Center for American Progress

AP PHOTO/MEL EVANS

A Forward-Looking Agenda for the Nation's Public Utility Commissions

By Greg Dotson and Ben Bovarnick May 2015

Center for American Progress

A Forward-Looking Agenda for the Nation's Public Utility Commissions

By Greg Dotson and Ben Bovarnick May 2015

Contents

Introduction and summary

The electricity sector in the United States is experiencing a period of dynamic change. Technological advancements are making energy available from new and innovative sources and offering an array of new and exciting tools for managing and understanding the way that Americans use energy. Market forces are pushing natural gas in and backing coal out, while renewable energy is increasing its share of the national market. Regulations, such as the proposed Clean Power Plan, are beginning to chart a course to a low-carbon future. Furthermore, the reality of climate change is barging onto the scene for the electricity sector, bringing with it challenges such as additional strain on the nation's water supplies, which are relied upon for cooling coal-fired and nuclear power plants and turning hydroelectric turbines.

Historically, electric retail markets have been regulated at the state level, but the challenges facing the electricity sector from a changing climate, powerful market forces, and the need to reduce pollution are of such importance that the federal government has a strong interest in ensuring they are met. Unfortunately, states' responses to these challenges to date have been uneven. Some state public utility commissions, or PUCs, have been tempted by short-sighted arguments to undermine successful regulatory policies and pretend the challenges of the day do not exist. Others are working overtime to surmount the challenges that the nation faces to create an affordable, reliable clean energy future.

Over the past four decades, Congress has periodically amended the Public Utility Regulatory Policies Act, or PURPA, to call upon state PUCs to consider adjusting their electricity policies using an open and evidence-based review process. By simply requiring PUCs to examine the merits of various policies through formal proceedings, PURPA has triggered states to adopt smart policies that have helped save energy and promote renewable energy.

Congress should embrace this precedent and help set a forward-looking agenda for the nation's PUCs to address the important issues facing the electricity sector today. Specifically, Congress should amend PURPA to require state PUCs to consider three policy standards:

- Boost energy-efficiency efforts through technology and regulation.
- Establish policies to encourage utilities to use clean energy to reduce pollution.
- Ensure utilities will have the resilience to function reliably in the future.

Time of change and challenge

Industry leaders, government officials, and academics all agree that the electricity sector in the United States is experiencing a period of dynamic change and challenge. According to the U.S. Department of Energy, or DOE, "the U.S. electric system is currently at a strategic inflection point."[1] In a recent landmark report, the DOE stated:

> *The U.S. electricity sector is being challenged by a variety of new forces, including a changing generation mix; low load growth; increasing vulnerability to severe weather because of climate change; and growing interactions at the Federal, state, and local levels. Innovative technologies and services are being introduced to the system at an unprecedented rate—often increasing efficiency, improving reliability, and empowering customers, but also injecting uncertainty into electricity-grid operations, traditional regulatory structures, and utility business models. Modernizing the grid will require that these challenges be addressed.*[2]

Of course, these challenges are not lost on the industry. For instance, one leading utility executive has called for new business models for electric utilities, saying:

> *We don't know exactly what the electric power business is going to look like in 10 or 20 years. But it seems clear that the way power is generated, distributed, and used is likely to change a great deal. We have to look for opportunities to find new and better ways to serve our customers—starting now.*[3]

The U.S. electric sector is estimated to require $2 trillion of investment over the next 20 years.[4] An interdisciplinary study by the Massachusetts Institute of Technology, or MIT, found that the U.S. electricity grid will face "serious challenges in the next two decades that will demand the intelligent use of new technologies and the adoption of more appropriate regulatory policies."[5]

Three key challenges for electric utilities involve the need to build resilience to a changing environment, to reduce carbon pollution in the future, and to incorporate new technology into an evolving electric grid.

Challenge: Building resilience to climate change

Scientists warn that climate change will have tremendous impacts on human health, the environment, and the overall economy, including key infrastructure that supports our quality of life. The electric-power sector will not be immune to the impacts of climate change and, in fact, is already feeling the effects. From 2003 to 2012, the United States experienced 679 major power outages due to extreme weather.[6] However, climate change is increasing the frequency and severity of extreme weather events. This in turn increases the risks to electric infrastructure from flooding driven by rising sea levels, water shortages worsened by droughts, and heat waves that stress the grid. Utilities must consider new investments and approaches to resilience that adequately meet these threats.

Coastal utilities are projected to experience more frequent flooding as rising sea levels increase the likelihood that facilities will be inundated during storms. The most recent National Climate Assessment found that rising seas will increase the number of electrical substations along the Gulf Coast that are vulnerable to storm surges from a Category 1 hurricane by almost 25 percent, from 255 substations today, to 337 substations by 2030, to as many as 400 substations by 2050.[7] A similar study found at least six power generation facilities worth a total of $80 billion; it also found that $250 billion in transmission and distribution assets from Texas to Alabama are at risk, with more than $1 trillion in energy assets in danger. These costs could be mitigated through proactive investment, however; approximately $50 billion in invested resilience retrofits over the next 20 years would avoid losses worth $135 billion.[8]

Elsewhere in the country, persistent heat waves and droughts threaten power plant operations and electrical distribution efficiency. Many power plants rely on outdoor sources of water or ambient air to cool their thermoelectric generators, and excessive or persistent high temperatures disrupt these operations. In August 2012, the water temperature in Long Island Sound was higher than allowed for the cooling of Unit 2 at the Millstone Power Station, in Waterford, Connecticut—the only currently operational nuclear power plant in New England—forcing it to shut down 800 megawatts of power, or 40 percent of the plant's capacity, for two weeks.[9] In addition, many power plants rely on freshwater sources that will be strained by rising temperatures and droughts. Thermoelectric-power generation in the United States uses more than 200 billion gallons of water per day, about 40 percent of all freshwater withdrawals, and 25 percent of U.S. electricity generation comes from counties expected to have at-risk water supplies by 2030.[10]

Challenge: Cutting carbon pollution

Nationally, generating electricity resulted in more than 2 billion metric tons of carbon pollution in 2014, nearly 40 percent of all energy-related carbon dioxide emitted that year. More than three-quarters of these emissions came from the nation's aging fleet of coal plants.[11] To effectively respond to climate change and avoid its worst effects, these emissions must be reduced. In 2014, the Intergovernmental Panel on Climate Change stated, "Decarbonizing (i.e. reducing the carbon intensity of) electricity generation is a key component of cost-effective mitigation strategies in achieving low-stabilization levels (430–530ppm CO2eq)."[12] While U.S. carbon emissions from energy consumption in 2012 reached their lowest levels in the past 20 years,[13] continuing this reduction will pose a number of technological, infrastructure, financial, and operational challenges.

Cheap natural gas has prompted significant fuel switching in recent years. From 2009 to 2012, electricity generated from coal in the United States decreased from 44.4 percent to 37.4 percent of total electricity generated, while electricity generated from natural gas increased from 23.3 percent to 30.3 percent.[14] Natural gas produces 44 percent less carbon dioxide when burned than coal, so this shift contributed to a significant reduction in the carbon intensity of the U.S. economy.[15] This market-driven switch from coal to natural gas is resulting in corresponding investments in infrastructure, which is a challenge in itself for utilities. Yet even more importantly, a laissez-faire approach to fuel switching could result in overcommitment to a fossil fuel that will not achieve the necessary pollution reductions in the future, ending in stranded investments or runaway climate change.

Additionally, clean energy has taken off dramatically in recent years, due in large part to declining costs.[16] Financial advisory firm Lazard recently found that the levelized cost of wind energy is far less than both natural gas and coal.[17] Installed wind power capacity has more than tripled in the United States since 2008.[18] The Department of Energy has calculated that the United States has wind generation capacity equivalent to 60 large nuclear reactors.[19] In 2014, Texas produced more than 10 percent of its total electricity generation from wind, while Iowa and South Dakota each generated more than 25 percent of their electricity from wind.[20] Wind is projected to contribute 5 percent of total national electricity generation in 2016.[21] In 2014, even American Electric Power—one of the nation's largest consumers of coal—invested in wind energy because of its economic attractiveness.[22]

Solar energy has also become much more competitive. In 42 of the 50 largest U.S. cities, solar power is cheaper than retail electric rates.[23] This can be attributed to both an 80 percent decrease in the cost of solar modules from 2007 levels[24] and the increasing use of innovative third-party financing tools, such as solar loans, leasing programs, and power purchase agreements from residential solar companies.[25] In 2013, Theodore Craver Jr.—then the vice chair of the Edison Electric Institute, or EEI—wrote that "members of EEI view distributed [solar] energy as perhaps the most important development currently facing our industry."[26] In 2014, California became the first state to generate 5 percent of its electricity from large-scale solar power installations.[27] This record does not even count the output of rooftop solar arrays on hundreds of thousands of homes and many businesses. Also in 2014, Austin Energy signed a 20-year contract to purchase solar power at 5 cents per kilowatt hour, lower than the average levelized cost of electricity from natural gas.[28]

As renewable energy costs continue to decline, wind and solar are expected to make additional market gains. According to the DOE, by 2030, wind energy could generate as much as 20 percent of the nation's electricity,[29] and solar could generate as much as 14 percent.[30] Electric utilities will have to consider how to plan for this significant expansion of renewable energy.

In addition to market forces, regulations at the state level are also driving utilities to adopt cleaner sources of electricity generation. States from Oregon to Montana to New York have all enacted standards to limit carbon dioxide emissions from new power plants.[31] The cap-and-trade market in California and the Regional Greenhouse Gas Initiative that Northeastern states participate in both cap regional emissions from state power sectors using market-based mechanisms to drive down emissions and encourage utilities to adopt cleaner sources of electricity.[32]

Finally, as part of a national strategy to reduce greenhouse gas emissions, the Environmental Protection Agency, or EPA, has proposed the Clean Power Plan. This initiative will require state environmental agencies to develop plans for electric generators to reduce their emissions.[33]

The EPA's Clean Power Plan

The Clean Power Plan, proposed on June 2, 2014, outlines the best system of emission reduction, or BSER, for carbon pollution from existing power plants and establishes state emissions-reduction targets based on cost-effective and demonstrated methods of pollution control.[34] The proposal grounds the BSER determination in the EPA's four key building blocks:

- Building block 1 aims to improve the efficiency of coal-fired power plants.
- Building block 2 seeks to substitute electricity generation from coal plants with natural gas-fired generation.
- Building block 3 strives to replace fossil fuel-fired electricity generation with lower- or zero-carbon generation from renewables and nuclear power.
- Building block 4 seeks to reduce overall electricity demand.[35]

The EPA uses a formula to propose state-specific carbon-pollution reduction targets based on each state's ability to apply the BSER. The EPA proposes that each state meet an interim carbon-pollution reduction goal, calculated as an average over the 10-year period from 2020 through 2029. States also would have to meet a final goal in 2030.

The policy proposal outlined in this report complements the Clean Power Plan. Although state air-pollution-control agencies have primary responsibility for developing plans to implement the Clean Power Plan, state public utility commissions likely will play a key role as well, given their ratemaking responsibilities and oversight of electric utilities.

State PUCs have tools at their disposal that state air agencies do not. They can approve or disapprove of utility investments based on their implications for grid reliability and consumer electric rates. They can establish rate structures that incentivize energy efficiency and resilience investments. And they can assess whether utility investments should be passed on to consumers or born by shareholders.

As the EPA finalizes the Clean Power Plan later this year, states, consumers, and electric utilities will turn to the state PUCs to better understand how these commissions will use their tools to facilitate a low-carbon future.

Challenge: New technologies to provide consumers with options and benefits

Renewable energy generation is not the only area where new technology promises significant change in the electricity sector. Advancements and innovation are occurring from electricity generation and transmission to distribution and information utilization. Demand-side management, energy-efficiency technologies, and energy storage will transform electricity consumption patterns, further altering electricity markets.

Integration of energy storage systems into the grid offers numerous benefits for grid reliability through voltage regulation and electric-load management. Energy storage systems can quickly dispatch electricity in the event of an unexpected power plant outage, a forecasting error by a wind or solar generator, or increased

temporary demands on the grid—for instance, a heat wave that drives up cooling needs. By increasing the use of energy storage, utilities can avoid future investment in electricity capacity reserves that would provide power only under peak-demand scenarios.[36] Today, energy storage is a relatively small part of the electricity sector. There are about 270 distributed energy storage projects in the United States, and the majority of storage capacity is from 42 pumped hydroelectric storage plants that total about 2 percent of U.S. electric-generating capacity.[37] These projects store electricity via pumped hydroelectric energy, compressed air energy storage, batteries, and flywheels.

New energy monitoring services and technologies are increasing the ability to manage electricity demand over time. For instance, demand-side management contracts between utilities and large industrial and commercial businesses have existed for decades to help utilities manage electric loads at times of peak demands, but new services and technologies are emerging for individuals to tap into these savings as well. Smart thermostats, building energy-management software, and energy service companies offer companies new ways to reduce their electricity consumption. Federal regulators have identified more than 28,000 megawatts of potential peak reduction from retail demand response programs.[38] This is more generation than currently exists in the entire state of Arizona.[39] Wholesale demand response programs can reduce another 26,000 megawatts.[40]

Integration of clean energy into the grid necessitates weather forecast models that minimize prediction errors and investment in resources to provide fast dispatch of electricity at times of grid variability.[41] Utilities and third-party companies can use energy storage units to provide ancillary services to the grid, including cost-competitive alternatives to investment in new power plants or transmission upgrades, but this market currently lacks clear regulatory standards within most states.

Renewable energy, energy storage, and energy-efficiency technologies all present substantial opportunities to utilities and states. Yet regulatory guidance is necessary to overcome challenges and realize these opportunities.

The role of PUCs in responding to challenges facing utilities

When Congress passed the Federal Power Act in 1935, it established a jurisdictional approach to sales of electricity that endures today. The Federal Energy Regulatory Commission regulates interstate transmission and wholesale sales of electricity. The individual states, typically acting through their public utility commissions, regulate the retail sales of electricity to consumers. At the retail level, the federal government's involvement in electricity sales has been mostly indirect, encouraging cleaner electricity generation through tax policy and promoting more efficient electricity use through standard setting for appliances or economic incentives.

Thus, state PUCs will play a critical role in helping investor-owned utilities, or IOUs, manage the challenges described earlier in carrying out their regulatory responsibilities. IOUs, regulated by PUCs, serve 68 percent of Americans.[42] In order to protect consumers in a captive market from being charged excessive rates for energy, PUCs set rates for electric consumers designed to offer consumer protections, while allowing utilities to meet their revenue requirements and continue to make investments in their electric grids.[43] Over the past 40 years, as the PUCs have considered regulatory standards and rate structures, Congress has periodically called for consideration of certain forward-looking policies. The Public Utility Regulatory Policies Act offers one tool for tackling these challenges by providing an accepted path for Congress to help set the agenda at the state level.

1978 Public Utility Regulatory Poliies Act[44]

In 1978, Congress passed PURPA as part of a broader set of federal reforms under the National Energy Act and in response to the 1973 oil crisis.[45] PURPA sought to encourage energy efficiency and development of renewable energy sources to increase U.S. energy security and access to low-cost energy. At the time, utilities employed promotional rate structures, which reduced prices per kilowatt as consumers increased their electricity usage. This contributed to an exponential

growth in American energy consumption at a time when energy supplies could not keep up with demand.[46] PURPA required PUCs to consider developing new rate structures and to implement new ratemaking methods that would increase energy efficiency while protecting consumer rates:

> *SEC. 111. (a) CONSIDERATION AND DETERMINATION.—Each State regulatory authority (with respect to each electric utility for which it has ratemaking authority) and each nonregulated electric utility shall consider each standard established by subsection (d) and make a determination concerning whether or not it is appropriate to implement such standard to carry out the purposes of this title.*[47]

PURPA established six policy standards for the PUCs to consider: Cost-of-service rates; declining block rates; time-of-day rates; seasonal rates; interruptible rates; and load-management techniques. These standards eliminated promotional rate structures that reduced the cost of electricity as customers increased their consumption and were designed to ensure that utilities offered rates that incentivized energy-efficiency investments while reflecting the price variability of wholesale electricity. Each of these reforms was adopted in the first three years of the act by at least 32 states, demonstrating the usefulness of PURPA as a tool for Congress to "effectively influence state ratemaking practices without forcing them to adopt any particular standard."[48]

PURPA ensured state compliance by obligating state regulatory agencies to "commence the consideration" no later than two years after PURPA's enactment and to make a determination on the standards no later than three years after enactment.[49] If a state regulatory agency refused to comply within three years, the act required consideration of the standards in the first rate proceeding following this timeframe.[50] This meant that each state PUC was obligated to open a formal process for consideration of adoption of the PURPA standards. If adopted, the PUC would require all IOUs in its service area to comply with the standards.

1992 Energy Policy Act PURPA amendment[51]

Following the first Gulf War of 1990 to 1991, energy efficiency again became a priority for Congress, motivated by concerns of U.S. dependence on foreign oil and a desire to reduce energy waste.[52] Four standards were added to PURPA in the Energy Policy Act of 1992. The act amended PURPA to add "integrated resource planning," "investments in conservation and demand management,"

and "energy efficiency investments in power generation and supply" to the list of standards that PUCs were obligated to consider.[53] Integrated resource planning, or IRP, is a process for utilities to evaluate electric supply and projected demand on an ongoing basis to ensure that they are providing electric services at a cost that services the interests of all stakeholders, including consumers and investors. IRP requirements grew out of demand-management programs implemented across the United States during the 1980s. By 1991, 14 states had adopted full IRP requirements, with another 18 states incorporating some IRP requirements as well.[54] State regulatory support for IRP and demand-management programs drove significant energy-efficiency investments, which more than doubled from $1.2 billion in 1990 to $2.8 billion in 1993.[55]

2005 Energy Policy Act PURPA amendments[56]

Congress next amended PURPA as part of the Energy Policy Act of 2005. As part of the law, Congress added five new standards to PURPA to promote energy efficiency and development of distributed electricity generation.[57] The amendment required state PUCs to consider standards for utilities to make net metering available to consumers (see below); diversify their fuel sources; develop a 10-year plan to increase generation efficiency; consider the deployment of smart meters that track electricity consumption on an ongoing basis; and provide interconnection of distributed electricity generation to homeowners when requested. The interconnection requirement had significant implications for today's electricity markets, since the vast majority of rooftop solar systems are dependent on interconnection to the grid.[58]

In the three years following the passage of the law, Arizona, North Dakota, Minnesota, Vermont, Ohio, and Texas all adopted portions of the standards or implemented modified versions of the new policies. Many states already had net metering laws in place—including Delaware, New York, Georgia, and Indiana—and declined to adopt the standards. Other states, such as Wyoming, declined adoption of the standards outright, determining that implementation would result in a sufficiently high burden on ratepayers.[59]

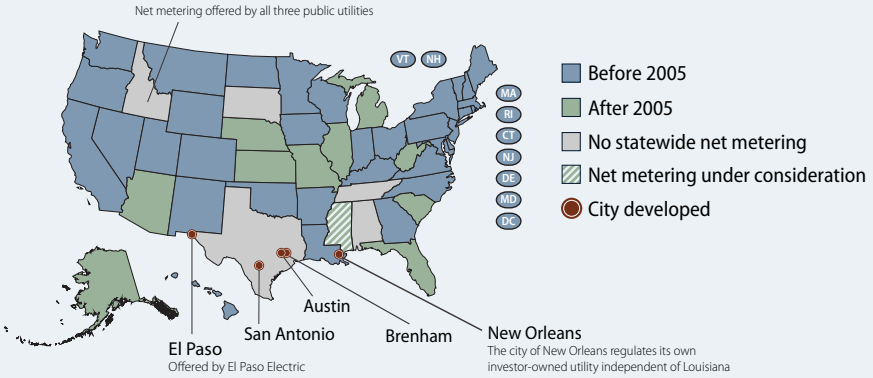
Net metering in the Energy Policy Act of 2005

Net metering is the policy that allows consumers who generate their own electricity to feed electricity they do not use back into the grid to offset their electricity consumption. Many states, or portions of states, allowed net metering by the early 2000s. After the passage of the Energy Policy Act of 2005, which amended PURPA to require consideration of net metering policies, 10 additional states adopted statewide net metering policies.[60]

FIGURE 1

State net metering programs

U.S. net metering programs enacted before and after the 2005 Energy Policy Act



Source: Database of State Incentives for Renewables & Efficiency, "Programs," available at http://programs.dsireusa.org/system/program (last accessed May 2015).

2007 Energy Independence and Security Act PURPA amendments[61]

Two years after the passage of the Energy Policy Act of 2005, Congress passed the Energy Security and Independence Act of 2007, or EISA, which included two amendments to PURPA to expand integrated resource planning and incentivize energy efficiency through rate design modifications. If adopted, integrated resource planning standards obligated utilities to include cost-effective energy efficiency as an investment priority. Rate design modification, or decoupling, encouraged utilities to develop and propose electric rates that would allow them to remain profitable while also providing customers with energy-efficiency savings, reducing the total electric consumption of their customers. The EISA also included two additional standards on smart-grid investments for PUCs to require utilities to consider smart-grid investments before undertaking nonadvanced grid investments and to provide information to customers on electricity usage as recorded by smart meters. These amendments also indicated policies and best practices that states could adopt that would incentivize utilities to deploy smart-grid technology and energy-efficiency investments.[62]

The PUCs of Idaho, Kentucky,[63] Rhode Island, South Dakota,[64] Utah, and Wyoming all conducted review of the advanced-metering and demand-pricing provisions in the EISA. The Kentucky and South Dakota PUCs implemented the provisions. Wyoming and Utah decided not to adopt the provisions. Idaho and Rhode Island determined that their existing standards satisfied the EISA or were being considered in separate cases.[65] PUCs in California, Connecticut, Delaware, Minnesota, New York, North Carolina, South Carolina, Tennessee, Utah, and Washington all determined that the laws and regulations in place before the passage of the EISA satisfied the new provisions and took no further action. The state legislatures of Colorado and Maine passed legislation to require their PUCs to implement policies in line with the EISA.[66]

Table 1
Established PURPA standards for electric utilities

Standards that Congress directed PUCs to consider

	Federal standards	Description of standards	Deadline for PUC consideration
		1978 PURPA	
1	Cost of service	Directs electric utilities to reflect to the best of their ability the cost of providing electricity in customer electric rates	Must consider two to three years after passage
2	Declining block rates	Prohibits the use of declining block rates, in which the price of electricity decreases as electric consumption increases—unless the cost of providing electricity over this period also decreases	Must consider two to three years after passage
3	Time-of-day rates	Directs electric utilities to charge electric rates on a time-of-day basis to reflect price variability throughout the day	Must consider two to three years after passage
4	Seasonal rates	Directs electric utilities to charge electric rates on a seasonal basis to reflect price variability throughout the year	Must consider two to three years after passage
5	Interruptible rates	Directs electric utilities to offer interruptible rates to commercial and industrial electric customers—rate agreements in which customers agree to reduce their electric consumption at times of peak demand in exchange for better rates	Must consider two to three years after passage
6	Load management techniques	Directs electric utilities to offer load management techniques to help customers reduce peak demand and increase electric reliability	Must consider two to three years after passage
		1992 Comprehensive National Energy Policy Act	
7	Integrated resource planning	Directs electric utilities to employ integrated resource planning and to report electric load and resource cost projections over a specific period of time to invest in the mix of electric resources that costs the least, including investments in energy efficiency	Must consider two to three years after passage; secretary of energy directed to report on progress after two years
8	Conservation and demand management	Sets a standard for electric rates to ensure that electric utility investments in energy efficiency are recoverable through electric rates and as profitable as investments in new electric infrastructure	Must consider two to three years after passage; secretary of energy directed to report on progress after two years

	Federal standards	Description of standards	Deadline for PUC consideration
9	Energy-efficiency investments	Directs state regulators to encourage electric utility investment in energy efficiency and to consider replacing policies that disincentivize energy efficiency with policies to encourage new investment and best practices	Must consider two to three years after passage; secretary of energy directed to report on progress after two years
10	Consideration of the effects of wholesale power purchases on utility cost of capital	Directs state PUCs to evaluate whether electric utility purchases of long-term wholesale power supplies, instead of utility investment in new generation, hold the potential for increases or decreases in utility costs of capital and associated retail electric rates	Must consider two to three years after passage
		2005 Energy Policy Act	
11	Net metering	Directs electric utilities to provide net metering services to the utility's electric customers upon request for onsite electricity generation	Must consider two to three years after passage
12	Fuel sources	Directs electric utilities to develop plans to minimize dependence on a single fuel source and to diversify their use of fuels and generating technologies, including renewable energy	Must consider two to three years after passage
13	Fossil-fuel generation efficiency	Directs electric utilities to develop and implement 10-year plans to increase efficiency of fossil-fuel electricity generation	Must consider two to three years after passage
14	Time-based metering and communications (smart metering)	Instructs PUCs to consider whether electric utilities must provide smart meters to customers to facilitate the requirement that utilities offer time-based electric rates to customers that reflect varying wholesale electric costs throughout the day	Must consider two to three years after passage
15	Interconnection	Directs electric utilities to provide interconnection for onsite generating facilities to any electric customer that the utility serves, allowing customers to install distributed generation on their property	Must consider one to two years after passage
		2007 Energy Independence and Security Act	
16	Integrated resource planning	Directs electric utilities to integrate energy efficiency into utility, state, and regional plans and to adopt policies that make cost-effective energy efficiency a priority	Must consider two to three years after passage
17	Rate design modifications to promote energy-efficiency investments	Directs electric utilities to offer electric rates that incentivise energy efficiency investments and to offer programs to ratepayers to increase energy efficiency; directs PUCs to consider providing utilities incentives for energy-efficiency programs and to consider supporting residential energy-efficiency programs	Must consider one to two years after passage
18	Consideration of smart-grid investments	Directs electric utilities to consider smart-grid investments before undertaking nonadvanced grid investments; directs PUCs to allow electric utilities to recover the costs of smart-grid investments and equipment replacements for equipment rendered obsolete by smart-grid investments	Must consider one to two years after passage
19	Smart-grid information	Directs electric utilities to provide information to customers on smart-meter recorded usage and electric price variance over time when requested and online; directs utilities to provide information on sources of electric generation to customers, including associated greenhouse gas emissions where available.	Must consider two to three years after passage

Sources: Public Utility Regulatory Policies Act of 1978 [As Amended Through P.L. 113–23, Enacted August 09, 2013] (December 1, 2014), available at http://legcounsel.house.gov/Comps/Public%20Utility%20Regulatory%20Policies%20Act%20Of%201978.pdf; Energy Policy Act of 1992, Public Law 486, 102nd Cong., 2d sess. (October 24, 1992), available at http://www.ferc.gov/legal/maj-ord-reg/epa.pdf; Energy Policy Act of 2005, Public Law 58, 109th Cong., 1st sess (August 8, 2005), available at http://www.gpo.gov/fdsys/pkg/PLAW-109publ58/pdf/PLAW-109publ58.pdf; Energy Independence and Security Act of 2007, Public Law 140, 110th Cong., 1st sess (December 19, 2007), available at http://www.gpo.gov/fdsys/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf.

2009 American Recovery and Reinvestment Act State Energy Program

In an effort to build on energy efficiency at the state level, the American Recovery and Reinvestment Act of 2009, or ARRA, appropriated $3.1 billion for the federal State Energy Program, or SEP.[67] Under this program, the Department of Energy provides funding to states for increasing energy efficiency, reducing energy imports, increasing electric reliability, and reducing the environmental impacts of energy production and use.[68]

ARRA required as a condition of receiving SEP funding that the governors assure the secretary of energy that the appropriate regulatory authority for each gas and electric utility would seek to implement a policy that encourages the alignment of utility incentives and efficiency goals. The DOE received letters of assurance from all U.S. governors by the end of August 2009, though many of the letters lacked specific explanations of how states would promote the policies of ARRA 410(1).[69]

The ARRA provision achieved some success in persuading certain states to encourage energy efficiency by adopting electric-rate decoupling or lost-revenue adjustment mechanisms, which can reduce disincentives for utility investment in energy efficiency. Alabama, Arizona, Arkansas,[70] Colorado, Indiana, Kansas, Louisiana,[71] Missouri, Mississippi,[72] New Jersey, Rhode Island, South Dakota, Washington, and Wyoming each implemented a decoupling program between 2009 and 2013.[73] California also established a PUC process to review grid modernization projects and investments by IOUs seeking ARRA funding.[74]

In Arizona, ARRA appeared to have a distinct role in persuading the Arizona Corporation Commission, or ACC, to adopt a rate decoupling plan. In 2010, the ACC wrote that: "ARRA has asked participating states to consider general policies that ensure that utility financial incentives are aligned with helping customers use energy efficiency. Arizona, in accepting ARRA funding, agreed to analyze and consider these policies."[75] The ACC worked with Arizona's utilities, consumer groups, and other stakeholders to produce a proposal that would allow utilities to file a rate decoupling proposal in December 2010.[76] Since 2011, the ACC has approved revenue decoupling for the Arizona Public Service Company and Tucson Electric Power.[77]

However, ARRA did not achieve all of its desired goals because the conditions for receiving SEP funding only required state governors to "obtain necessary assurances" from commissioners that they would seek to implement "a general policy that ensures that utility financial incentives are aligned with helping their customers use energy more efficiently."[78] Unlike the consideration requirements in PURPA, the ARRA provision lacked enforcement capabilities and was difficult to monitor, due to the vague nature of the requirement. The number of states whose governors offered assurances of action without providing specific commitments or proof of the existence of apparent outcomes suggests that the lack of stronger language failed to compel state leaders or their PUCs to consider fully the application of new energy policies. In contrast, the standards laid out in PURPA were supported by a clear requirement that each PUC open formal proceedings to consider whether to implement the standards within a three-year timeframe.

Clean energy solutions for PUCs to consider

While much has changed in the U.S. energy sector since 1978, the Public Utility Regulatory Policies Act has repeatedly proven itself as a modest but useful tool for Congress to encourage smart standards for utilities at the state level. Throughout the country, including in states that initially declined to adopt the standards that PURPA established in 1978, electric rates offered by investor-owned utilities to encourage energy efficiency and net metering services are commonplace. Ninety percent of states have net metering policies in place, and 72 percent of states have adopted some form of energy-efficiency ratemaking standard.[79] Energy consumption no longer grows at the same pace as the overall economy,[80] and renewable energy is becoming cost competitive with fossil fuels.[81]

Given the success that Congress has had in using PURPA to spur productive state action historically, Congress should now consider amending PURPA once again to bring focus to today's challenges and opportunities in the electricity sector. In the face of climate change and evolving electricity markets, it is vital that public utility commissions work with utilities to encourage investments in resilient systems and to consider long-term plans to incorporate increasing amounts of clean energy generation and storage in their state grids. Congress can amend PURPA to support these initiatives and help states increase their energy security and electric reliability, as well as support electric-rate stability over the long term.

Congress should amend PURPA to require the PUCs to consider three important policies:

- Boost energy-efficiency efforts through technology and regulation.
- Establish policies to encourage utilities to use clean energy to reduce pollution.
- Ensure utilities will have the resilience to function reliably in the future.

Energy-efficiency incentives and affordability

First, Congress should require PUCs to consider implementing the policies that state governors already committed to pursue on a bipartisan basis in 2009. Congress appropriated State Energy Program funding in ARRA on the condition that state governors and PUC commissioners offer assurances that they would pursue policies that would ensure that utility financial incentives are aligned with helping their customers use energy more efficiently. The rate structures should balance timely cost recovery and a timely earnings opportunity for utilities with cost-effective measureable and verifiable efficiency savings in a way that sustains or enhances utility customers' incentives to use energy more efficiently.

PUCs should consider regulatory incentives to make energy-efficiency investments as a means to avoid future investment by IOUs in new generation and transmission infrastructure. Energy-efficiency programs can obviate the need for new transmission and distribution assets and reduce energy demand at one-third of the cost of new generation on a per-kilowatt basis.[82] Because these benefits may not be realized under existing rate structures, regulators should work with the Department of Energy to develop new techniques to validate and value energy-efficiency savings and avoided costs of infrastructure investment. Shifting these investment incentives may require changes to existing rate structures, but they can provide consumers and the grid with numerous increased benefits.

Integrating clean energy and energy storage into the grid

Second, Congress should require PUCs to consider how to encourage integration of clean energy and energy storage into their grid. As the cost of clean energy technology continues to fall, regulators must be proactive in establishing standards for deployment that achieve economic, environmental, and other societal benefits and that address any institutional biases against generation. Clean energy sources are nonpolluting, so they do not impose health risks on the communities they serve; can be placed closer to demand centers, mitigating the need for additional investment in transmission; and with the use of microgrids that can operate independently of the traditional electric grid, can provide access to electricity during blackouts.

Clear regulatory guidance from state public utility commissioners can send strong signals to energy markets by eliminating barriers for integration of renewable energy, encouraging investment in energy storage to balance loads from intermittent sources of energy, and examining what policies can facilitate the use of fossil-power generation that captures and stores carbon pollution. Regulators that consider the value offered by clean energy beyond the immediate benefits can better serve state consumers with what the DOE calls a "portfolio of electricity options that meet their state specific goals for reliable, affordable, and clean electricity."[83] As inexpensive sources of renewable electricity make up an increasing share of state electricity generation, regulators also will have to adopt better planning and prediction methods to accommodate clean energy in a way that ensures grid stability and reliability. In states that have not already established net metering and interconnection standards, PUCs should consider their applications.

Regulatory guidance also has been cited as one of the primary tools to enable proliferation in the energy storage market—both large-scale and distributed storage.[84] PUCs that embrace a proactive approach to the benefits conferred by energy storage can work with utilities in their states to direct investments into energy storage systems that reduce the need for new investment in peaking plants; transmission and distribution upgrades or new transmission to relieve grid congestion; and load-management infrastructure. Specifically, regulators could consider rate structures that value ancillary services and demand-response support of energy storage appropriately or whether energy storage is most appropriately classified as a distribution asset or a storage asset, which would offer clarification to utilities and investors on the value of energy storage investments.[85] Similarly, regulators could consider the eligibility of third-party providers to aggregate energy storage services at the distribution level to provide their collective ancillary benefits, such as load moderation to increase grid stability. Energy storage offers benefits at both levels of the electric grid, but because regulators treat generation assets and distribution assets differently, clarification of this can provide stronger market signals than currently exist.[86]

Building resilience into utilities

Third, Congress should require PUCs to consider how to encourage utility resilience planning to protect investments against extreme weather and drought in a changing climate. Shifting weather patterns will require utilities to invest in resources to harden infrastructure, conserve water, and increase the resilience of their assets. Planning and proactive investment by IOUs can protect their ratepayers and investors from excessive recovery costs and falling operational efficiencies

due to climate change. Regulators could encourage their utilities to develop long-term plans for their facilities that determine acceptable levels of risk to climate change, particularly during rate cases to evaluate investments in new assets. Such planning will support grid reliability and long-term affordability.

One new rate structure that could encourage utility investments in resilience and reliability is performance-based ratemaking, or PBR. Under a PBR regulatory structure, a PUC sets performance goals over a set timeframe that utilities must comply with, such as reliability, efficiency, or affordability. The better a utility's performance against these benchmarks, the more revenue the utility is entitled to receive. Conversely, if a utility does not achieve the benchmarks, a penalty is incurred.[87] In 2012, the Maryland Grid Resiliency Task Force recommended implementing a PBR structure to align customer and utility incentives for reliability,[88] and in 2014, the Maryland Public Service Commission conducted an evaluation into the application of PBR.[89] This approach could be used to ensure that utilities are increasing resilience over time.

Conclusion

The nation's electricity sector is undergoing historic change with the opportunity for tremendous benefits, from cutting pollution to upgrading and strengthening the grid. To most easily realize these benefits, however, the state public utility commissions should take a forward-looking approach and act to encourage clean energy, boost energy efficiency, and build resilience in their electric utility systems. To facilitate this forward-looking approach at the state level, Congress should amend PURPA to call upon the states to undertake formal consideration of these important and timely issues.

About the authors

Greg Dotson is the Vice President for Energy Policy at the Center for American Progress. For more than 18 years, Dotson was the lead environmental and energy staffer for Rep. Henry A. Waxman (D-CA) and a top staffer on the House Energy and Commerce Committee and the House Committee on Oversight and Government Reform. His major accomplishments include House passage of comprehensive climate change legislation and the enactment of laws on clean energy, pesticide safety, drinking water, and clean air.

Ben Bovarnick is a Research Assistant with the Energy Policy team at the Center, where he works on domestic clean energy deployment and international climate policy.

Acknowledgments

The authors thank Alison Cassady, Director of Domestic Energy Policy at the Center, for her contributions to this report.

Endnotes

1 U.S. Department of Energy, *Quadrennial Energy Review Summary: Transforming U.S. Energy Infrastructures in a Time of Rapid Change: The First Installment of the Quadrennial Energy Review* (2015), available at http://energy.gov/sites/prod/files/2015/04/f22/QER_Summary_0.pdf.

2 Ibid.

3 Theodore F. Craver Jr., "Raising Our Game," *Electric Perspectives*, September/October 2013, pp. 18–25, available at http://www.eei.org/resourcesandmedia/magazine/Documents/2013-09-01-RAISEGAME.pdf.

4 Ronald Lehr, "Utility and Regulatory Models for the Modern Era" (America's Power Plan, 2013), available at http://americaspowerplan.com/wp-content/uploads/2013/10/APP-UTILITIES.pdf.

5 Massachusetts Institute of Technology, "The Future of the Electricity Grid" (2011).

6 U.S. Department of Energy, *Quadrennial Energy Review Chapter II: Increasing the Resilience, Reliability, and Safety of Asset Security and TS&D Infrastructure* (2015), available at http://energy.gov/sites/prod/files/2015/04/f22/QER_Ch2.pdf.

7 Ibid.

8 America's Wetland Foundation, America's Energy Coast, and Entergy, "Effectively Addressing Climate Risk through Adaptation for the Energy Gulf Coast" (2010), available at http://www.entergy.com/content/our_community/environment/GulfCoastAdaptation/report.pdf; Stephen F. Singer, "Millstone Power Station: Emails Show Officials Worried About Connecticut Nuclear Plant," HuffPost Green, February 18, 2013, available at http://www.huffingtonpost.com/2013/02/18/millstone-power-station-emails-connecticut_n_2711067.html.

9 Ibid.

10 U.S. Department of Energy, *U.S. Energy Sector Vulnerabilities to Climate Change and Extreme Weather* (2013), available at http://energy.gov/sites/prod/files/2013/07/f2/20130716-Energy%20Sector%20Vulnerabilities%20Report.pdf.

11 Energy Information Administration, "How Much of U.S. Carbon Emissions Are Associated With Electricity Generation?", available at http://www.eia.gov/tools/faqs/faq.cfm?id=77&t=11 (last accessed May 2015).

12 Intergovernmental Panel on Climate Change, "Summary for Policymakers." In "Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change" (2014).

13 Energy Information Administration, "AEO2014 Early Release Overview," available at http://www.eia.gov/forecasts/aeo/er/early_elecgen.cfm (last accessed May 2015).

14 Energy Information Administration, *Monthly Energy Review: April 2015* (U.S. Department of Energy, 2015), table 7.2a, available at http://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf.

15 Energy Information Administration, "Carbon Dioxide Emissions Coefficients," February 14, 2013, available at http://www.eia.gov/environment/emissions/co2_vol_mass.cfm.

16 Levi Tillemann, "Revolution Now: The Future Arrives for Four Clean Energy Technologies" (Department of Energy, 2013), available at http://energy.gov/sites/prod/files/2013/09/f2/200130917-revolution-now.pdf.

17 Lazard, "Lazard's Levelized Cost of Energy Analysis—Version 8.0" (2014), available at http://www.lazard.com/PDF/Levelized%20Cost%20of%20Energy%20-%20Version%208.0.pdf.

18 National Renewable Energy Laboratory, "Installed Wind Capacity," available at http://apps2.eere.energy.gov/wind/windexchange/wind_installed_capacity.asp (last accessed May 2015).

19 Tilleman, "Revolution Now."

20 American Wind Energy Association, "Wind was largest source of new electricity in 2014, Congress still must provide long-term policy certainty," Press release, March 5, 2015, available at http://www.awea.org/MediaCenter/pressrelease.aspx?ItemNumber=7294.

21 Energy Information Administration, *Short-Term Energy Outlook (STEO)* (U.S. Department of Energy, 2015), table 7d, available at http://www.eia.gov/forecasts/steo/pdf/steo_full.pdf.

22 Diane Cardwell, "Solar and Wind Starting to Win on Price vs. Conventional Fuels," *The New York Times*, November 24, 2014, available at http://www.nytimes.com/2014/11/24/business/energy-environment/solar-and-wind-energy-start-to-win-on-price-vs-conventional-fuels.html.

23 Jim Kennerly, "Going Solar in America: Ranking Solar's Value to Consumers in America's Largest Cities" (Raleigh, NC: NC Clean Energy Technology Center, 2015), available at http://nccleantech.ncsu.edu/wp-content/uploads/Going-Solar-in-America-Ranking-Solars-Value-to-Customers_FINAL.pdf.

24 Ethan Zindler and Michael Di Capua, "Sustainable Energy in America: 2015 Factbook" (New York: Bloomberg New Energy Finance, 2015).

25 Andrew Hobbs, Uday Varadarajan, and Brendan Pierpont, "Improving Solar Policy: Lessons from the solar leasing boom in California" (San Francisco: Climate Policy Initiative, 2013), available at http://climatepolicyinitiative.org/publication/improving-solar-policy-lessons-from-the-solar-leasing-boom-in-california/.

26 Craver Jr. "Raising Our Game."

27 Allen McFarland, "California First State to Generate More Than 5% of Electricity From Utility-Scale Solar," Energy Information Administration, March 24, 2015, available at http://www.eia.gov/todayinenergy/detail.cfm?id=20492.

28 Cardwell, "Solar and Wind Starting to Win on Price vs. Conventional Fuels."

29 U.S. Department of Energy, *Wind Vision: A New Era for Wind Power in the United States* (2015), available at http://www.energy.gov/sites/prod/files/WindVision_Report_final.pdf.

30 Office of Energy Efficiency & Renewable Energy, "SunShot Vision Study," available at http://energy.gov/eere/sunshot/sunshot-vision-study (last accessed May 2015).

31 Environmental Defense Fund, "States Have Led the Way in Curbing Carbon Pollution from New Plants" (2012), available at http://www.edf.org/sites/default/files/State_GHG_standards_3-13-2012.pdf.

32 Regional Greenhouse Gas Initiative, "Fact Sheet: Investment of RGGI Proceeds Through 2013" (2015), available at http://www.rggi.org/docs/ProceedsReport/Proceeds-Through-2013-FactSheet.pdf.

33 See the text box on p. 12 for more details.

34 U.S. Environmental Protection Agency, "Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units; Proposed Rule," *Federal Register* 79 (117) (2014), available at http://www.gpo.gov/fdsys/pkg/FR-2014-06-18/pdf/2014-13726.pdf.

35 Ibid.

36 Interstate Renewable Energy Council, "Deploying Distributed Energy Storage: Near-term Regulatory Considerations to Maximize Benefits" (2015), available at http://www.irecusa.org/2015/03/deploying-distributed-energy-storage-near-term-regulatory-considerations-to-maximize-benefits/.

37 Ibid.; Department of Energy, *Quadrennial Energy Review Chapter III: Modernizing the Electric Grid* (2015), available at http://energy.gov/sites/prod/files/2015/04/f22/QER%20ch3%20final_0.pdf.

38 Federal Electric Regulatory Commission, "Assessment of Demand Response & Advanced Metering" (2014), available at https://www.ferc.gov/legal/staff-reports/2014/demand-response.pdf.

39 Energy Information Administration, "Arizona Electricity Profile 2012," May 1, 2014, available at http://www.eia.gov/electricity/state/arizona/index.cfm.

40 Federal Electric Regulatory Commission, "Assessment of Demand Response & Advanced Metering."

41 Jaquelin Cochran and others, "Integrating Variable Renewable Energy in Electric Power Markets: Best Practices from International Experience" (Washington: National Renewable Energy Laboratory and others, 2012), available at http://www.nrel.gov/docs/fy12osti/53730.pdf.

42 Executive Office of the President, *Economic Benefits of Increasing Electric Grid Resilience to Weather Outages* (The White House, 2013), available at http://energy.gov/sites/prod/files/2013/08/f2/Grid%20Resiliency%20Report_FINAL.pdf.

43 Regulatory Assistance Project, "Electricity Regulation in the US: A Guide" (2011).

44 *Public Utility Regulatory Policies Act of 1978*, H. Rept. 4018, 95 Cong., 2 sess. (Government Printing Office, 1978).

45 Julia Richardson and Robert Nordhaus, "The National Energy Act of 1978," *Natural Resources and the Environment* 10 (1) (1995): 62–68.

46 National Museum of American History, "The Public Utilities Regulatory Policies Act," available at http://americanhistory.si.edu/powering/past/history4.htm (last accessed May 2015).

47 *Public Utility Regulatory Policies Act of 1978*.

48 Brian Spak, Stephanie Levine, and Jeffrey Swofford, "Lessons from the Stimulus: The Past and Potential Future Impacts of Federal Policy on Utility Rate Structures" (Washington: American Council for an Energy-Efficient Economy, 2014).

49 *Public Utility Regulatory Policies Act of 1978*.

50 "If a State regulatory authority (with respect to each electric utility for which it has ratemaking authority) or nonregulated electric utility declines to implement any standard established by subsection (d) which is determined under subsection (a) to be appropriate to carry out the purposes of this title, such authority or nonregulated electric utility shall state in writing the reasons therefor. Such statement of reasons shall be available to the public." See *Public Utility Regulatory Policies Act of 1978*.

51 *Energy Policy Act of 1992*, Public Law 486, 102nd Cong., 2d sess. (October 24, 1992).

52 Rep. Olympia Snowe, "Changing the Course of Energy in America," Testimony before the House of Representatives, May 27, 1992, available at http://thomas.loc.gov/cgi-bin/query/D?r102:4:./temp/~r102VtGnRn::.

53 *Energy Policy Act of 1992*.

54 Rachel Wilson and Paul Peterson, "A Brief Survey of State Integrated Resource Planning Rules and Requirements" (Cambridge, MA: Synapse Energy Economics Inc., 2011), available at http://www.cleanskies.org/wp-content/uploads/2011/05/ACSF_IRP-Survey_Final_2011-04-28.pdf.

55 Douglas C. Bauer and Joseph H. Eto, "Future Directions: Integrated Resource Planning" (Washington: American Council for an Energy-Efficient Economy, 1992), available at http://aceee.org/files/proceedings/1992/data/papers/SS92_Panel8_Paper02.pdf; Stan Hadley and Eric Hirst, "Utility DSM Programs from 1989 Through 1998: Continuation or Cross Roads?" (Oakridge, TN: Oak Ridge National Laboratory, 1995), available at http://web.ornl.gov/~webworks/cpr/rpt/77275.pdf.

56 *Energy Policy Act of 2005*, Public Law 58, 109th Cong., 1st sess. (August 8, 2005).

57 Rep. Dennis Moore: "… our country needs to reduce its dependence on foreign oil and increase its national energy independence. Increasing our energy independence will stabilize future energy prices, benefit American consumers and businesses, and enhance both our energy security and our national security." See Dennis Moore, *Congressional Record*, daily ed., 151 (54) (Government Printing Office, April 21, 2005): 7390, available at http://origin.www.gpo.gov/fdsys/pkg/CREC-2005-04-28/html/CREC-2005-04-28-pt2-PgE818-4.htm.

58 *Energy Policy Act of 2005*, p. 370.

59 U.S. Demand Response Coordinating Committee, "Demand Response and Smart Metering Policy Actions Since the Energy Policy Act of 2005: A Summary For State Officials" (2008), available at http://www.demandresponsesmartgrid.org/Resources/Documents/Final_NCEP_Report_on_DR_and_SM_Policy_Actiona_08.12.pdf.

60 Database of State Incentives for Renewables & Efficiency, "Programs," available at http://programs.dsireusa.org/system/program (last accessed May 2015).

61 *Energy Independence and Security Act of 2007*, Public Law 140 110th Cong., 1st sess. (December 19, 2007).

62 Ibid., pp. 175, 300.

63 Public Service Commission of the Commonwealth of Kentucky, "Consideration of the New Federal Standards of the Energy Independence and Security Act of 2007," Case No. 2008-00408 (2008), available at http://psc.ky.gov/order_vault/Orders_2008/200800408_11132008.pdf.

64 Public Commission of the State of South Dakota, "Order Adopting Modified Electric PURPA Standards," Order Adopting Modified Electric PURPA Standards, EL-08-028 (2008), available at http://puc.sd.gov/commission/orders/electric/2009/el08-028C.pdf.

65 Energy Information Administration, *Smart Grid Legislative and Regulatory Policies and Case Studies* (U.S. Department of Energy, 2011), available at http://www.eia.gov/analysis/studies/electricity/.

66 Ibid.

67 *American Recovery and Reinvestment Act of 2009*, Public Law 111-5 111th Cong., 1st sess. (February 17, 2009).

68 Spak, Levine, and Swofford, "Lessons from the Stimulus."

69 The letters from each governor offering assurances to the secretary of energy that they would implement decoupling policy can be found here: U.S. Department of Energy, "Search Results: State Energy Program Assurance," available at http://energy.gov/search/site/%22state%20energy%20program%20assurances%22 (last accessed May 2015).

70 In December 2010, the Arkansas Public Service Commission approved implementation of a lost-revenue mechanism that would allow utilities to seek "lost contributions to fixed costs" from investments in energy efficiency. See Arkansas Public Service Commission, "Order Approving Joint Utility Motion for Lost Contributions to Fixed Costs, As Modified," Docket No. 08-137-U, Order No. 14 (2008), available at http://www.apscservices.info/pdf/08/08-137-u_134_1.pdf.

71 In October 2012, the Louisiana Public Service Commission proposed a set of rules for electric and gas utilities to recover energy-efficiency program costs through an energy-efficiency rider. This "Lost Contributions to Fixed Costs" mechanism was included in energy-efficiency programs implemented by three of Louisiana's investor-owned utilities in November 2014. See American Council for an Energy-Efficient Economy, "Utility Business Model," available at http://database.aceee.org/state/utility-business-model (last accessed May 2015).

72 In January 2010, the Mississippi Public Service Commission began consideration of Rule 29, whose "purpose is to promote the *efficient* use of electricity and natural gas by implementing energy efficiency programs and standards in Mississippi." In addition, the commission ordered electric and gas utilities to submit annual reports that addressed performance of approved energy-efficiency programs each May. See Mississippi Public Service Commission, "Proposal of the Mississippi Public Service Commission to Possibly Amend Certain Rules and Regulations Governing Public Utility Service," Docket No. 2010-AD-2 (2010), available at http://www.psc.state.ms.us/InsiteConnect/InSiteView.aspx?model=INSITE_CONNECT&queue=CTS_ARCHIVEQ&docid=310904.

73 Spak, Levine, and Swofford, "Lessons from the Stimulus"; American Council for an Energy-Efficient Economy, "Utility Business Model"; Pamela Morgan, "A Decade of Decoupling for US Energy Utilities: Rate Impacts, Designs, and Observations" (Lake Oswego, OR: Graceful Systems LLC, 2012), available at http://switchboard.nrdc.org/blogs/rcavanagh/decouplingreportMorganfinal.pdf.

74 California Public Utilities Commission, "Decision Establishing Commission Processes for Review of Projects and Investments by Investor Owned Utilities Seeking Recovery Act Funding," Rulemaking 08-12-009 (2009), available at http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/106992.pdf.

75 Arizona Commerce Commission, "Final ACC Policy Statement Regarding Utility Disincentives to Energy Efficiency and Decoupled Rate Structure," Docket Nos. E-000005- 08-0314 and G-00000C-08-0314. 29 (2010), available at http://images.edocket.azcc.gov/docketpdf/0000121666.pdf.

76 Spak, Levine, and Swofford, "Lessons from the Stimulus."

77 American Council for an Energy-Efficient Economy, "Utility Business Model."

78 *American Recovery and Reinvestment Act of 2009*.

79 Energy-efficiency ratemaking standards include decoupling or lost-revenue adjustment mechanisms. See Apoorv Bhargava, comment on "This map shows how 36 states are modernizing the utility business model," Our Thinking, comment posted September 24, 2014, available at http://blog.opower.com/2014/09/utility-business-model-20-map/.

80 Energy Information Administration, "Today in Energy U.S. economy and electricity demand growth are linked, but relationship is changing," March 22, 2013, available at http://www.eia.gov/todayinenergy/detail.cfm?id=10491.

81 Cardwell, "Solar and Wind Energy Starting to Win on Price vs. Conventional Fuels."

82 American Council for an Energy-Efficient Economy, "Energy Efficiency as a Resource," available at http://aceee.org/topics/energy-efficiency-resource (last accessed May 2015).

83 U.S. Department of Energy, *Quadrennial Energy Review Chapter II*.

84 Interstate Renewable Energy Council, "Deploying Distributed Energy Storage."

85 Ibid.

86 Chet Lyons, "Guide to Procurement of Flexible Peaking Capacity: Energy Storage or Combustion Turbines?" (Boston: Energy Strategies Group, 2014), available at http://www.energystrategiesgroup.com/wp-content/uploads/2014/10/Guide-to-Procurement-of-New-Peaking-Capacity-Energy-Storage-or-Combustion-Turbines_Chet-Lyons_Energy-Strategies-Group.pdf.

87 Sonia Aggarwal and Eddie Burgess, "New Regulatory Models" (San Francisco: Energy Innovation Policy and Technology LLC, 2014), available at http://energyinnovation.org/wp-content/uploads/2014/06/SPSC-CREPC_NewRegulatoryModels.pdf.

88 Maryland Energy Administration, "Grid Resiliency Task Force," available at http://energy.maryland.gov/reliability/ (last accessed May 2015).

89 Public Service Commission of Maryland, "Report on Performance Based Ratemaking Principles and Methods for Maryland Electricity Distribution Utilities," Case No. 9298 (2014), available at http://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?filepath=C:%5CCasenum%5C9200-9299%5C9298%5CItem_99%5C%5C9298DerechoPBRReviewStaffJuly12014.pdf.

Our Mission

The Center for American Progress is an independent, nonpartisan policy institute that is dedicated to improving the lives of all Americans, through bold, progressive ideas, as well as strong leadership and concerted action. Our aim is not just to change the conversation, but to change the country.

Our Values

As progressives, we believe America should be a land of boundless opportunity, where people can climb the ladder of economic mobility. We believe we owe it to future generations to protect the planet and promote peace and shared global prosperity.

And we believe an effective government can earn the trust of the American people, champion the common good over narrow self-interest, and harness the strength of our diversity.

Our Approach

We develop new policy ideas, challenge the media to cover the issues that truly matter, and shape the national debate. With policy teams in major issue areas, American Progress can think creatively at the cross-section of traditional boundaries to develop ideas for policymakers that lead to real change. By employing an extensive communications and outreach effort that we adapt to a rapidly changing media landscape, we move our ideas aggressively in the national policy debate.

Center for American Progress

1333 H STREET, NW, 10TH FLOOR, WASHINGTON, DC 20005 • TEL: 202-682-1611 • FAX: 202-682-1867 • WWW.AMERICANPROGRESS.ORG