Federal-State Partnership

Transforming DR and smart-grid policies into reality.

By George E. Johnson

Policies promoting energy conservation and demand-side management have been around for decades with meager levels of customer participation, so it's legitimate to ask: Why does it matter that Congress has declared demand-response and smart-grid development to be the policy of the United States?[1] In fact, the combined forces of federal and state policy initiatives and changing public attitudes toward energy and the environment are about to fundamentally change how Americans deal with electricity.

Two main factors are responsible: First, congressional action—through the *Energy Policy Act of 2005* (EPAct), the *Energy Independence and Security Act of 2007* (EISA), and the *American Recovery and Reinvestment Act of 2009* (ARRA)—not only required the states to consider implementation of demand response (DR) and smart-grid capabilities, but placed the full weight of federal policymaking and financial power behind that effort. Congress required the federal government to set standards and create an institutional framework for DR and the smart grid. It has provided billions of dollars for federal technical assistance and stimulus program matching funds to enable, guide, and support the states and utilities in making the investments and enacting the rules and processes necessary for every electricity customer to become an active participant in the nation's electrical grid.

Second, cultural and economic currents are at work that favor the germination of these policies. There is an emerging consensus among policymakers and the public that fundamental changes are required in the manner in which we produce and use energy if we are to preserve the environment for future generations. As a result, state regulators and the ratepayers they serve are coming to understand and accept that DR and a smart grid enhance environmental, energy security, and economic objectives that are central to our nation's and the world's future by increasing the use of renewable energy, combating climate change, reducing emission of harmful pollutants, reducing vulnerability to insecure fuel sources, and fostering prosperity through technical innovation.

Customer Participation Levels

Current data show that DR and use of smart meters still remain at very low levels. At the end of 2008, the Federal Energy Regulatory Commission (FERC) estimated that about 8 percent of all customers were on some type of DR program, comprising about 5.8 percent of total peak load.[2] The Department of Energy (DOE) estimates that about 4.7 percent of all electric meters are advanced meters,[3] and the FERC estimates that only about 1 percent of customers are on time-of-use pricing.[4] However, this data doesn't capture or measure regulator, utility and derivative commercial and investment activities that are setting the stage for a transformation in end-use customer participation in the grid. The state regulatory and legislative initiatives Congress hoped to stimulate by EPAct and EISA have in fact been undertaken, with well over half the states completing some type of action. Between 2005 and 2008:

- 35 states engaged in regulatory policy making on DR;
- 22 states engaged in legislative policy making on DR;
- 18 states engaged in regulatory policy making on smart grid and advanced metering;
- 10 states engaged in legislative policy making on smart grid and advanced metering;
- 38 states initiated action to consider implementation of time-based metering and rates in compliance with EPACT; and
- 32 states completed action.[5]

The FERC's most recent assessment found that 26 utilities in 19 states have announced, or are pursuing, advanced meter pilots or full-deployment programs. Significantly, the FERC also found that nearly every retail regulatory filing for advanced metering in the past year also included a request to approve dynamic pricing.[6]

Smart Grid Infrastructure

Even before the Obama Administration and Congress committed to inject more than $4 billion in matching grants to promote smart-grid investment and pilot program grants under the ARRA,[7] state commissions, investor-owned utilities, and municipal utilities had taken bold steps to fund large-scale implementation of smart-grid infrastructure. For example, in September 2008, the California Public Utilities Commission approved $1.63 billion in ratepayer funding for installation of 5.3 million new smart meters for Southern California Edison's residential and small-business customers.[8] By late 2008, Austin Energy was well on its way toward 100-percent coverage of its customer base with smart-grid meters and thermostats—close to 500,000 devices.[9] In 2008, the Public

The DR endgame is price-responsive demand, in which customers actively determine when, how much, and at what price they will buy (or sell) electricity.

George E. Johnson (johnsong@dicksteinshapiro.com) is a senior counsel in the energy practice at Dickstein Shapiro LLP. This article reflects his views and not necessarily those of Dickstein Shapiro or clients of the firm.

Utility Commission of Texas approved installation of more than 3 million advanced meters in Oncor's service territory by 2012, and 127,000 advanced meters in CenterPoint Energy's Houston service territory.

However, the $4 billion in ARRA federal matching grant money earmarked for DR and smart-grid investments and development—part of $11 billion in stimulus funds committed for smart-grid development—appears to be the accelerant causing the congressional policy to catch fire. With matching funds approved by state regulators, utilities have proposed to invest many hundreds of millions of dollars in the smart grid. In response to the initial August 2009 deadline for matching grant proposals, DOE reported a total of 431 applications, with a project value of $26.4 billion—almost six times the authorized amount. From these, DOE in late October selected 100 applicants to receive $3.4 billion in investment grants—for projects with a total value of $8.1 billion. For example, San Diego Gas & Electric will receive $28 million to deploy 1.4 million smart meters; NV Energy will receive $138 million to link 1.35 million smart meters and other smart-grid technologies in its territory; CenterPoint Energy's award of $200 million will fund installation of 2.2 million smart meters and advanced system protection devices; Consolidated Edison was awarded $136 million to fund a variety of smart-grid deployments in New York City; and Florida Power & Light will receive $200 million to implement a comprehensive smart-grid program that includes installing 2.6 million meters by 2014. Since these are requests for matching funds, state commissions will be called upon to authorize at least the same order of ratepayer funding. Indeed, some state regulators instituted rate recovery proceedings for the matching portion of the commitment, in order to increase the chances of utility applicants in their states.[10]

In September 2009, DOE moved to further support state and utility implementation of DR and smart-grid initiatives by committing to provide additional stimulus funds to hire and train new workers needed to upgrade the electric grid: $100 million was allocated for training programs for utility workers and $44 million for hiring and training state employees to help achieve the energy efficiency, renewable energy, and low-carbon policy objectives of the smart grid.

Ironically, some entrepreneurs developing smart-grid technologies complain that the rush to apply for stimulus funds has diverted the attention of state governmental entities and utilities from smart grid-related projects already under development, and has delayed securing investments and completion of projects. One smart-grid Web site recently reported that smart-meter manufacturers experienced sales declines in the second quarter of 2009.[11] However, the delay soon will be over if DOE releases the bulk of its available funds by early 2010. More important, the absolute amount of federal funding and its impact on state and utility spending is enlarging the new marketplace for smart grid-focused technical innovation, and likely will have a significant multiplier effect that will improve the economic opportunity for entrepreneurs, investors, technology innovators and service providers. Large companies and small companies, startups and existing companies are getting into position to develop what will be a renewed electricity industry.

The Wall Street Journal reported that U.S. utilities plan to spend $10.75 billion on smart grid-related computer hardware, software, and services this year alone—an amount equal to the entire smart-grid stimulus package. The multiplier effect of smart-grid investments is illustrated by PG&E's solicitation to Cisco Systems and IBM to design displays and manage data for providing just 75,000 of its 570,000 business customers with digital information to manage their energy use.[12] This followed shortly after announcements by Cisco and IBM of partnerships with more than a dozen vendors to provide hardware and software products.[13] IBM previously announced the availability of $2 billion to finance IT initiatives targeted by the ARRA—the smart grid, health information, and broadband access.[14]

Federal Policy Strategy

While the billions of dollars of smart-grid support undoubtedly stimulate near-term economic activity, perhaps most important to the likelihood of long-term success of this enterprise is that Congress has adopted, and federal agencies are implementing, a strategy of working with the states that's based on forward-looking policies that the states themselves increasingly are endorsing (*e.g.*, renewable portfolio standards, carbon allowance trading, and peak demand reduction).

This strategy just might work. It's straightforward, relying on the states to voluntarily implement rate and recovery policies that will stimulate price-responsive demand or other variations of DR. At the same time, it provides the states, utilities, and DR and smart-grid innovators and service providers with an Internet-like platform on which to seamlessly operate, as well as programmatic tools and at least some of the money needed to create appropriate regulatory mechanisms and build necessary infrastructure. The best evidence that the states are buying into not only the federal funding opportunities, but also the federally-fostered pricing reforms, is the fact that nearly all smart-grid proposals are accompanied by utility dynamic DR pricing policies.

Nearly all smart-grid proposals are accompanied by utility dynamic pricing policies.

As Congress contemplated, the FERC and other federal agencies are making progress with their EPAct and EISA-mandated tasks by:

- Implementing a common open platform for smart-grid communications and controls;
- Setting priorities for smart-grid functionalities (*e.g.*, facilitating DR);
- Developing a computer model to help states decide what level of DR is feasible, and to estimate the total national DR that's feasible (which FERC estimates to be 188 GW, or 20 percent of total peak demand);[15] and
- Developing, with stakeholder input, a national action plan to provide states, localities, utilities, alternate service providers, and end-use customers with the technical and regulatory tools they need for wide-scale deployment of DR.

Standards represent another key factor in the evolution of DR and the smart grid. In EISA Section 1305, Congress assigned primary responsibility for developing standards for the smart-grid communications platform to the National Institute of Standards (NIST) and responsibility for the adoption of such standards by rulemaking to the FERC. Following a year of intensive stakeholder activity involving 1,500 individuals representing hundreds of organizations, in September 2009 NIST released for public comment a draft of the "NIST Framework and Roadmap for Smart Grid Interoperability Standards." As the report notes, it's "only the beginning of an ongoing process to create the full set of standards that will be needed and manage their evolution in response to new requirements and technologies."[16] Nevertheless, the report takes the following significant steps:

- Describing a high-level reference model of the grid functionalities to which interoperability standards must be applied;
- Identifying nearly 80 existing standards that can be used now to support smart-grid development;
- Using priorities adopted by the FERC in its July 2009 *Smart Grid Policy Statement and Action Plan*, it establishes eight smart-grid functionalities for which standards should be developed on a high priority basis; and
- Setting forth an action plan with target completion dates for developing interoperability standards on an expedited basis for 14 high-priority areas.

Following a public comment period, NIST plans to finalize the report and send it to FERC for implementation.

DR Endgame

Congress gave FERC numerous responsibilities for both design and implementation of its DR and smart-grid policies, including the responsibility for receiving and adopting NIST consensus interoperability standards. Indeed, FERC didn't wait for NIST, but issued its own policy statement not only to aid NIST's standards development work, but also to encourage states and utilities to move ahead to initiate new programs to implement

Startups and existing companies are getting ready to develop a renewed electricity industry.

priority smart-grid functions, including cross-interface communications and wide-area situational awareness, cyber security, DR, electric storage and electric vehicles.[17]

In addition, Congress gave FERC the even more challenging task of providing the information, coordination, and direction needed to stimulate and enable the state and utility infrastructure development and rate-making reforms that are essential to the success of the smart grid.

Through a series of reports mandated by Congress, the FERC has begun providing technical information and policy guidance designed to inform the states of the status of DR today, to describe where it's headed, and to provide a roadmap for getting there (see "Rethinking Rate Design," p. 30). FERC's 2008 *Assessment of Demand Response and Advanced Metering* benchmarks the progress that states are making towards that end. It reported that the DR resource contribution from all existing U.S. DR programs[18] is close to 41,000 MW, or about 5.8 percent of U.S. peak demand, with a high proportion coming from the Mid-Atlantic, Midwestern, and Southeastern regions.[19]

The FERC's *National Assessment of Demand Response Potential* describes the destination. This report, completed in June 2009, contains a systematic state-by-state estimate of the total potential for U.S. DR over the next decade, based on a computer model of state-specific inputs (that the states themselves may use to develop their own estimates). The study concluded that if, over the next 10 years, utilities universally deployed advanced metering and if all customers were exposed to, and required to pay, real-time wholesale rates, the result would be a 20-percent reduction in peak demand, totaling 188,000 MW.[20] This is equivalent to a savings of $150 billion if that amount of demand had to be met with new generation construction.[20] FERC Chairman Jon Wellinghoff expressly disclaimed that the 20-percent level of peak DR is a prediction of what's likely to occur, or is a "target, goal or requirement."[22] Nevertheless, the heart of the congressional strategy, which FERC is implementing, is to determine what's possible,[23] and then to develop and provide the tools that can make that possibility achievable.

To provide the road map, Congress directed the FERC to develop, in consultation with interested stakeholders, and to submit by June 2010, a *National Action Plan on Demand Response*. Over the last year, FERC has circulated drafts of its evolving action plan and has met with a large number of potential stakeholders. The *National Action Plan on Demand Response* has three objectives: 1) to identify the technical assistance needed by states to maximize their DR potential; 2) to design a

national communications program to provide broad-based consumer education; and 3) to develop analytical tools, information, model regulations, model contracts, and similar support materials for use by customers, states, utilities, and DR providers.[24] Six months after expected finalization of this plan in June 2010, the FERC is expected to submit to Congress a more detailed implementation plan, complete with assignments of responsibility, proposed budget amounts, and any agreements obtained for participation by states and others.[25]

Finally, emblematic of the policy of actively reaching out to those who must make these policies real—the state regulators—the FERC has established two collaborative groups with the National Association of Regulatory Utility Commissioners (NARUC); one each for DR and the smart grid. These collaboratives provide an opportunity for federal and state regulators to meet on a regular basis to share information, and to develop joint positions on issues. One such example was a joint policy statement in which the FERC and NARUC proposed criteria that proposals for DOE smart-grid stimulus funding should meet.

The Work Ahead

The electricity footprint has seen little change so far. But with all of this activity involving the majority of state regulatory commissions, hundreds of utilities, thousands of technology and service providers, as well as policy advocates, the nation appears at the cusp of an electricity system transformation. While there's no guarantee, understanding what actions still are needed is essential to success. In this regard, the FERC's national assessment report identified many real barriers—regulatory, economic, technological, and attitudinal—that must be overcome to implement this transformation. As in many other transformational contexts throughout American history, the authority and roles of federal and state governments and their ability to work together are critical to the chances for this national policy to succeed.

In its most recent annual assessment, the FERC summarized six recommendations to overcome the most salient of the barriers to success:

- Sharing of information on effective program designs;
- Increasing customer awareness of, and education about, DR programs;
- Coordinating wholesale and retail DR strategies;
- Improving and expanding interoperability and open standards;
- Coordinating DR and energy efficiency policies; and
- Articulating clearly the role of DR in operational and long-term planning, and the recovery of associated costs.[26]

Not surprisingly, these are also the goals of the national action plan that FERC is preparing.

The New Electricity Economy

With the example of the revolution in information technology and communications brought through the Internet, it's instructive, if not essential, to look past the birth pangs of this electricity system transformation to consider whether, once the enabling electronic communications platforms are constructed and complete, the rules of participation and practicalities of being connected will be able to accommodate a scale of participation that couldn't have been imagined until only recently. Three areas of concern stand out, all of which are within FERC's jurisdiction, at least in part, and each of which would appear to require more attention than FERC currently is giving.

Allowing distribution utilities to have their own individual requirements will stifle technical innovation.

First, FERC must strengthen its policy toward coordination and standardization of the development of DR in the organized wholesale electric markets. The DR endgame is price-responsive demand, in which retail end-use customers not only monitor their consumption, but actively determine when, how much, and at what price they will buy (or sell) electricity. The organized markets will play a central role. Price-responsive demand requires a wholesale market price, and those prices are revealed in the organized independent system operator (ISO) wholesale markets. Even though regional and local markets will continue to exist, the development of innovative products and services will depend on market incentives and scalability. It simply won't work for every region to have its own set of market products and rules for participation (as they do today), just as it made no sense for every state to have its own set of automobile emission standards.

In its recent notice of proposed rulemaking, *Standards for Business Practices and Communications Protocols for Public Utilities*,[27] FERC took a positive step to address this concern. It proposed to adopt standards for business practices and communications protocols that will require the operators of the organized wholesale electric markets to provide access to information, including common definitions, operational criteria, and performance measurement techniques for quantifying the value of DR products, to all participants in these markets. The FERC notes that these standards will facilitate the greater participation of DR providers in the markets and an opportunity for more customers to participate in these programs.

However, these standards don't require standardization of DR products and services. To its credit, the FERC notes that these are just "a starting place" for developing more comprehensive standards. There is, however, considerable push-back

from the ISOs and from among their stakeholders to standardizing markets that they argue reflect legitimate regional differences. It remains unclear how hard the FERC is prepared to push the regional transmission organizations and independent system operators toward a common set of products, services, and quantification techniques that not only are simple to understand and access, but that also will allow DR and smart-grid service providers to replicate and deliver their technologies across the country. A more concerted push to real standardization is required to avoid stifling technical innovation, new services, and competition.

Second, FERC should consider the burden imposed on DR service providers by non-uniform distribution utility communications and telemetry requirements. While ordinarily DR resources already are interconnected to the electric grid, they nevertheless will be responsible for the communications and telemetry that distribution utilities require to provide the necessary metering and controls. Allowing hundreds of distribution utilities to have their own individual requirements and procedures will impede the development of readily available and low-cost devices that end-use customers will need, and will stifle technical innovation and the development of new products. FERC should pursue development of uniform requirements, through rules for FERC-jurisdictional utilities, whether or not in organized markets, and through the National Action Plan for state-jurisdictional situations.

Third, security and communications used to operate the electric grid, more than ever, are critical components of the electric system. Yet, responsibility for cyber security can be costly and burdensome for a start-up company considering providing technology or services for the smart grid. Numerous comments on FERC's proposed Smart Grid Policy Statement and Action Plan raised concerns about the potential for the North American Electric Reliability Corporation's (NERC) cyber-security rules to reach down to the retail level where impacts on system reliability are minimal, and to impose unnecessary compliance costs on service providers and would-be entrants. The FERC basically punted on this issue, deferring to the NIST stakeholder process and NERC critical infrastructure protection reliability standards development processes. While both NIST and NERC now are beginning to take up this issue, these processes remain obscure for many potentially affected parties. Due to the importance of this issue and the potential negative effect that liability for NERC compliance may have on product and service development, FERC may wish to reconsider its posture and hold a technical conference or other forum to air both the issues and concerns more fully.

Looking ahead, it's clear that most of the tasks remaining to implement the DR and smart-grid policies need to be accomplished at the state and local levels, with the need and opportunity for interested parties to engage at those levels. This doesn't necessarily mean that it makes sense for the products and services that will serve this new industry to be developed with a local focus. The transformation of the electricity system brought through DR and the smart grid is national in scope. Solutions, products, and services can—and should—be developed to serve this new national market. This won't happen if the rules and procedures require a different solution in each region, state, or locality. The way to improve the chances that it will is through advocacy for, and implementation of, policies that will capitalize on the intense interest of technology innovators, new service providers, entrepreneurs, and advocacy organizations in developing the tools and services that will serve this new market. F

ENDNOTES:

1. Demand response is the active participation in electric markets by purchasers of electricity through changes in consumption in response to price or system conditions. The smart grid is an electricity infrastructure that uses advanced digital technologies and interactive communications to optimize the efficiency of all components of the electric system.
2. Federal Energy Regulatory Commission, "2008 Assessment of Demand Response and Advanced Metering," at i, 23, December 2008.
3. Department of Energy, "Smart Grid System Report," at vi, July 2009.
4. *Id.*
5. Dan Delurey, "Policy Overview," presentation at National Town Meeting on Demand Response and Smart Grid, Washington, D.C., July 13-14, 2009. Details of the State activities reported by Delurey are found in "Demand Response and Smart Metering Policy Actions Since the Energy Policy Act of 2005: A Summary for State Officials," prepared by the U.S. Demand Response Coordinating Committee for the National Council on Electric Policy, Fall 2008.
6. Federal Energy Regulatory Commission, "2009 Assessment of Demand Response and Advanced Metering," at pp. 10 and 12, September 2009. "Dynamic pricing" generally refers to retail rate structures under which retail rates vary with wholesale prices or system conditions.
7. The total amount of ARRA funding committed to all smart-grid activities actually totals a whopping $11 billion.
8. DOE Electric Advisory Committee, "Smart Grid: Enabler of the New Energy Economy," p.4, December 2008.
9. *Id.*
10. *See, e.g.*, New York State Public Service Commission Case No. 09-E-0310, "In the Matter of the American Recovery and Reinvestment Act of 2009 - Utility Filings for New York Economic Stimulus." In addition to the ARRA funds available from DOE, the Department of Agriculture's Rural Utility Service and the Commerce Department's National Telecommunications and Information Administration are making $4 billion available to fund new smart-grid broadband infrastructure projects, for which $28 billion in applications has been submitted. *See, http://ia.cpus.ca.gov/CommChong/post/NTIARUS-Gets-Bucketload-of-ARRA-Broadband-Applications.aspx.*
11. "Are Stimulus Funds Working Against Smart Grids?" Sept. 28, 2009; TMCnet. See, *http://smart-grid.tmcnet.com/topics/smart-grid/articles/65315-stimulus-funds-working-against-smart-grids.htm.*
12. *The Wall Street Journal*, Sept. 28, 2009 (on-line service).
13. Zachs Equity Research, Sept. 18, 2009. See, *http://finance.yahoo.com/news/Smart-Grid-Partners-for-IBM-zacks-1429584180.html?x=0.*
14. *See, http://www-03.ibm.com/press/us/en/pressrelease/27368.wss.*
15. *See*, note 19, infra.
16. NIST Report at 7. *(Cont. on p. 66)*

Federal-State Partnership

(Cont. from p. 53)

17. *Smart Grid Policy*, 128 FERC ¶ 61,060 (2009).
18. This is the amount of demand response enrolled in any type of program or committed to make load reductions, not the amount of load reductions actually delivered.
19. *2008 Assessment of Demand Response and Advanced Metering*, at i, 33.
20. "A National Assessment of Demand Response Potential, Staff Report, Federal Energy Regulatory Commission," at xii, 27-28, June 2009. The FERC's *2009 Assessment of Demand Response and Advanced Metering* did not update its 2008 survey, but promised an update in the next report. FERC *Assessment of Demand Response and Advanced Metering*, p.1, September 2009.
21. This is the cost of meeting 188 GW of demand with an equal amount of new plant construction at a conservative total installed cost of $800/kW.
22. Statement of Chairman Jon Wellinghoff on *Demand Response Report*, June 18, 2009.
23. *The National Assessment of Demand Response Potential* in fact provides an interactive computer program that allows anyone, by altering the input assumptions, to estimate what level of demand response is achievable, on a state-by-state basis.
24. *See*, Section 529 of EISA.
25. *Id.*
26. *Id.* at 14 (noting that a fuller discussion of these barriers is contained in the FERC's *National Assessment of Demand Response Potential*, issued in June 2009).
27. 128 FERC ¶ 61,263 (2009).

Green Energy Outlook

(Cont. from p. 58)

Waxman-Markey Bill and has been approved by the Senate Energy and Natural Resources Committee.[7] As currently proposed, CEDA would operate as an independent, government-owned, nonprofit investment bank, with an initial charter of 20 years and $7.5 to $10 billion in funding.[8] CEDA would provide access to capital and offer lower financing rates through loans and loan guarantees. With $10 billion in funding, CEDA is estimated to be able to support more than $100 billion in debt to finance elements of the integrated solution, including the renewable generation and associated T&D and other technologies that can reduce CO_2 emissions.

The recent significant economic recession has presented a challenging environment for all aspects of the U.S. economy, and the power industry is no exception. Despite the lingering effects of the downturn and continued economic uncertainty, a unique opportunity exists to fundamentally change the future of the U.S. power industry through the successful execution of an integrated reinvestment plan that explicitly recognizes the interrelated nature of renewable generation development, CO_2 emissions abatement, modernized T&D, and more flexible energy production capability. Importantly, the levels of innovation in creating the right incentives for sustained financing and investment must match the levels of innovation around renewable energy production and delivery, development of smart-grid technologies, and efforts to significantly reduce emissions.

ENDNOTES:

1. For utilities with sales greater than 4 million MWh with adjustments allowed for existing hydro generation, new nuclear generation, and new carbon sequestration units. Additionally, 25-40 percent of the targets will be allowed to be met by energy efficiency measures.
2. Chairman's Mark of the *Clean Energy Jobs and American Power Act* (S. 1733) Oct. 23, 2009.
3. President Obama's Weekly Address, Jan. 24th, 2009.
4. Source: PA Consulting Group's merchant capacity database.
5. Section 1705.
5. Projects funded through this program will need to show that it is likely they will be able to start construction by September 2011.
7. *American Clean Energy and Leadership Act 2009.*
8. In the Waxman Markey bill, CEDA is funded with $7.5B and in the Senate version it is funded with $10B.