to customers.

In Table 3, is a list of the strategies and activities described in the Draft National Action Plan.

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<sup>90</sup> Connecticut Light and Power, *Results of CL&P Plan-it Wise Energy Pilot*, Docket No. 05-10-03RE01, Compliance Order No. 4 (2009).

### **Sidebar 3: The DRIVE Model**

The National Assessment answered an important question about the level of demand response that could be achieved in the United States. It also raised new questions about the implications of achieving this potential. For example:

- How would demand response programs affect load during non-event hours?
- What changes in system operations might demand response require?
- How does demand response affect the need for new capacity?
- How would carbon dioxide emissions change with demand response?
- Would these effects change with the introduction of additional smart grid programs?
- *Ultimately, what is the dollar value (benefit) of these impacts?*

To help answer such questions, FERC staff and The Brattle Group are currently developing the Demand Response Impact and Value Estimation (DRIVE) model. The DRIVE model estimates the impact of a portfolio of demand response and smart grid programs on system operations, using specific characteristics of a power system as inputs.

The DRIVE model is an example of one type of tool that could be created through the efforts of the National Action Plan. A simple user interface makes the model accessible to a broad audience, supporting the educational objectives of the National Action Plan. Its specific focus on demand response and smart grid programs makes it a useful complement to other tools that are available for assessing the system impacts of energy resources.

Preliminary work with the DRIVE model suggests that:

- Modest amounts of demand response can lead to large benefits.
- Avoided capacity cost is a significant benefit.
- Very large reductions in peak demand can lead to the creation of a new peak, which can reduce potential benefits.
- The value of large peak reductions may be enhanced by a broader range of technologies and program offerings, the benefits of which may extend beyond avoided capacity and into other areas like avoided energy costs and reduced carbon dioxide emissions.

**Table 3: Strategies and Activities****Requirements for Technical Assistance**

- Establish a National Forum
- Conduct Informational and Educational Sessions for Policymakers and Regulators
- Conduct Communications Training for State and Local Governing Officials
- Build a Panel of Demand Response Experts
- Sponsor Technical Papers
- Establish a Program for Technical Assistance for Demand Response
- Establish a Demand Response Grant Program

**Requirements for National Communications Program**

- Develop a Communications Umbrella
  - Program Development
    - Compile Case Studies
    - Identify Demonstration Program Sites
    - Conduct Program Evaluation
  - Message Framework Development
    - Conduct Foundational Market Research
    - Develop Adaptable, Consumer-Friendly Messages
    - Position Demand Response as Part of Overall Smart Energy Use
    - Develop Communications Materials, Tactics and Toolkits
    - Develop Support Materials Tailored to Large Commercial and Industrial Customers
- Local Implementation
  - Support for Demonstration Programs
  - Support for Other Demand Response Programs
- Direct Outreach to States, Policymakers, and Partners
  - Communications Assistance to States and Policymakers
  - Partnership Development

**Requirements for Tools and Materials For Use by Customers, States and Demand Response Providers**

- Develop a Web-Based Clearinghouse of Demand Response Materials
  - Case Studies of State Laws, Regulations, and Tariffs
  - Database of Pilots, Programs, and Markets
  - Quantitative and Qualitative Summaries
  - Measuring Program Results with Criteria and Metrics
  - Information for Program Implementation
  - Online Message Board Capability
  - Information About the Development of Standards and Protocols
- Develop or Enhance Demand Response Estimation Tools and Methods
  - System Impact Estimation and Prediction Tools
  - Cost-Effectiveness Tools
  - Decision Tools for End-Use Customers
  - Cost Recovery Tools and Methods for Enabling Technology
  - Tools and Methods for Incorporating Demand Response in Dispatch, Ancillary Services Transmission and Resource Planning
  - Transparency of Price Information



# Appendix 1: Coalition Examples

## ***The National Action Plan for Energy Efficiency***

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In 2006, a group 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 joined together to release the *National Action Plan for Energy Efficiency*.<sup>91</sup> Together, these stakeholders recognized that energy efficiency remained a critically underutilized resource in the nation's energy portfolio, and they published their *National Action Plan for Energy Efficiency* as a call to action to increase investment in energy efficiency. To oversee their continued work in this arena, these stakeholders formed a Leadership Group, which is a private-public initiative that operates with a limited budget and support from DOE and EPA. The Leadership Group neither sets standards or protocols for energy efficiency, nor issues grants for program design, implementation, or monitoring.

The overarching goal of the Leadership Group 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* 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.<sup>92</sup>

The *National Action Plan for Energy Efficiency* is accompanied by a tool for estimating the benefits of energy efficiency. It also envisions providing experts and resource materials to parties who are interested in pursuing energy efficiency. The document notes that success requires the joint efforts of customers, utilities, regulators, states, and other partner

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<sup>91</sup> National Action Plan for Energy Efficiency, *National Action Plan for Energy Efficiency* (2006), available at [http://www.epa.gov/cleanenergy/documents/napee/napee\\_report.pdf](http://www.epa.gov/cleanenergy/documents/napee/napee_report.pdf).

<sup>92</sup> *Id.* at ES-2, ES-6 to ES-9.

organizations.<sup>93</sup> As of January 2010, more than 120 organizations have endorsed these recommendations and/or made commitments to promote energy efficiency within their spheres of influence.

Following the release of the *National Action Plan for Energy Efficiency*, the Leadership Group published its *Vision for 2025*,<sup>94</sup> which identifies 10 implementation goals and measures the progress made so far. Among the goals are 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.<sup>95</sup> The Leadership Group has developed a suite of additional technical assistance resources to help parties achieve all cost-effective energy efficiency by 2025. These resources are publicly available at [www.epa.gov/eeactionplan](http://www.epa.gov/eeactionplan). Recently, the Leadership Group has undertaken further activities that are described in Sidebar 2.

### **The Air Bag and Seat Belt Safety Campaign**

In 1993, General Motors and the National Safety Council formed the Air Bag and Seat Belt Safety Campaign, a coalition of auto manufacturers, insurance companies, 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.<sup>96</sup> With primary funding from General Motors and the Insurance Institute for Highway Safety, this coalition 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.<sup>97</sup>

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 into the coalition.
4. Measure results through rigorous survey methods.
5. After demonstrating success, expand the program to other states while maintaining a presence in all prior states.

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<sup>93</sup> *Id.* at 1-2.

<sup>94</sup> National Action Plan for Energy Efficiency, *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>.

<sup>95</sup> *Id.* at ES-2 to ES-7.

<sup>96</sup> For more information about the Air Bag and Seat Belt Safety Campaign, visit <http://www2.nsc.org/airbag.htm>.

<sup>97</sup> 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](http://www.nhtsa.dot.gov/portal/nhtsa_static_file_downloader.jsp?file=/staticfiles/DOT/NHTSA/Vehicle%20Safety/Articles/Associated%20Files/811014.pdf).

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 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.<sup>98</sup>

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.<sup>99</sup> Child fatalities from traffic crashes dropped by 20 percent, and proper restraint use among toddlers jumped dramatically from 60 to 94 percent.<sup>100</sup> In addition, in 2004, the fatality rate on the nation's highways was the lowest since record-keeping began 35 years ago.<sup>101</sup>

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<sup>98</sup> 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).

<sup>99</sup> National Safety Council, *National Safety Council Honors Air Bag and Seat Belt Safety Campaign for Lifesaving Achievements* (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](http://www.csrwire.com/press/press_release/18157-National-Safety-Council-Honors-Air-Bag-and-Seat-Belt-Safety-Campaign-for-Lifesaving-Achievements).

<sup>100</sup> National Safety Council, *Welcome to the Air Bag & Seat Belt Safety Campaign* (2004), available at <http://www2.nsc.org/airbag.htm>.

<sup>101</sup> CNN, *Study: Seat Belt Use at an All-Time High* (2004), available at <http://www.cnn.com/2004/US/09/16/seat.belts/index.html>.





## Appendix 2: Research Gaps

In developing a list of possible areas for further research, some potential resource and research gaps have been identified. Research topics to fill these gaps are listed below, organized by whether each topic relates more to social science<sup>102</sup> research or technical issues. It will be the role of the federal agency and the Coalition, working with its members, to prioritize the topics, identify additional topics, and select a subset as candidates for further research.

### ***Social Science Research Issues***

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- Exploration of issues related to rate design, metering costs, and an analysis of customer response to time-varying prices in successful programs.
- 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.
- Estimates of customer price sensitivity by type and class of customer.
- The short run price elasticities from pilot demand response programs are results that originate in a few states (and Canadian provinces); investigate whether these results are applicable to other areas and also investigate how results would change over the long run (i.e., whether they would be higher because of equipment purchase decisions favoring storage and battery technologies or lower because of lack of persistence).
- 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; gender and income level), 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.
- Exploration of 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 how consumers shift demand to off peak hours of the day and if consumers take conservation measures to lower peak demand over all hours of the day, not just during peak hours.
- How demand response programs compare with energy efficiency programs in terms of cost-effectiveness and demand reduction efficacy.

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<sup>102</sup> 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.

- Identification of the most cost-effective demand response programs for customers that do not have advanced metering infrastructure.
- Impacts of customers participating in multiple demand response programs.
- Research on electricity use by home office workers.
- Research on effective gender-based, age-based, and race/ethnicity-based messages.
- Research to identify “discretionary use” appliances — i.e., appliances whose operations can easily be scheduled for off-peak times.
- Usage of environmentally oriented feedback information, such as carbon content, to motivate behavior change.

## ***Technical Research Issues***

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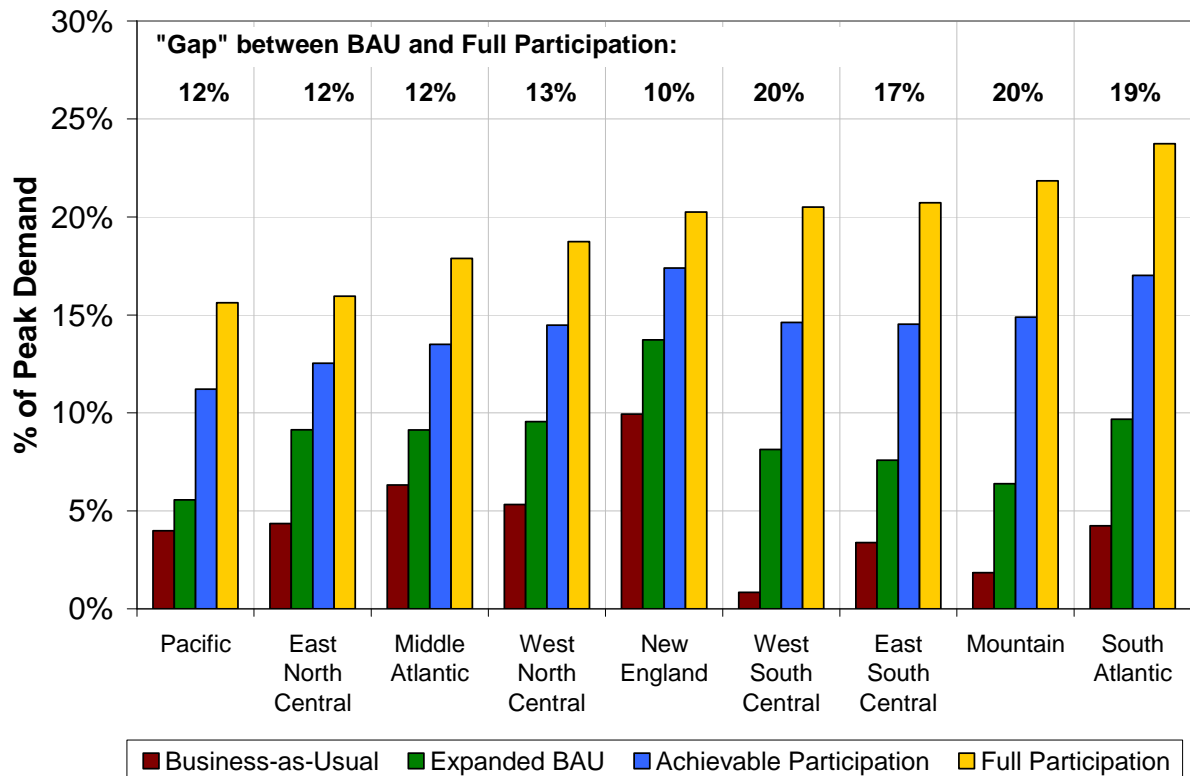
- Relative benefits and costs of various types of demand response programs, products, technologies, and incentives, covering such topics as the various types of benefits, potential costs, and payback horizons associated with each.
- Better understanding of the optimal amount of consumer versus demand response provider control of appliances.
- An analysis of the environmental effects of demand response, such as: an estimate of emissions mitigation when considering load reduction versus load shifting; an assessment of the potential for demand response to assist in 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 with other resources such as generation, transmission, and storage.
- A study of how demand response resources can be dispatched to support and balance variable generation from renewable energy.
- A study of how plug-in hybrid electric vehicles (PHEVs) 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.
- Research into 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. 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 database, customer awareness, access to data, retrofitting existing meter connections with smart technology, and consumer protections.
- 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 the state electricity portfolio under municipal, county, state, and federal control, and the potential impact of incorporating government loads into demand response programs and products.
  - Ensuring smart grid cybersecurity, system reliability, and systems interoperability, especially considering 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.
  - 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.
  - Economic and reliability impacts of PHEVs as they penetrate the market.
  - Exploration of the effectiveness of various types of in-home displays.
  - Exploration of impacts that the battery life of various home area network devices and in-home displays will have on residential participation in demand response programs.
  - Exploration of impacts on appliance/electronics longevity that are cycled on/off by demand response programs.
  - Research the development of a federal demand response mandate, and assess the impact of cutting off funding to states that refuse to participate in demand response programs.
  - Research consumer willingness to sell back energy from micro-generation and home storage to offset peak periods.
  - 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.
  - Curtailable load programs aimed at industrial customers, covering such topics as potential benefits to all customers, cost recovery, rate design, and program marketing.
  - The relationship of demand response to other state energy initiatives (e.g., energy efficiency, renewable energy, smart grid). This research would explore how demand response overlaps or complements these other initiatives, and where management and oversight could be leveraged or combined.
  - 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.

- The ability to integrate large-scale renewable energy resources and electric vehicles, which is critical to advance the benefits of demand response.
- The impact of distributed generation as a resource that can be integrated more effectively in conjunction with demand response.
- An assessment of the location impacts of demand response.
- A study that identifies the load and peak demand profiles of the electricity control areas.

## Appendix 3: Examples of Existing Demand Response Programs

This appendix presents a few examples of existing demand response retail and wholesale programs around the United States. To put these case studies in context, Figure 6, which is taken from the National Assessment, shows the regional variation in the national potential for demand response.



**Figure 6: Regional Demand Response Potential**

## ***Retail Programs***

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### 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, the Arizona Public Service Company and the Salt River Project, have offered time-of-use (TOU) pricing programs to their residential customers for over two decades.<sup>103</sup> During this time, they have attracted some 30 to 40 percent of the residential market.<sup>104</sup> 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 United States.<sup>105</sup> Typical TOU customers on this program lower their bill by 7 percent.<sup>106</sup> 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. 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 consumption<sup>107</sup> are a major reason that per capita electricity use in California has stayed constant during the past three decades, while the per capita consumption in the United States has grown appreciably.<sup>108</sup> Later, during the western energy crisis of 2000–2001, California developed an Energy Action Plan that specified a loading order of resources: first, energy efficiency; second, demand response; third, renewable energy sources; and finally, conventional generation options.<sup>109</sup>

The Energy Action Plan also set a target reduction in peak demand of 5 percent for 2007.<sup>110</sup> When California's three investor-owned electric utilities only achieved 40 percent of that target in 2007, they were asked to revamp their efforts. Simultaneously, the California Public Utilities

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<sup>103</sup> 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](http://www.aps.com/aps_services/residential/rateplans/Default.html) (Arizona Public Service Company).

<sup>104</sup> eMeter, *Demand Response: An eMeter White Paper Presentation* (2008).

<sup>105</sup> 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>.

<sup>106</sup> *Id.*

<sup>107</sup> Cal. Code Regs. tit. 20, §§ 1601–1608 (2009) (efficiency standards for appliances); Cal. Code Regs. tit. 24.

<sup>108</sup> California Energy Commission, *2007 Integrated Energy Policy Report*, at 3–4 (2007).

<sup>109</sup> State of California, *Energy Action Plan*, at 4 (2003).

<sup>110</sup> *Id.*

Commission approved business cases for the deployment of advanced metering initiatives (AMI) by all three utilities,<sup>111</sup> 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 of pending energy shortages and to encourage them to curtail energy use.<sup>112</sup> 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.<sup>113</sup> 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.<sup>114</sup> 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.<sup>115</sup> 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 on January 1, 2008.<sup>116</sup> The identified resource needs must first be met through all available energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible.<sup>117</sup> 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.<sup>118</sup>

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<sup>111</sup> See, e.g., Pacific Gas & Electric Company, *Decision Adopting Dynamic Pricing Timetable and Rate Design Guidance for Pacific Gas & Electric Company*, D. 08-07-045 (2008).

<sup>112</sup> For more information about the Flex Your Power campaign, visit <http://www.fypower.org/>.

<sup>113</sup> For more general information about the pilot program and its results, see Charles River Association, *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](http://sites.energetics.com/madri/toolbox/pdfs/pricing/cra_2005_impact_eval_ca_pricing_pilot.pdf).

<sup>114</sup> See *id.*

<sup>115</sup> 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](http://www.sfpower.org/SFCP_TrackB_FocusGroups.pdf) (finding strong statistical support that customers wanted to remain on the critical peak pricing rates).

<sup>116</sup> Conn. Gen. Stat. § 16a-3a (2008).

<sup>117</sup> *Id.*, § 16a-3a(c).

<sup>118</sup> *Id.*

In summer 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.<sup>119</sup> Data from this program have been analyzed and the results have led to a number of conclusions about customer response to prices, both with and without various enabling technologies.<sup>120</sup>

This case study indicates that legislation can be passed that encourages the use of demand response. It also shows 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.<sup>121</sup> This biennial resource report requires Delaware Power & Light to project a 10-year supply and demand forecast. Additionally, Delaware Power & Light must propose the resource mix it proposes to meet its long-term obligations over the 10-year period, including the use of demand-side management programs.<sup>122</sup>

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 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.<sup>123</sup> This program 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 kilowatt-hour and the critical peak pricing (CPP) tariff applied during the top 1 percent of the hours is four times higher.<sup>124</sup> 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 bills after paying a monthly fee of about \$5 a month.<sup>125</sup> Gulf Power estimates that the program induces a drop of 2 kW per participating customer, amounting to approximately 40 to 50 percent of customer load during the top 1 percent of the hours of the year.<sup>126</sup> The program is generating interest among other Florida utilities as well.

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<sup>119</sup> Connecticut Light and Power, *Plan-It Wise Energy Program*, <http://www.clp.com/home/saveenergy/goinggreen/planitwise.aspx> (2009).

<sup>120</sup> "CL&P Energy Program Pilot Customers Respond to Price Signals," *Transmission & Distribution World* (2010), available at [http://tdworld.com/customer\\_service/clp-energy-program-20100101/](http://tdworld.com/customer_service/clp-energy-program-20100101/).

<sup>121</sup> Del. Code Ann. tit. 26, § 1002(4) (2009).

<sup>122</sup> *Id.*

<sup>123</sup> Gulf Power, *Energy Select* (2009), <http://www.gulfpower.com/energysselect/index.asp>.

<sup>124</sup> Gulf Management Company, *Good Cents SELECT: Advanced Energy Management Program*, at slide 6 (2006), available at [www.ewh.ieee.org/r3/nwflorida/presentations/01\\_19\\_06.ppt](http://www.ewh.ieee.org/r3/nwflorida/presentations/01_19_06.ppt).

<sup>125</sup> *Id.*

<sup>126</sup> Thompson J, Gulf Power, *Presentation for the Southeast Energy Efficiency Meeting*, at 14 (2007), available at <http://www.epa.gov/RDEE/documents/southeast->



One is running a pilot to test customer acceptance and response, which is being closely tracked by the others.

Florida Power & Light's (FPL's) demand response program, "On Call," is one of the largest load management systems (LMSs) 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 with the total cost of adding new peak load power generating plants.

An essential element of the success of the program is keeping customers enrolled in the program and maintaining the equipment in the field to ensure that 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, although in other cases, customer service representatives may have to respond to a customer's 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 a 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.<sup>127</sup>

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

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[meeting/thompson\\_southeast\\_energy\\_efficiency\\_meeting\\_atlanta\\_ga.pdf](#) (discussing real-time pricing and the Good Sense *SELECT* program at Gulf Power).

<sup>127</sup> Email from Julie Kreafler, Manager, Product Marketing, Florida Power and Light Company, to Ahmad Faruqui (Sep. 16, 2009, 9:47 PM ET) (on file with The Brattle Group).

## Georgia

Georgia Power has operated the nation's largest real-time pricing program directed at large commercial and industrial customers since the mid-1990s.<sup>128</sup> 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.<sup>129</sup> 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 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.<sup>130</sup>

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.<sup>131</sup> 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 setting the tariff, each electric utility was required to, at a minimum, describe its methodology and the manner in which real-time customers would have 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, and was entitled to recover incurred costs in implementing real-time pricing. These costs were imposed on all customers — those who elected to participate in a real-time pricing rate and those who did not.

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<sup>128</sup> O'Sheasy M, "How to Buy High and Sell Low: Spot Priced Electricity Offers Financial Rewards," *Pricing in Competitive Electricity Markets* 295 (2000).

<sup>129</sup> Braithwait S, *Evaluating Changes in RTP Price Response — The Effect of Market and Environmental Conditions*, prepared for the International Energy Program Evaluation Conference Proceedings in New York (2005).

<sup>130</sup> *Id.*

<sup>131</sup> 2005 Ill. Laws 977 (amending 220 Ill. Comp. Stat. Ann. 5/16-101A, 16-102, 16-107).

At the end of 2007, the first full year required under the law, Commonwealth Edison had 3,334 and Ameren had 500 active participants in their respective residential real-time pricing programs. In that year, average bill savings for all participants in the Commonwealth Edison program was about 13 percent.<sup>132</sup> Ameren participants, on the other hand, had a total savings of 16 percent compared with what the same bill would have been under the flat rate.<sup>133</sup>

By the end of 2008, Commonwealth Edison and Ameren had increased their enrollments to 5,838 and 3,147 active participants, respectively, though average bill savings fell to 2.5 percent for all participants in the Commonwealth Edison program<sup>134</sup> and 9 percent in the Ameren program.<sup>135</sup>

This case study indicates that legislation can be used to encourage dynamic pricing. Also, real-time pricing rates are feasible for residential customers and 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.<sup>136</sup> 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 older, less-efficient equipment.<sup>137</sup>

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<sup>132</sup> 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>.

<sup>133</sup> 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>.

<sup>134</sup> 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>.

<sup>135</sup> 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=06-0691&docid=136151>.

<sup>136</sup> 2008 Mass. Acts 50 (amending Mass. Gen. Laws ch. 164B, § 116(a) (2009)).

<sup>137</sup> Governor Deval Patrick, *Governor Patrick Signs Energy Bill Promoting Cost Savings, Renewable and Clean Energy Technology* (2008), available at [http://www.mass.gov/?pageID=gov3pressrelease&L=1&L0=Home&sid=Agov3&b=pressrelease&f=080702\\_bill\\_energy\\_clean&csid=Agov3](http://www.mass.gov/?pageID=gov3pressrelease&L=1&L0=Home&sid=Agov3&b=pressrelease&f=080702_bill_energy_clean&csid=Agov3).

## Michigan

In January 2007, the Michigan Public Service Commission (PSC) submitted its *21<sup>st</sup> Century Electric Energy Plan*<sup>138</sup> in response to an executive order from the governor the year before. One of the recommendations in the 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). The plan also recommends pilot programs employing advanced metering infrastructure to provide real-time price information to customers.

In Consumers Energy's Balanced Energy Initiative, the company forecasted that load management, demand response, and interruptible load programs would reduce retail peak by 9.3 percent by 2030.<sup>139</sup> The reduction would be implemented through a comprehensive AMI program that includes central air conditioning load management and demand response programs for residential and small commercial customers. This program would reduce peak demand as well as ongoing energy requirements.<sup>140</sup>

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 with strategic control groups.

The research is distinguishable from previous demand response pilot programs because it will 1) carefully use treatment randomization to achieve internal and external validity; and 2) address a set of questions that extend beyond a standard investigation of load-shifting behavior.<sup>141</sup> At a high level, this research aims 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 critical peak pricing against critical peak rebates.
- Understand consumer responses to real-time provision of information regarding electricity usage, during both peak and off-peak periods.

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<sup>138</sup> Lark JP, *Michigan's 21<sup>st</sup> Century Electric Energy Plan* (2007), available at [http://www.michigan.gov/documents/mpsc/21stcenturyenergyplan\\_185274\\_7.pdf](http://www.michigan.gov/documents/mpsc/21stcenturyenergyplan_185274_7.pdf).

<sup>139</sup> Consumers Energy Company, *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).

<sup>140</sup> 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.

<sup>141</sup> Email from Mark Lesiw, AMI Senior Program Manager of Load Management, Consumers Energy, to Ahmad Faruqui (Sep. 2, 2009, 1:19 PM ET) (on file with The Brattle Group).

- 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 that 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 AMI investment.<sup>142</sup>

In addition to future efforts, demand reduction has been conducted in Michigan for many years. Detroit Edison maintains a significant Direct Load Control Interruptible Air Conditioning (IAC)<sup>143</sup> program, which was established over 20 years ago during the days of demand-side management. IAC has grown to over 280,000 enrolled customers (of 1.9 million total customers, with a 79.1 percent central air conditioning saturation)<sup>144</sup> 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 10 years ago. This decrease in load reduction is due to the increase in efficiency of central air conditioning units over the years.<sup>145</sup>

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-minute 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.<sup>146</sup>

In addition, the program is used for localized substation load relief. Detroit Edison developed a remote control program using IAC customers (identified by the substation serving them) that is

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<sup>142</sup> *Id.*

<sup>143</sup> DTE Energy, *Interruptible Air Conditioning Rate* (2009), <http://www.dteenergy.com/residentialCustomers/billingPayment/rates/electric/interruptibleRates.html>.

<sup>144</sup> Email from Mark Williamson, Manager, Load Research, DTE Energy, to Ahmad Faruqui (Aug. 31, 2009, 1:21 PM ET) (on file with The Brattle Group).

<sup>145</sup> *Id.*

<sup>146</sup> Email from Mark Williamson, Manager, Load Research, DTE Energy, to Ahmad Faruqui (Aug. 31, 2009, 9:48 AM ET) (on file with The Brattle Group).

capable of interrupting only customers taking service within substation-serviced areas.<sup>147</sup> This program has proven very successful at relieving load on overloaded substations and avoiding localized circuit rotation, brownouts, and in extreme cases the loss of a substation transformer.<sup>148</sup>

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 bills to customers. Instead of overhauling the entire billing system and the process of mailing bills, it is possible to include a simple dynamic pricing line item adjustment in the current 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's PowerCentsDC pilot program,<sup>149</sup> is provided in Figure 7. This example is not the actual bill that pilot program participants receive. Rather, this is supplemental information included as an insert with the actual bill.<sup>150</sup>

This case study provides an example of a billing structure that considers the many regulatory and information technology factors surrounding the billing of customers.

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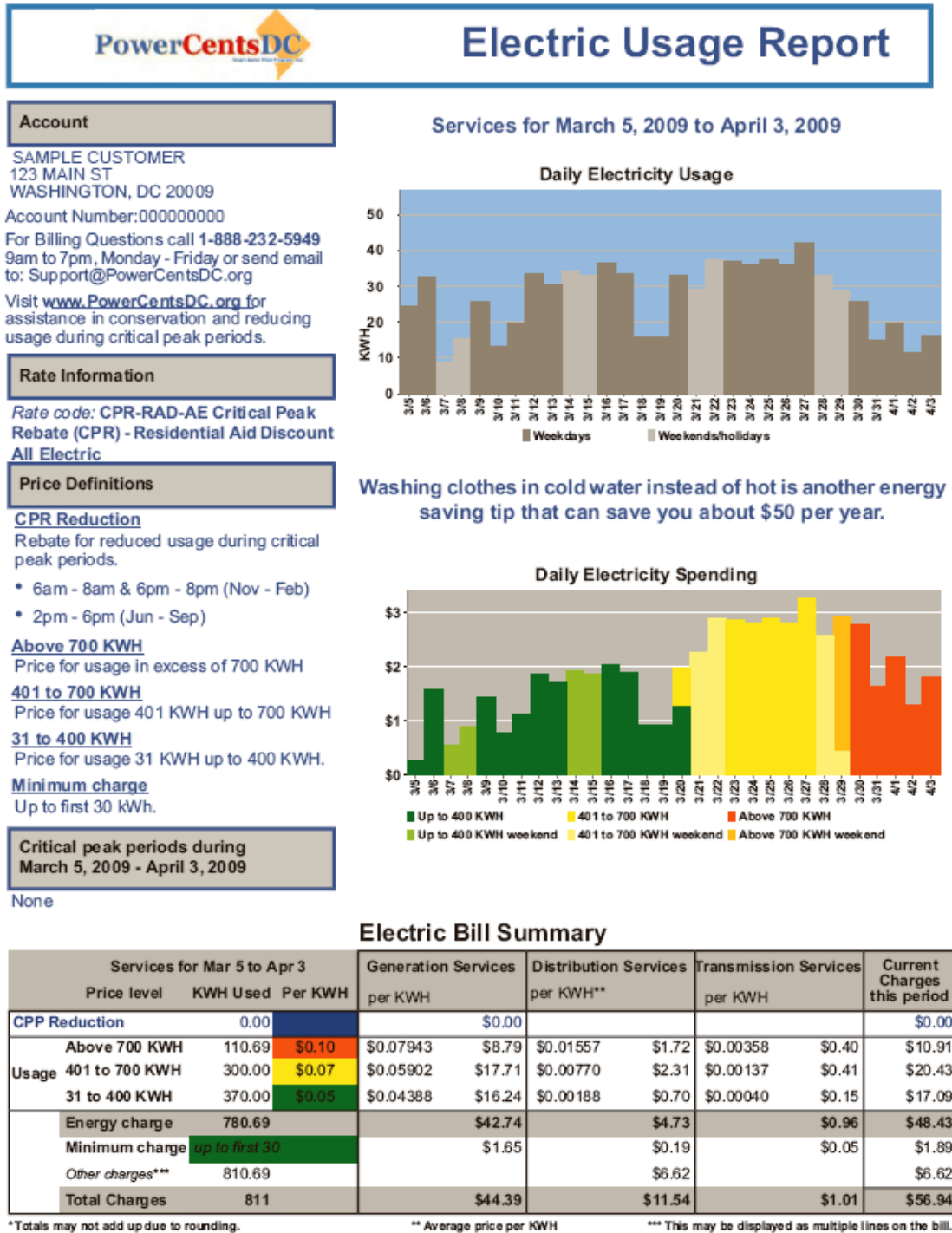
<sup>147</sup> See MacDonald T, *The Localized Substation Load Relief Program at Detroit Edison*, Presentation for AEIC National Conference (2006), PowerPoint available at [http://www.aeic.org/load\\_research/docs/15\\_2006\\_09\\_The\\_Localized\\_Substation\\_Load\\_Relief\\_Program\\_at\\_Detroit\\_Edison\\_presentation\\_.ppt](http://www.aeic.org/load_research/docs/15_2006_09_The_Localized_Substation_Load_Relief_Program_at_Detroit_Edison_presentation_.ppt).

<sup>148</sup> See *id.*

<sup>149</sup> For more information about this pilot program, please visit <http://www.powercentsdc.org/>.

<sup>150</sup> Emails 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 7: PowerCentsDC Pilot Program Sample Bill



## Wholesale Programs

Regional transmission organization (RTO) and independent system operator (ISO) program offerings are summarized below.<sup>151</sup>

<i>Name</i>	<i>Service Type</i>	<i>Trigger</i>	<i>Response Time</i>
<b>California ISO</b>			
Participating Load Program	Energy	Market bid (energy price > offer price)	1 hour
Participating Load Program	Reserve	Market bid (capacity bid and separate energy bid > offer price)	10 minutes
<b>Electric Reliability Council of Texas</b>			
Emergency Interruptible Load Service	Capacity	Reliability	10 minutes
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)
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-minute response for remaining obligation to electronic instruction
Loads Acting as a Resource Providing Non-Spinning Reserve Service	Reserve	Reliability	30 minutes
Controllable Load Resources Providing Regulation Service	Regulation	Reliability	Effectively instantaneous
<b>ISO-New England</b>			
Real Time Demand Response Program (Capacity Component)	Capacity	Reliability	10 minutes/30 minutes
Real Time Demand Response Program (Energy Component)	Energy	Reliability	10 minutes/30 minutes

<sup>151</sup> 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).



<i>Name</i>	<i>Service Type</i>	<i>Trigger</i>	<i>Response Time</i>
<b>Day-Ahead Load Response Program for RTDRP</b>	Energy	Market bid (day-ahead LMP = or > offer price)	Effectively instantaneous
<b>Day-Ahead Load Response Program for RTPR</b>	Energy	Market bid (day-ahead LMP = or > offer price)	Effectively instantaneous
<b>Demand Response Reserves Pilot</b>	Reserve	Reliability	30 minutes
<b>Real Time Price Response Program</b>	Energy	Market bid (day-ahead or forecast real-time LMP = or > \$100/MWh)	Effectively instantaneous
<b>Real Time Demand Response Resource</b>	Capacity	Reliability	30 minutes
<b>FCM: On-Peak, Seasonal Peak Resources</b>	Capacity	Reliability	Effectively instantaneous
<b>Real Time Emergency Generation Resource</b>	Capacity	Reliability	Effectively instantaneous
<b>Midwest ISO</b>			
<b>Emergency Demand Response</b>	Energy	Reliability	Resource-specific (biddable parameter)
<b>Demand Response Resource Type I</b>	Energy	Market bid (energy price > offer price)	5 minutes
<b>Demand Response Resource Type I</b>	Reserve	Market bid (energy price > offer price)	10 minutes
<b>Demand Response Resource Type II</b>	Energy	Market bid (energy price > offer price)	5 minutes
<b>Demand Response Resource Type II</b>	Reserve	Market bid (energy price > offer price)	10 minutes
<b>Demand Response Resource Type II</b>	Regulation	Market bid (energy price > offer price)	Effectively instantaneous
<b>Load Modifying Resource</b>	Capacity	Reliability	—
<b>New York ISO</b>			
<b>Day-Ahead Demand Response Program</b>	Energy	Market bid (energy price > offer price) (security-constrained unit commitment)	—
<b>Demand Side Ancillary Services Program</b>	Reserve	Market bid (energy price > offer price) (security-constrained economic dispatch) (10 minute ramp)	10 minutes
<b>Demand Side Ancillary Services Program</b>	Reserve	Market bid (energy price > offer price) (security-constrained economic dispatch) (10 minute /30 minute ramp)	10 minutes/30 minutes

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<i>Name</i>	<i>Service Type</i>	<i>Trigger</i>	<i>Response Time</i>
<b>Demand Side Ancillary Services Program</b>	Regulation	Market bid (energy price > offer price) (security-constrained economic dispatch)	Effectively instantaneous
<b>Emergency Demand Response Program</b>	Energy	Reliability	2 hours
<b>Installed Capacity Special Case Resources (Energy Component)</b>	Energy	Reliability	2 hours
<b>Installed Capacity Special Case Resources (Capacity Component)</b>	Capacity	Reliability	2 hours
<b>PJM</b>			
<b>Economic Load Response</b>	Energy	Market bid (self-scheduled, cleared day-ahead bid, or real-time dispatch)	Resource-specific
<b>Economic Load Response</b>	Reserve	Reliability (one hour notice)	10 minutes
<b>Economic Load Response</b>	Reserve	Reliability (day-ahead notice)	30 minutes
<b>Economic Load Response</b>	Regulation	Reliability	Effectively instantaneous
<b>Emergency Load Response — Energy Only</b>	Energy	Reliability	1 hour or 2 hours (participant-selected)
<b>Full Emergency Load Response (Capacity Component)</b>	Capacity	Reliability	1 hour or 2 hours (participant-selected)
<b>Full Emergency Load Response (Energy Component)</b>	Energy	Reliability	1 hour or 2 hours (participant-selected)
<b>Southwest Power Pool</b>			
<b>Variable Dispatch Demand Response</b>	Energy	Market bid (energy price > offer price) (security-constrained economic dispatch)	5 minutes

FCM: forward capacity market

LMP: locational marginal price

MWh: megawatt-hour

RTDRP: real-time demand response program

RTPR: real-time price response

## Appendix 4: List of Commenters

The following parties presented comments at the Technical Conference held at the Commission's headquarters on November 19–20, 2009:

<b>Party Name</b>
Wal-Mart Stores, Inc., Ken Baker
Illinois Commerce Commission, Sherman Elliott
Florida Power & Light, John Haney
Demand Response Coordinating Committee, Dan Delurey
Sacramento Municipal Utility District, Jim Parks
Hess Corporation, Jay Kooper
National Rural Electric Cooperative Association, David Mohre
Ohio Consumers' Counsel, Janine Migden-Ostrander
Alcoa, Inc., Walter Brockway
ISO-New England, Inc., Henry Yoshimura
Energy Curtailment Specialists, Paul Tyno
To the Point, Judith Schwartz
General Electric, Mary Bell
IBM Energy and Utilities, Don Mak

The following parties submitted written comments to the Commission in response to the Discussion Draft:

<b>Party Name</b>
American Public Power Association
Brett Feldman
California Department of Water Resources State Water Project
California Public Utilities Commission
Californians for Renewable Energy, Inc.
Constellation Energy Commodities Group, Inc. and Constellation NewEnergy, Inc.
Demand Response and Smart Grid Coalition
Demand Response Coordinating Committee
District of Columbia Public Service Commission
Edison Electric Institute
Electricity Consumers Resource Council
Energy Curtailment Specialists, Inc.
Environmental Defense Fund
Federal Trade Commission
Hess Corporation
heyCoop, LLC
National Association of Regulatory Utility Commissioners
National Association of State Utility Consumer Advocates
National Grid USA
National Rural Electric Cooperative Association
New York State Public Service Commission
North America Power Partners LLC
North American Electric Reliability Corporation
Occidental Chemical Corp. et al.
Ohio Public Utilities Commission
Pacific Gas & Electric Co.
Peak Load Management Alliance Aztech Associates, Inc. Comverge, Inc. CPower, Inc. Energy Curtailment Specialists Schneider Electric Southern California Edison Summit Blue Consulting

<b>Party Name</b>
Portland General Electric Co.
Project for Sustainable FERC Energy Policy
PSEG Companies
Robert Borlick
San Diego Gas & Electric Co.
Smart Grid Library (Christine Hertzog)
Southern California Edison Co.
Steel Producers
Tendril Networks, Inc.
To the Point
Utilimetrics Peak Load Management Alliance
Utility Economic Engineers (Mark B. Lively)
Wal-Mart Stores, Inc.
Ziphany, LLC