UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Discussion Draft of Possible Elements of a) Docket No. AD09-10-000
National Action Plan on Demand Response)

COMMENT OF THE FEDERAL TRADE COMMISSION
December 11, 2009

I. Introduction

The Federal Trade Commission (FTC) apprec outreach efforts aim to help these stakeholders develop programs to better manage demand and to support marketing that encourages consumers to participate. Yet it is end-users – consumers and businesses – who create and control demand, and who ultimately will choose whether to participate in demand response programs. Thus, the Action Plan should place greater emphasis on designing programs that consumers find convenient and attractive. A deep understanding of consumers' preferences and motives, decision-making patterns, ability to deal with technology, and willingness to pay attention to energy use should inform the design of demand response programs. Such well designed programs can deliver benefits, including reduced bills, a greater sense of control over power bills, and increased electric system reliability. The best programs not only are attractive to participating consumers, but also benefit utilities and all ratepayers by helping to solve the engineering challenge of matching the quantity of power generated to the quantity consumed minute-by-minute.

The Action Plan proposes constructive consumer research regarding how best to explain demand response to consumers. We think that consumer research that sharpens one's understanding of consumers' needs, perceptions, and preferences also has a crucial role to play in designing demand response programs. For example, a better understanding of consumers' concerns could inform choices about tradeoffs between electric pricing accuracy and simplicity; between the costs and benefits of installing "enabling" technology that allows consumers to program their thermostats to reduce air conditioner operations automatically when power is scarce; and between the simplicity and "customizability" of that enabling technology. A better understanding of consumers informs the development of programs that customers perceive as attractive, fair, and low-risk, and as contributing [illegible]

- The Action Plan should recognize that le[illegible]ing and equipment upgrades will improve customers' ability to respond over time to [illegible]ograms such as dynamic pricing. The Action Plan should foster learning and should info addition, the FTC has held public conferences on energy topics, including *Energy Markets in the 21st Century* (April 10-12, 2007).[7]

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the system by exploiting the baseline's own counterproductive incentives. In practice, customers often can alter their use patterns in ways that exploit the baseline-setting formulas in order to increase their rebates, without changing their critical period use. Idiosyncratic factors can lead baselines to differ widely from the amount the customer would have used in the absence of incentives to conserve. These factors include differences in weather between the baseline-setting and critical periods, in the number of people present, and in the equipment in use. As a result, sometimes administrative programs are beset with intractable problems.

Conversely, one virtue of dynamic pricing programs is that they require only metering data about actual usage and thus simplify measurement and verification, eliminating some of the problems described above. Dynamic pricing programs' incentives typically are fairly transparent and generally do not allow idiosyncratic or strategic choices to lead to unintended changes in incentives to conserve.[12]

C. Improving the section on dynamic pricing

Although Section 2.3.4 ("Provide Guidelines on Rate Design for Dynamic Pricing")

understanding of demand response as well as its benefits.[14]" This analysis is particularly important in light of consider

The best demand response programs incorporate consumer interests and preferences, create efficient incentives, address the nature of scarcity and volatility in the region, and address regulatory and utility concerns. The Action Plan adequately addresses important engineering, stakeholder, and regulatory concerns at the design stage, but needs to incorporate consumer concerns as well. Below are examples of consumer research projects that can inform demand response program design. Some of this consumer research might inform both the technical paper series in Action Plan Section 2.1.5 and the analytical tools discussed in Section 2.3.1.

A. Control

- Which consumers prefer highly automated response to rapidly changing pricing (perhaps augmented with price displays), manual response to simpler pricing models, or direct load control? How are these preferences sensitive to details like user interfaces, the perception of user control, price ceilings, and bill risk? The Pacific Northwest National Lab GridWise trial reported high levels of consumer satisfaction with a program that automated response to 5-minute pricing.[17] California's statewide pricing pilot kept customers satisfied with manual response to simple pricing,[18] while a major residential CPP program gets very high satisfaction rates with a combination of simple pricing and "set it and forget it" automation.[19] All of these options seem technically feasible. Consumer preferences and cost-benefit calculations should be major aspects of the choice.

- Residential CPP program customers reported that increased control over their electricity usage and bills was a major benefit of participation. This raises questions such as: What do customers mean by increased control? How can we build programs and user interfaces to deliver a sense of control, or offer marketing materials to convey that sense? How can those approaches be incorporated into a consumer-friendly design that addresses other consumer and company preferences?

- What kinds of enabling technology interfaces, usage and price displays, and feedback enable customers to respond better? Which display approaches increase satisfaction?

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[17] D. J. Hammerstrom, et al., "Pacific Northwest GridWise Testbed Demonstration Projects," available at http://gridwise.pnl.gov/docs/op_project_final_report_pnnl17167.pdf

[18] Karen Herter, "Residential implementation of critical-peak pricing of electricity" (Lawrence Berkeley National Laboratory, 2006), available at http://escholarship.org/uc/item/6tq6c9d4

[19] Brian White, "GoodCents SELECT Advanced Energy Management Program" (Gulf Power Co., PowerPoint presentation), available at http://www.ewh.ieee.org/r3/nwflorida/presentations/01_19_06.ppt

- If consumers want automation to simplify and ensure their response while they lead complex lives, how much control do they want over their response? The user interface could offer a simple continuum between “maximize comfort” and “maximize savings”; or it could let customers express complex preferences about time- and appliance-specific response strategies. For example, such a user interface might allow a consumer to choose to make air conditioning very price-sensitive during the afternoon and modestly sensitive during the evening.

B. Rates and features, risk and distribution

- What features would attract end-user participation by eliminating what end-users view as major problems? Do customers find it important to be able to adjust their home thermostats remotely by mobile phone or Internet, so that they can come home to a comfortable house? How many consumers will refuse to sign up for CPP programs that sometimes expose them to high prices during the dinner hour?

- Customers who use a high percentage of their power on-peak often resist dynamic pricing because it could increase their power bills. Economists have suggested ways to improve customers’ incentives, while roughly preserving each customer’s current bill level. These sometimes complex strategies make participation attractive to more people by allowing more customers to realize bill savings if they respond to prices. It would be quite useful to conduct research into whether these approaches can be refined into something that customers find comprehensible, fair, and attractive. Which consumers would be comfortable with a buy-your-own-baseline approach, implemented either by asking consumers to decide how much to buy or by automatically selling customers a baseline?[20]

- To what extent do tools such as limits on bill volatility, annual payments, smart appliances, real-time price and consumption display devices, or preannounced, CPP-like price levels[21] make small, unsophisticated customers willing to sign up for a combination of enabling technology and frequently updated (*e.g.*, hourly or 5-minute) prices?[22]

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[20] For more discussion of these issues, *see*, Severin Borenstein, “Wealth Transfers Among Large Customers from Implementing Real-time Retail Electricity Pricing,” 28:2 *Energy J.* 131 (2007).

[21] For example, the rate could commit to low, medium, high, and critical price levels and to the number of hours per year each price level would be in effect.

[22] Such a program would allow a utility to set a low price during a very windy summer weekday afternoon hour, and then switch to a critical price later the same day if the wind suddenly stopped blowing.

- How much bill volatility are large commercial and industrial customers willing to experience, and how do they feel about the inclusion of a default hedge in their rate?[23] What bill shock management approaches do small customers want and find comprehensible and comforting?

- It would be useful to understand consumer responses to existing and novel methods of financing investments to reduce energy bills. These investments might enable demand response, provide distributed generation, or increase energy efficiency. How many consumers would make an energy investment that would save them $15 a month by paying $300 upfront? How many more would make this investment if they could pay a monthly charge of $10 on their utility bills for the next 30 months instead of making an upfront payment? What if payment could be through a $10-per-month increase in their mortgage payments? These results could inform the design of demand response programs and identify supportive legislation, regulations, or links to financial institutions.

C. Do end-users want energy efficiency and demand response in the same package? Should there be a demand response certification program separate from broader "energy smart" certification?

- In what situations do customers want equipment that is both demand-response-ready and energy efficient? Do many small to medium-sized customers express a strong preference for grid-friendly products without also voicing a strong preference for energy efficiency? How many customers are interested in products that are energy efficient but not grid-friendly? Do these preferences for product characteristics change when customers are told that demand-response-enabled products help integrate wind generation? Would these customers prefer unified certification of both energy efficiency and demand response capabilities? Can unified certification accurately inform consumers and avoid creating misperceptions and false expectations? Unified certification might backfire if consumers get a false impression that certified appliances are always more efficient or cheaper to run than uncertified appliances. This is an instance in which the demand response education program for small customers likely will need to be accurate and unambiguous, yet simpler than the educational materials and contacts with large customers or with the electricity policy community.

- Appliances already come with a plethora of certification logos and labels describing their safety, energy efficiency, and standards compliance. Most of these certifications are obscure. Well recognized, respected labels such as "Energy Star" are the exception, not

[23] See Severin Borenstein, "Customer Risk from Real-Time Retail Electricity Pricing: Bill Volatility and Hedgability," 28:2 Energy J. 131 (2007).

the rule. Would a logo certifying grid-friendliness or demand-response-readiness be likely to get lost among the other certifications?

- Wiser and Pickle present evidence that many customers would prefer mandatory green power programs to voluntary ones.[24] This suggests that consumers do not always prefer more individual choice when they decide about energy services that have both private and shared effects. Choosing appliances is already complex for time-strapped consumers. In addition, grid-friendly circuitry might be inexpensive, and the benefits of a single grid-friendly appliance are likely to justify only modest monetary incentives to choose a grid-friendly model. In view of these considerations, would consumers prefer that grid-friendliness be required?[25] Would many people choose a grid-friendly appliance over a similar, slightly cheaper model that lacked the grid-friendly technology if that feature were optional? How many grid-friendly appliances likely would be sold in the absence of a mandate? Will manufacturers voluntarily include grid-friendly circuitry?

- Which kinds of large industrial and commercial customers want to make demand response and energy efficiency investments in a single package, from a single vendor? Which are in position to benefit from a package that delivers significant benefits on both fronts? Can such customized packages be made available to consumers in areas where retail competition is not allowed?

E. Learning

- What is the learning curve of consumers, and how is it affected by particular circumstances? How can the Action Plan foster end-user learning?

F. Offering expertise to individual end-users or associations of end-users

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[24] Ryan Wiser and Steven Pickle, "Green Marketing, Renewables, and Free Riders: Increasing Customer Demand for a Public Good" (Lawrence Berkeley National Laboratory 1997), available at http://eande.lbl.gov/ea/emp/reports/40632.pdf

[25] Grid-friendly appliances have the potential to confer both private benefits on their owners and public benefits on society by preventing socially costly voltage collapses and by reducing the need for costly public investment in plants that adjust their output minute-by-minute to prevent brownouts and surges. These public goods might justify making grid-friendly circuitry mandatory. Automobile headlights are mandatory and provide an analogous mix of benefits because they reduce the private cost of crashes and the need for public investment in street lights.

The Action Plan might consider assessing and addressing end-users' needs for technical assistance to select and participate effectively in demand response programs. Section 2.1 of the Action Plan already appears to go beyond its mandate to propose assisting local officials: "Local officials governing publicly-owned and cooperatively-owned utilities face challenges similar to those of state governing officials, and FERC staff proposes that the National Action Plan identify requirements for technical assistance to them." End-users are largel

If program participants learn by doing, then static cost-benefit calculations based on initial performance are likely to understate benefits to both utilities and end-users. Better technology – for instance, smart thermostats and ice-storage air conditioners – will gradually become available to increase the magnitude, speed, and reliability of dynamic pricing customers' responses. These products likely will come to market only when enough customers participate in dynamic pricing programs. An assumption that participants will use only existing, first-generation technology is likely to understate benefits.

The best demand response programs give customers incentives to make better choices and then reward them for increasing their ability to synchronize their operations with the availability of cheap power. The potential for learning is one of dynamic pricing programs' many advantages over direct load control programs and interruptible tariffs. Similarly, dynamic pricing programs can manage most scarcities by using the sma

B. The Action Plan should build an institutional infrastructure to support innovation, entry, and competition in the electricity industry

The Action Plan should conceptualize demand response as an infrastructure that allows not only utilities, but also end-users and new providers of demand response, to capture the value of managing consumption so as to help the grid balance the quantity supplied and the quantity demanded on a minute-by-minute basis. Regulators should ensure that the demand response infrastructure allows entrants and end-users to participate.

For example, there may be room for FERC to require that ISOs offer a standardized real-time pricing product and communications protocol to large commercial and industrial customers or energy service providers. This would allow corporations whose operations span several ISOs (e.g., “big box” stores) to use the same demand response hardware and procedures nationwide. Standardized protocols will offer economies of scale to hardware vendors and curtailment service providers, because a single product can serve a larger region. This is a logical extension of FERC's significant efforts to create infrastructure for competition in wholesale markets, by, for example, requiring transmission providers to offer an Open Access Same-Time Information System. Similarly, if FERC required utilities and ISOs to use standardized communication protocols and to grant service providers access to utility customers' price and metering data, such action would allow energy management firms to compete to serve customers. We recommend that Point 6 in Table 4 of the Action Plan be augmented to describe these benefits.

C. The Action Plan should eliminate the counterproductive distinction between “dispatchable” interruptible load programs and “callable” price programs

Good communications standards and infrastructure also might allow the elimination of the needless distinction between “dispatchable” direct load control and “callable” price-responsive demand. Sidebar 2 of the Action Plan describes this distinction: “Demand response can be both dispatchable and non-dispatchable. Dispatchable demand response refers to planned changes in a customer’s consumption in response to direction from someone besides the customer. It includes direct load control of customer appliances such as those for air conditioning and water heating [and] directed reductions in return for lower rates (called curtailable or interruptible rates). . Non-dispatchable demand response refers to programs and products in which the customer decides whether and when to reduce consumption based on a [dynamic] retail rate . . . that charge[s] higher prices during high-demand hours and lower prices at other times.”

Conventional dispatchable programs have significant limitations because end-users want to limit the degree to which grid operators can interrupt power and how often they can do so.

For example, air conditioner direct load control programs can be activated only during certain seasons. Dispatchable programs have been in use for decades, which means that they are well proven but also that their basic design and implementation reflect the technology available in an earlier era. Direct load control cannot make subtle operational changes such as pre-cooling buildings. Conventional dynamic pricing programs offer larger potential response – because they leave more control in users' hands – and better incentives for participants to educate themselves regarding the timely operation of all their electrical equipment. Reportedly they do not offer the kind of speed, control, and predictability preferred by the engineers who operate grids. Technology makes it possible, however, to develop programs that capture the best qualities of both approaches in dynamic pricing: programs that yield known, dispatchable response to price signals that can be sent on short notice. Such programs package excellent economic incentives in the kind of predictable, dispatchable system that makes grid operators comfortable.[27]

Pacific Northwest National Laboratory's GridWise pilot has already demonstrated "smart" thermostats that submit bid curves for electricity based on the user's willingness to pay for comfort and the current temperature in their house.[28] This system gives users the kind of control typical of "callable" price systems, while also providing grid operators the ability to dispatch precise changes in load in precise places. In practice, these systems are likely to be a hybrid of automated and manual response. A homeowner or business manager would have his or her computerized thermostat bid in the demand control system's dispatchable, automated response to price signals. He or she could also modify the use of manually controlled electrical equipment (such as stoves and lights) in response to predictable price patterns or extreme weather. Programs that harness bid curves from users' power control systems require appropriate two-way communication protocols. If this hybrid product has large benefits, creation of the right protocol infrastructure likely will enable innovative firms to offer it and share its benefits with consumers.

VI. Conclusion

There are numerous commendable aspects of the Action Plan, and we applaud FERC's development of it. We recommend, however, that the Action Plan also:

- Attempt to better understand consumers' preferences.

[27] *See* Mani Vadari, Battelle Energy Technologies, "Active Demand Management," 147:11 Pub. Util. Fortnightly 42, 46 (Nov. 2009).

[28] D. J. Hammerstrom *et al.*, "Pacific Northwest GridWise Testbed Demonstration Projects," *supra* note 17.

- Design demand response programs to reflect consumers' preferences. Demand response programs should be developed from the ground up to address not only the needs of the grid, but also those of the consumers who create the demand and who will likely need to volunteer to participate in demand response programs.

- Foster positive processes such as learning, innovation, and competition.

- Increase analysis and consulting to support dynamic pricing.

Appendix: Additional Opportunities

I. Strategic Vision and Goals

could hurt their bottom line and that they have a fiduciary responsibility to protect profits, even at the cost of sacrificing economic efficiency. Allowing utilities to capture some of the benefits of demand response, or protecting them from unexpected enrollment or consumption patterns, may make utilities enthusiastic partners rather than obstacles.

- Consumers want enough benefits to justify participation: A Lawrence Berkeley National Laboratory study observed that "[a] number of program managers suggested that the modest participation rates in their RTP [real-time pricing] program were a result of the fact that . . . the vast majority of eligible customers view the risks of RTP as too great and/or the potential benefits as too small."[35]

- Participation rates may increase significantly if incentives are presented in ways that are compatible with how consumers think. We discussed this at length above.

- Flawed incentives undermine program effectiveness. An Anaheim baseline-rebate field experiment found strong consumer reaction not only to the desirable incentive to reduce critical period consumption, but also to the program's perverse incentive to raise consumption during baseline-setting weekday afternoon hours.[36]

Several sections of the Action Plan propose analysis to improve demand response programs and to understand what (and where and when) to deploy. The Action Plan discusses these analysis efforts in quite separate consumer research, technical paper, and assessment tool sections. The research agendas of these sections overlap, as they should. Separate treatment may miss opportunities to make coherent plans and to benefit from synergies.

For example, one project might produce both a paper and analysis tools. Other analysis might inform the communications toolkit's marketing messages and a paper on choosing consumer-friendly features. The Action Plan might yield better analysis if a single section identified important questions for analysis and assessed whether each analysis project is best delivered by means of technical assistance tools, technical papers, and communications materials in some combination.

We encourage the National Demand Response Coalition to collect and distribute existing research, data, and insights and to support research to fill in the significant gaps. Projects such as the California Statewide Pricing Pilot already have addressed many of the questions that the Action Plan raises in its list of "Social Science" research projects.

III. Transition Strategy

FERC's Action Plan addresses the challenge of moving from the status quo – where volatility in electricity demand is managed largely by building costly, rarely used facilities – to a new paradigm in which many electricity consumers will be able to shift demand away from scarcity periods (such as hot summer days). Legislators, regulators, or utilities frequently want convincing, "real-world" evidence before they will endorse programs that mandate participation or will spend money on new approaches. The Action Plan should describe incremental implementation, which might begin with the deployment of voluntary programs in locations where regulators are receptive and where there are large potential benefits. Early successes would create opportunities to launch more programs and to expand existing programs by, for example, switching enrollment from "opt-in" to "opt-out." The Action Plan might support the analysis and diffusion of successful program models and help new programs learn from their predecessors.