Preparing for the Energy Future by Creating It: What State Public Utility Commissions Can do to Promote Sustainable Energy Policies

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Safe, abundant, and reliable electricity is the bedrock upon which the United States has built its modern economy. Our national security, commercial activity, and day-to-day living depend on the stability of the nation's electric system—a system facing a set of challenges unmatched by any other in the grid's century-long history. Stringent environmental regulations, climate change concerns, waves of older generator retirements, protracted natural gas market dominance, third-party competition, as well as increasing renewables and demand-side technology integration are just some of the realities coalescing into the perfect storm for electric utilities and regulators.

Although intimidating, these challenges must be addressed. With their experience and duty to regulate in the public interest, state public utility commissions ("PUCs"), also called public service commissions, are well-positioned to help solve these problems and guide our transitioning electric system toward a low-carbon future. To that end, this Article explores how PUCs can influence this evolution and promote sustainable energy goals, especially in the realm of generator selection. Part I discusses the changes happening in the electric industry today and why state-level regulation is necessary in the absence of effective federal action. Part II briefly summarizes the development of the electric system, as well as federal and state regulatory schemes. With that background information as context, Part III sets out various options for state PUCs to pursue in advancing a sustainable energy agenda.

The difficulties facing electric utilities and regulators today bring with them a host of uncertainties about how our electric system can cope in the near-term and thrive in the long-term. However, by embracing the opportunities inherent in this transition to a twenty-first century grid, state regulators can prepare for tomorrow's energy future by helping to create it today.

I. Why State-Level Action Is Necessary

This Part describes in more detail the magnitude of the problems facing the electric system today, and sets out three reasons why state regulators should get more engaged. First, the reality of climate change demands a governmental response that, in the absence of comprehensive federal action, state governments are the next best equipped to deliver. Second, the electricity system is already undergoing unprecedented transformation, and state regulators are in a prime position to direct this new development toward a sustainable, low-carbon future. Third, this transition opens up vast new economic growth opportunities for states willing to be on the leading edge of energy policy innovation.

A. *To Address Climate Change*

The mounting scientific evidence, near unanimity among experts, and real-world impacts felt around the globe leave no reasonable doubt as to the existential threat posed by climate change.[1] In December 2015, world leaders gathered in

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1. *See, e.g.*, Intergovernmental Panel on Climate Change, *Publications and Data Reports*, https://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml (last visited Aug. 9, 2016) (setting out various publications produced by the IPCC, including assessment reports going back to 1990, which summarize for policymakers numerous scientific studies on climate change). Ninety-seven percent of climate scientists agree on the following statement:

Paris for the United Nations Climate Change Conference ("COP21") and adopted the world's first universal climate accord.[2] Although many environmental advocates criticize the Paris Agreement as insufficient to avert the worst consequences of global warming,[3] it nonetheless signals a major shift in the status quo for the dirtiest industries—especially the electric power sector, which is the single largest source of greenhouse gas emissions in the United States[4]—and accounts for over a third of the nation's total carbon footprint.[5] Tamping down on emissions from electricity generators is therefore one of the best ways to reduce the country's overall level of emissions, especially for carbon dioxide ("CO_2"), which is a primary byproduct of fossil-fuel generation.[6]

Since the Supreme Court's decision in *Massachusetts v. EPA*,[7] the federal Environmental Protection Agency ("EPA") has made significant strides toward regulating carbon dioxide emissions from electric generating units—resulting in the agency's Clean Power Plan ("CPP") final rule in August 2015.[8] Using the agency's authority under Section 111(d) of the Clean Air Act ("CAA"), EPA set state-by-state carbon emissions limits on both existing and future electric generating units.[9]

The ink on the Clean Power Plan was barely dry, however, before the first of several legal challenges were filed collectively by a group of states, industries, and utilities—an effort that ultimately culminated in an unprecedented Supreme Court stay of the rule's implementation pending resolution of the lawsuit.[10] One of the major contentions levied by challengers is that the final rule's performance standards include options that are unrelated to the existing sources targeted by the rule. As the challengers argue, the CAA 111(d) standard, "best system of emission reduction,"[11] should not include compliance options that are inherently outside the control of the regulated source itself, such as: substituting combined-cycle natural gas units or zero-emission renewable energy generating units for existing coal-fired units. In this way, challengers assert, EPA is inserting itself into the generation resource selection process—a realm traditionally regulated by states.[12]

As summarized in Part II.A, states have indeed been the primary government actors involved in questions of in-state electric generation resource portfolio development. In the absence of more comprehensive federal legislation, however, and with the fate of the CPP uncertain as of this writing, states—and their public utility commissions—will continue to be the nation's pivotal energy policy decision-makers.

B. *To Direct Electric System Development Toward a Sustainable Future*

Once lauded as the "supreme engineering achievement of the [twentieth] century" by the National Academy of Engineering,[13] the nation's electricity system today is struggling to cope with twenty-first century challenges. The next few years will be a pivotal time in the history of the U.S. electric system as regulators and industry members grapple with a compounding set of problems, including:

1. Anemic Electricity Demand

According to the most recent *Annual Electricity Outlook* from the Energy Information Administration, electricity demand is projected to increase by less than one percent per year.[14]

"that climate-warming trends over the past century are very likely due to human activities, and most of the leading scientific organizations worldwide have issued public statements endorsing this position." U.S. Nat'l Aeronautics & Space Admin., *Scientific Consensus*, climate.nasa.gov/scientific-consensus/ (last visited Aug. 9, 2016). For a summary of some of the climate change impacts being felt today, see U.S. Nat'l Aeronautics & Space Admin., *Climate Change: How do We Know?*, http://climate.nasa.gov/evidence/ (last visited Aug. 9, 2016); *see also* Richard Monastersky, *Biodiversity: Life—A Status Report*, Nature (Dec. 20, 2014), www.nature.com/news/biodiversity-life-a-status-report-1.16523 (chronicling the status of global biodiversity and noting, among other things, 41% of amphibians face extinction, as well as large fractions of mammals and birds—threats that will only intensify as a result of climate change).

2. United Nations, Framework Convention on Climate Change: Adoption of the Paris Agreement (2015), https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf.
3. *See, e.g.*, Alissa J. Rubin & Elian Peltier, *Protesters Are in Agreement as Well: Pact Is Too Weak*, N.Y. Times, Dec. 12, 2015, www.nytimes.com/2015/12/13/world/europe/climate-activists-gather-in-paris-to-protest-outcome-of-conference.html?_r=0; Bill McKibben, *What the Paris Conference on Climate Change Can do for Planet Earth*, L.A. Times, Nov. 29, 2015, www.latimes.com/opinion/op-ed/la-oe-mckibben-paris-un-climate-conference-20151129-story.html; *see also, e.g.,* International Energy Agency, World Energy Outlook 2014, Executive Summary 2 (2014), https://www.iea.org/Textbase/npsum/WEO2014SUM.pdf (noting that the world is not on track to stay below two degrees Celsius, the internationally agreed on goal, and that "urgent action" is needed "to steer the energy system on a safer path").
4. U.S. Envtl. Prot. Agency, *Sources of Greenhouse Gas Emissions*, epa.gov/climatechange/ghgemissions/sources/electricity.html. The other prominent sectors according to their emissions levels are: transportation (28%), industry (20%), agriculture (10%), and commercial and residential (10%) according to a 2012 study by the EPA. *Id.*
5. According to the U.S. Energy Information Administration, carbon emissions from the electric power sector accounted for about 38% of total U.S. emissions in 2013—the most recent year for which the EIA has data. U.S. Energy Info. Admin., *Frequently Asked Questions: How Much of U.S. Carbon Dioxide Emissions Are Associated With Electricity Generation?* (Feb. 2, 2015), www.eia.gov/tools/faqs/faq.cfm?id=77&t=11.
6. Carbon dioxide accounts for 84% of U.S. greenhouse gas emissions, and almost 75% of global emissions. U.S. Envtl. Prot. Agency, *Carbon Pollution Standards: Learn About Carbon Pollution From Power Plants*, www2.epa.gov/carbon-pollution-standards/learn-about-carbon-pollution-power-plants#what (last updated July 27, 2016).
7. 549 U.S. 497, 500 (2007) (holding that greenhouse gases, such as carbon dioxide, are "pollutants" under the Clean Air Act and therefore subject to regulation by the EPA).
8. U.S. Envtl. Prot. Agency, *Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units*, 80 Fed. Reg. 64662 (Oct. 23, 2015) (to be codified at 40 C.F.R. pt. 60).
9. *Id.* at 64662–64; 42 U.S.C § 7411(d) (2012).
10. Order in Pending Case, Chamber of Commerce et al. v. EPA et al., 577 U.S. __ (Feb. 9, 2016), www.supremecourt.gov/orders/courtorders/020916zr3_hf5m.pdf. The challenges to the CPP have been consolidated into a single case before the D.C. Circuit Court of Appeals, *West Virginia et al. v. EPA et al.*, No. 15-1363, oral argument for which was held on June 2, 2016.
11. 42 U.S.C. § 7411(a)(1) (2012) (defining "standard of performance" as used in CAA Section 111(d), 42 U.S.C. § 7411(d)).
12. Opening Brief of Petitioners at 36–41, West Virginia et al. v. EPA et al., No. 15-1363, (D.C. Cir. Feb. 19, 2016), www.eenews.net/assets/2016/02/22/document_ew_02.pdf.
13. Mass. Inst. of Tech., Future of the Electric Grid 1 (2011), https://mitei.mit.edu/system/files/Electric_Grid_Full_Report.pdf (quoting G. Constable & B. Somerville, A Century of Innovation: Twenty Engineering Achievements That Transformed Our Lives (Joseph Henry Press, 2003)).
14. U.S. Energy Info. Admin., Annual Energy Outlook 2015 7 (Apr. 2015), http://www.eia.gov/forecasts/AEO/pdf/0383(2015).pdf; *see generally* Ron Binz et al., Practicing Risk-Aware Electricity Regulation: What Every

This spells trouble for investor-owned utilities, whose current business models rely heavily on producing and selling lots of kilowatt hours.[15]

2. Aging Assets

Despite meager increases in electricity demand, a number of aging generation and transmission facilities will need to be replaced in the coming years. Around 18 gigawatts ("GW") of electric generation capacity retired in 2015, all but 20% of which was coal-fired.[16] By the end of the next decade, the U.S. Energy Information Administration projects that there will be nearly sixty GW of coal plant retirements.[17] Many nuclear energy generators are also closing early—with at least four plants having closed since 2013.[18] Especially in restructured states, these nuclear and coal plant retirements are driven significantly by competition from low-cost natural gas in the wholesale marketplace,[19] but coal plants across the country face additional economic pressure due to high costs of environmental compliance,[20] as discussed below.

3. Expensive Environmental Constraints

Fossil-fuel generators are already subject to numerous Clean Air Act standards for acid rain, smog, ground ozone, particulates and mercury, as well as other toxic pollutants. Furthermore, coal-fired generation represents about one-third of total U.S. generation capacity and the overwhelming majority of those generating units lack at least one major piece of emissions control equipment (such as a scrubber).[21] Necessary equipment upgrades can range from as little as $19/kilowatt ("kW") to over $900/kW for some scrubbers.[22] In some cases, regulations can make continued plant operation uneconomic, as illustrated by the fact that a wave of coal-fired generators retired in the same month that EPA's Mercury and Air Toxics Standard ("MATS") rule came into force in 2015.[23]

4. Side Options and Customer Choices

Research and development of new energy technologies has been spurred-on by tax incentives, subsidies, renewable mandates, as well as concerns over climate change and resource diversification.[24] Customers are more interested in smart grid technology and distributed energy resources, much to the delight of third-party companies competing with utilities.[25] Today, grid operators are grafting-in new technologies and accommodating more diverse resources than ever before, all while having to maintain constant supply-demand balance.[26]

5. Reliability Concerns Due to Increasing Renewables Integration

With higher penetrations of renewable energy onto the grid, reliability becomes a greater concern. The variable nature of resources like wind and solar power requires grid operators to have enough extra resources available whenever the sun sets and winds die down.[27] However, recent research suggests that wind penetration of up to 35% could be managed, and would even lead to net system benefits.[28]

6. Increasing Physical and Cyber Security Concerns

As our infrastructure and daily lives become more interconnected and reliant on our electricity systems, the vulnerability of thousands of transformers, substations, and other critical system nodes becomes more apparent. Indeed, between 2011 and 2014, utilities reported 362 physical and cyber attacks to the U.S. Department of Energy,[29] and a leaked federal report in 2014 warned that the country could

State Regulator Needs to Know 5 (Apr. 2012), www.ceres.org/resources/reports/practicing-risk-aware-electricity-regulation.

15. Amory Lovins, Reinventing Fire 172-74 (Joni Praded & Nancy Ringer eds., 2011) (discussing the typical utility business model, and how it is negatively impacted by declining electricity demand).
16. U.S. Energy Info. Admin., *Coal Made Up More Than 80% of Retired Electricity Generating Capacity in 2015* (Mar. 8, 2016), https://www.eia.gov/todayinenergy/detail.cfm?id=25272.
17. U.S. Energy Info. Admin., *Planned Coal-Fired Power Plant Retirements Continue to Increase* (Mar. 20, 2014), https://www.eia.gov/todayinenergy/detail.cfm?id=15491.
18. Nuclear Energy Inst., Status and Outlook for Nuclear Energy in the United States 3 (Nov. 2015), www.nei.org/CorporateSite/media/filefolder/Policy/Papers/statusandoutlook.pdf?ext=.pdf.
19. *Id.*
20. *See, e.g.,* U.S. Energy Info. Admin., *AEO2014 Projects More Coal-Fired Power Plant Retirements by 2016 Than Have Been Scheduled* (Feb. 14, 2014), www.eia.gov/todayinenergy/detail.cfm?id=15031.
21. Metin Celebi, Coal Plant Retirements and Market Impacts, Brattle Group 5 (Feb. 5, 2014), www.brattle.com/system/publications/pdfs/000/004/982/original/Coal_Plant_Retirements_and_Market_Impacts.pdf?1391611874.
22. *Id.* at 7.
23. U.S. Energy Info. Admin., *AEO2014 Projects More Coal-Fired Power Plant Retirements by 2016 Than Have Been Scheduled*, *supra* note 20; U.S. Energy Info. Admin., *Coal Made Up More Than 80% of Retired Electricity Generating Capacity in 2015*, *supra* note 16.
24. Lovins, *supra* note 15, at 176–77.
25. *See, e.g.,* Gridwise Alliance, The Future of the Grid: Evolving to Meet America's Needs 1 (2014), https://www.smartgrid.gov/sites/default/files/doc/files/Future_of_the_Grid_web_final_v2.pdf; Lovins, *supra* note 15, at 177–78.
26. *See* Lovins, *supra* note 15, at 177–78.
27. *See, e.g.,* National Renewable Energy Laboratory, *Variability of Renewable Energy Sources*, NREL, www.nrel.gov/electricity/transmission/variability.html (last updated Sept. 19, 2014). In addition, although forecasting models are becoming ever-more precise and sophisticated, these resources still cannot be scheduled or dispatched with precision. Binz et al., *supra* note 14, at 30 (discussing the intermittency problem of renewable energy and how it relates to risk).
28. According to a recent analysis from the Department of Energy, a scenario that saw wind energy's share of the nation's electricity consumption rise from today's 4.5% to 35% in 2050 would diversify the grid's resource mix, resulting in a 20% reduction in system-wide sensitivities to fossil fuel prices. In addition, that scenario would result in $149 billion savings in reduced electric sector expenditures, 14% reduction in greenhouse gas emissions (avoiding $400 billion in climate change related damages), reduce electric power sector-related water consumption and withdrawals by 23% and 15% respectively, and avoid 21,700 air pollution-related premature deaths. Such an outcome, the U.S. Department of Energy admits, would depend on a variety of state and federal policy pathways. U.S. Dept. of Energy, Wind Vision: A New Era for Wind Power in the United States xxiii–xxvi (2015), www.energy.gov/sites/prod/files/WindVision_Report_final.pdf.
29. Steve Reilly, *Bracing for a Big Power Grid Attack: "One Is Too Many,"* USA Today, Mar. 24, 2015, www.usatoday.com/story/news/2015/03/24/power-grid-physical-and-cyber-attacks-concern-security-experts/24892471/.

face a coast-to-coast blackout if attackers targeted only nine of the nearly 55,000 substations on a high-congestion summer day.[30] The ease with which our infrastructure can be compromised, especially physically, is one reason why grid security ranks near the top of concerns for the federal government and utility executives.[31]

7. Challenges to the Financial Stability of Utilities and Generators

In recent years, the prospect of cheap customer-side generation, storage, and favorable net metering policies has prompted much handwringing over a potential "utility death spiral." According to one influential report from the Edison Electric Institute, a utility trade organization, the financial pressures posed by "declining utility revenues, increasing costs, and lower profitability potential … could have a major impact on realized equity returns, required investor returns, and credit quality."[32] As another report noted, utility credit quality has declined over the past forty years, most notably in the past decade, and now around three-quarters of companies in the electricity sector "are rated three notches or less above 'junk bond' status."[33] Whether one ascribes to the notion that utilities truly face a "death spiral" or simply more competition, the financial stability of the industry remains an ongoing concern for regulators.

This perfect storm of realities bearing down on the grid at once is creating "a level and complexity of risks that are perhaps unprecedented in the industry's history."[34] One of the few certainties in the midst of all these unknowns is that over the next several decades, a staggering amount of capital will be invested in the utility sector. With ratepayers on the hook, it becomes the job of state regulators to ensure that such investments are made wisely. That does not mean that public utility commissions have to sit by passively waiting for utilities to initiate the review process. Rather, they can use some of the methods outlined in Part III to help guide utility investment decisions before the review process even begins.

C. *To Open Up New Economic Opportunities*

To some, the status quo of large utilities operating baseload coal plants within the "safe but unimaginative financial haven" of government-protected franchises is still a viable model.[35] To a growing number of scholars, regulators, and even industry members, however, this business-as-usual approach is not sustainable considering the compounding challenges facing utilities and the grid today.[36] The priorities for the twentieth century electric system were simply to provide cheap, abundant, and reliable power, but as explained above, the priorities for the twenty-first century grid are much more complicated and nuanced. Change can be difficult, especially for utility regulators and executives who may still be thinking with a twentieth century mindset, but there are two reasons why this change should be embraced.

First, this transition is inevitable. From the whale oil industry, to toll bridges and turnpikes, the "creative destruction" of older, vested industries in favor of new innovations and market opportunities is one of the essential tenants of capitalism, and has a long history in the United States.[37] Getting out of the way of this process is "the government's way of promoting the public good."[38]

Second, and relatedly, this transition will open up new markets and opportunities to which states can facilitate access. As Richard Branson, founder of the Carbon War Room and the Virgin Group, has noted, "climate change is one of the greatest wealth-creating opportunities of our generation."[39] Indeed, the forces of climate change regulation, advancing technology, and enhanced customer engagement are opening up whole new industries and billion-dollar opportunities for states and their local businesses.

Reducing regulatory barriers, shortening the cash-depleting "valley of death" between startup and scale-up, supporting and responsibly sun-setting support for new technologies, and ending the confusing array of subsidies for legacy energy industries are all policy tools that lawmakers can use to reduce the cost of capital for clean tech and open up the cli-

30. Rebecca Smith, *U.S. Risks National Blackout From Small-Scale Attack*, Wall St. J., Mar. 12, 2014, www.wsj.com/articles/SB10001424052702304020104579433670284061220.
31. *See, e.g.*, Utility Dive Brand Studio, State of the Electric Utility 19 (2015), http://www.utilitydive.com/library/the-state-of-the-electric-utility-2015/ (discussing recent survey results of utilities, and noting that many feel underprepared to secure the grid); *see also* U.S. Dept. of Energy, Quadrennial Energy Review 2-1 to 2-42 (Apr. 2015), http://energy.gov/sites/prod/files/2015/07/f24/QER%20Full%20Report_TS%26D%20April%202015_0.pdf (detailing the grid's security vulnerabilities and making recommendations). For years the Department of Defense has warned that the electric grid, with its dependence on large, centrally-located generators and control centers, is increasingly vulnerable to physical and cyber attacks—a prediction that has proven true through multiple failed war game simulations. The Pentagon has been sounding the alarm about grid security since at least 1981. Lovins, *supra* note 15, at 178–79 (describing some of the DOD's efforts to prepare the country for cyber-terrorist attacks on the grid—including multi-agency war games—without much effect). These repeated calls to increase security measures for the electric grid have gone unanswered by Congress. *See, e.g.*, Ted Koppel, Lights Out 25–33 (2015).
32. Peter Kind, *Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business*, Edison Electric Inst. 1 (Jan. 2013), http://www.eei.org/ourissues/finance/documents/disruptivechallenges.pdf.
33. Binz et al., *supra* note 14, at 5, 17–18; *see also id.* at 18, fig. 5 (detailing the declining credit rating of U.S. investor-owned utilities from 1970 to 2010).
34. Forest Small & Lisa Frantzis, The 21st Century Electric Utility: Positioning for a Low-Carbon Future 28 (July 2010), www.ceres.org/resources/reports/the-21st-century-electric-utility-positioning-for-a-low-carbon-future-1.
35. Lovins, *supra* note 15, at 172; Katherine Tweed, *FirstEnergy CEO: Renewables "Sound Good" but Should Take Backseat to Coal*, GreenTech Media (Apr. 10, 2014), www.greentechmedia.com/articles/read/first-energy-ceo-attacks-renewables-efficiency-and-demand-response (summarizing a speech from a utility CEO in which he called for renewed focus on fossil-fuel generation).
36. *See, e.g.*, Binz et al., *supra* note 14, at 5–11; Kind, *supra* note 32, at 1; Monast & Adair, *Triple Bottom Line, infra* note 62.
37. Lovins, *supra* note 15, at 13 (discussing how the whale oil industry was brought to its knees by the advent of kerosene and electricity); Proprietors of Charles River Bridge v. Proprietors of Warren Bridge, 36 U.S. 420, 422 (1837); Joseph Schumpeter, Capitalism, Socialism and Democracy ch. VII (1942) (coining the term "Creative Destruction," and describing it as a form of economic evolution by which older industries and business processes are abandoned for newer markets, better performing products, etc.).
38. Scott Hempling, Regulating Public Utility Performance 102 (2013).
39. Jigar Shah, Creating Climate Wealth 125 (2013) (quoting Sir Richard Branson, founder of the Carbon War Room).

mate wealth market.[40] As Jigar Shah, founder of SunEdison and co-founder of Generate Capital, notes, "[t]he solutions, the technology, and the demand exist."[41] He and his free-market colleagues ultimately argue for a bottom-up approach led by entrepreneurs and investors, but there is much that state governments, acting through their PUCs, can do to unclog the capital flow to clean tech investments and other sustainable energy solutions.[42]

II. The Development of Federal and State Energy Regulation

Today's grid challenges are daunting and must be addressed. Nonetheless, they also present regulators with a unique opportunity to steer new development in a low-carbon direction while opening-up untapped economic opportunities. Before describing what state-level actions public utility commissions can take, this Part briefly summarizes the historical development of the electricity system and the jurisdictions of state and federal regulators, which will put into perspective the policy options described in Part III.

A. Early Electrification and Development of Federal and State Regulation

By the time that Thomas Edison and Samuel Insull incorporated some of the country's first electric utilities in the late nineteenth century, the concept of regulating private property "affected with the public interest" was well-established,[43] as was the truism that such regulation must allow for "a fair return upon the value of that which it employs for the public convenience."[44] Such were the mandates governing state public utility commissions beginning with the railroad industry in the 1840s and 50s.[45] Starting with New York and Wisconsin in 1907, states began regulating electric utility companies, and by 1920, nearly every state had enveloped electric utility regulation within the purview of the state's public utility commission.[46] From the outset, electric utilities were considered "natural monopolies" and were regulated by PUCs according to a kind of regulatory compact: in exchange for a protected franchise and captive ratepayers, utilities agreed to rate and investment regulation from the government.[47]

1. The Federal Power Act and FERC Jurisdiction

The Federal Power Act of 1935 ("FPA")[48] created the Federal Energy Regulatory Commission ("FERC," formerly the Federal Power Commission) to regulate "transmission of electric energy in interstate commerce," "the sale of electric energy at wholesale in interstate commerce," and "all facilities for such transmission or sale of electric energy."[49] Section 201 of the FPA also generally limits FERC's jurisdiction to only "those matters which are not subject to regulation by the States," and explicitly disclaims federal jurisdiction over "any other sale of electric energy," as well as generation and distribution facilities and facilities used "only for the transmission of electric energy in intrastate commerce."[50]

In practical terms, FPA 201 divides state and federal jurisdiction primarily along transactional lines: The federal government, through FERC, regulates transmission and the wholesale sale of electricity, whereas states regulate retail-level sales, distribution infrastructure, and other matters such as electricity generation approval and siting.

2. The Public Utility Regulatory Policies Act and State Restructuring Efforts

Until the 1970s, electric utilities were "vertically-integrated," that is, they owned and operated the facilities used in generation, transmission, and distribution.[51] The shift away from vertical integration in the electricity sector started in 1978 with the Public Utility Regulatory Policies Act ("PURPA").[52] Congress passed PURPA to spur U.S. independence from foreign oil through promoting energy efficiency and alternative energy sources.[53] Although not initially intended to spur market competition in the generation sector, PURPA opened the door to eventual restructuring efforts through its mandate that utilities buy power from "qualifying facilities" ("QFs")—typically co-generators and certain "small power" producers.[54] Under PURPA,

40. *Id.* at 67–72 (describing some of the ways that state and federal governments can facilitate investments in the climate wealth market).
41. *Id.* at 4.
42. *Id.* at 4, 125.
43. Munn v. Illinois, 94 U.S. 113, 125 (1876) (holding that private property, such as grain elevators in a busy commercial bottleneck, can be subject to government regulation when it is "affected with the public interest" and "such regulation becomes necessary for the public good").
44. Smyth v. Ames, 169 U.S. 466, 547 (1898), *overruled by* Fed. Power Comm'n v. Natural Gas Pipeline Co. of Am., 315 U.S. 575 (1942) (holding that the Constitution requires that regulated businesses receive just compensation through a "fair return" on their investments).
45. Inara Scott, *Teaching an Old Dog New Tricks: Adapting Public Utility Commissions to Meet Twenty-First Century Climate Challenges*, 38 Harv. Envtl. L. Rev. 371, 378 (2014); *see also* Hempling, *supra* note 38, at 219.
46. Ari Peskoe, *A Challenge for Federalism: Achieving National Goals in the Electricity Industry*, 18 Mo. Envtl. L. & Pol'y Rev. 209, 216 (2011).
47. *Id.* at 212; Douglas Gagax & Kenneth Nowotny, *Competition and the Electric Utility Industry: An Evaluation*, 10 Yale J. on Reg. 63, 64 (1993). The New York and Wisconsin statutes differed in one key aspect: New York permitted regulators only to cap the maximum rates that utilities could charge, whereas Wisconsin's law required regulators to set the rates that were not "unjust, unreasonable, discriminatory, or preferential." In addition, the Wisconsin law permitted rate calculation based only on the value of property that was "actually used and useful for the convenience of the public." Peskoe, *supra* note 46, at 212. Those two standards, first established by Wisconsin in 1907, remain two of the most fundamental principles in electric utility regulation. For a more detailed breakdown of the rights, obligations, powers and protections conferred on utilities under the "regulatory compact," *see* Hempling, *supra* note 38, at 14–15.
48. 16 U.S.C. §§ 791(a) et seq. (2012). The FPA arose in response to the Supreme Court's decision in *Public Utils. Comm'n of R.I. v. Attleboro Steam & Elec. Co.*, 273 U.S. 83 (1927) that the "negative impact of the Commerce Clause" constrained state regulation to within its own borders, even where one utility was selling power to ratepayers in a neighboring state at arguably unfair rates.
49. 16 U.S.C. § 824(b)(1) (2012).
50. § 824(a)-(b)(1).
51. Regulatory Assistance Project, Electricity Regulation in the U.S.: A Guide 10 (2011) [hereinafter RAP Electricity Regulation Report].
52. *See* Pub. L. No. 95-617, 92 Stat. 3117 (codified as amended in scattered sections of 16 U.S.C.).
53. Peter Navarro, *A Guidebook and Research Agenda for Restructuring the Electricity Industry*, 16 Energy L.J. 347, 351 (1995).
54. David Schraub, *Renewing Electricity Competition*, 42 Fla. St. U. L. Rev. 937, 954 (2015).

QF purchases must be valued at the cost that the utility avoided having to pay as a result of procuring the energy from the QF—the so-called "avoided cost" rate.[55] Third-party producers proliferated in the early days of PURPA thanks partly to generous "avoided cost" rates pegged to inaccurately high long-term petroleum forecasts.[56]

By the 1990s, it was apparent that the electricity generation sector, like the telecommunications and natural gas sectors before it,[57] was not a "natural monopoly" and could accommodate competition. Taking notice of these developments, as well as of successful utility restructuring efforts in the U.K., in the mid-1990s, several states passed laws to restructure their electricity sectors.[58]

Formerly vertically-integrated utilities in most restructuring states sold-off their generation assets, which they would then compete against in wholesale markets facilitated by open, non-discriminatory transmission system access mandated by FERC.[59] Today, fifteen states and the District of Columbia have retail electricity competition (often called "retail choice").[60] In light of the robust competition present in restructured wholesale markets today, Congress added Section 210(m) to PURPA in 2005, which allows utilities to avoid the QF purchasing mandate if various factors indicate that, in essence, the QF already has competitive access to wholesale markets.[61]

B. *Limitations of Federal Regulation and the Role of State PUCs*

State public utility commissions exercise significant regulatory authority over how jurisdictional utilities make decisions about generation options, technology adoption, and other investments. For states with traditional retail regulation, PUCs regulate the generation, transmission and distribution activities of monopoly vertically-integrated utilities. In restructured states, because utilities have typically divested their generation facilities, PUCs regulate their distribution-level operations as well as their distribution and transmission investments.[62] In both restructured and traditionally-regulated states, utilities seeking a rate increase, or to construct a new facility, must seek approval from the PUC. In a rate-making proceeding, the commission will examine the utility's expenses, capital investments made and proposed by the utility, and then sets "just and reasonable" rates for various customer classes sufficient to allow the utility to cover its expenses and receive a fair rate of return.[63] For both approval of new facility construction costs, typically given in the form of a Certificate of Public Convenience and Necessity, as well as other investments and management decisions, a utility must establish that its proposed actions are "prudent" and in the "public interest."[64] Those standards are explained further in the coming sections.

State regulatory predominance over electric generation procurement is the result of a statutory framework based on federalism rather than physics. However bright the state and federal jurisdictional line may have been in 1935 when the FPA was passed, it has now become blurred by technological advancements in demand-response and distribution-level resources.[65]

III. State-Level Solutions That PUCs Can Pursue

In the absence of a comprehensive federal scheme, states are left to configure their own solutions to addressing electric sector carbon emissions and accommodating the technological shifts occurring in the utility industry. This Part explores the tools state public utility commissions can use to take action on climate change, enhance electric system reliability, and help new market entrants capitalize on the burgeoning clean tech opportunities. The following sections set out these solutions (in order of ease of adoption and political feasibility) and discuss how they relate to the traditional role of state public utility commissions.

A. *The Easy Reach*

There are a number of options to which state PUCs can turn to de-carbonize their electricity sectors. In the absence of explicit statutory authorization to undertake such an endeavor, PUCs are left to innovate within their existing regulatory framework. This section sets out some of the more legally feasible possibilities to accommodate such innovation and discusses examples of states that have gone down this road.

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55. Navarro, *supra* note 53, at 16.
56. *Id.*
57. *See* RAP Electricity Regulation Report, *supra* note 51, at 8 (noting that by the 1980s the telecommunications and natural gas sectors were mostly restructured).
58. *Id.* at 14.
59. *See, e.g.,* Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities, 61 Fed. Reg. 21540 (May 10, 1996) (codified at 18 C.F.R. pts. 35 and 385).
60. *See* U.S. Energy Info. Admin., *Status of Electricity Restructuring by State* (Sept. 2010), http://www.eia.gov/electricity/policies/restructuring/restructure_elect.html. As noted in EIA's chart, state restructuring efforts have stalled in recent years.
61. *See* Energy Policy Act of 2005, 16 U.S.C. § 824a-3(m) (Aug. 8, 2005) (amending PURPA by, among other things, adding the purchase obligation termination provision).
62. *See* Jonas J. Monast & Sarah K. Adair, *Completing the Energy Innovation Cycle: The View From the Public Utility Commission*, 65 Hastings L.J. 1345, 1357 (2014) [hereinafter Monast & Adair, *Energy Innovation Cycle*].
63. RAP Electricity Regulation Report, *supra* note 51, at 25, 31; Scott, *supra* note 45, at 381–82; Jonas J. Monast & Sarah K. Adair, *A Triple Bottom Line for Electric Utility Regulation: Aligning State-Level Energy, Environmental, and Consumer Protection Goals*, 38 Colum. J. Envtl. L. 1, 11 (2013) [hereinafter Monast & Adair, *Triple Bottom Line*].
64. Rap Electricity Regulation Report, *supra* note 51, at 26; Monast & Adair, *Energy Innovation Cycle, supra* note 62, at 1357; Monast & Adair, *Triple Bottom Line*, *supra* note 63, at 12.
65. *See, e.g.*, Fed. Energy Reg. Comm'n v. Elec. Power Supply Ass'n, 577 U.S. __, 136 S. Ct. 760, 766 (2016) (noting that the blurred line between state and federal authority "generates a steady flow of jurisdictional disputes" due to their interlinked nature); Frank R. Lindh & Thomas W. Bone Jr., *State Jurisdiction over Distributed Generators*, 34 Energy L.J. 499, 502 (2013) (arguing that the plain language of the FPA reserves to states the ability to regulate intrastate wholesale sales at the distribution level); Gridwise Alliance, The Future of the Grid: Evolving to Meet America's Needs 15 (Dec. 2014), https://www.smartgrid.gov/files/Future_of_the_Grid_web_final_v2.pdf.

1. What Is Permissible Under the Federal Power Act

In keeping with the plain language of FPA Section 201, FERC has reiterated that the Federal Power Act allows states to "choose to require a utility to construct generation capacity of a preferred technology or to purchase power from the supplier of a particular type of resource."[66] As such, nothing in the plain text of the FPA necessarily preempts states from out-right favoring specific kinds of generation and calling for competitive bids for certain generation types. One commonplace example of this option in action is a state renewable portfolio standard, which requires local utilities to procure a certain percentage of their electricity generation through renewable sources.[67] Another includes the nation's first utility energy storage mandate from California's Public Utility Commission.[68]

State laws that directly relate to generation selection and distribution-level activity are the lowest of the low-hanging fruit because such regulatory decisions are explicitly left up to state control under the FPA.[69] In that sense, Public Utility Commissions are undoubtedly on the safest ground where they regulate within this realm, especially when there is additional statutory support from their legislatures, as in the case of renewable portfolio standards, certain efficiency standards, and California's storage mandate.

One caveat to this approach, however, is that states must ensure that incentives to encourage new forms of electricity generation are not dependent on that generator's wholesale market participation. In a decision from April 2016, *Hughes v. Talen Energy*,[70] the U.S. Supreme Court invalidated a Maryland PUC order that required utilities to enter into "contracts for differences" with certain new generators whereby the generators would be guaranteed revenue and made whole in the event of low wholesale capacity market prices.[71] Recognizing states' "traditional authority over retail rates or, as here, in-state generation," the Court nonetheless struck down the order because it "disregard[ed] interstate wholesale rates FERC has deemed just and reasonable."[72] Although *Hughes* puts market-based subsidy arrangements in the cross-hairs of FPA preemption, the Court was careful to limit the scope of its holding: "Nothing in this opinion should be read to foreclose Maryland and other States from encouraging production of new or clean generation through measures 'untethered to a generator's wholesale market participation.'"[73] Such measures, the Court noted, can include direct subsidies, land grants, tax incentives, construction of state-owned generators, or even, the re-regulation of the energy sector.[74]

2. Under PURPA

Traditional fossil-fuel project developers have a substantial advantage over their so-called "cleaner" competitors because the technology powering natural gas and coal-fired generators is proven and therefore more easily financeable. It is no surprise, then, that one of the major challenges facing renewable energy development is financing. One regulatory mechanism that has been tried abroad, and to a limited extent in the United States, is a "feed-in tariff" ("FiT").[75] In sum, FiTs require utilities to purchase electricity from a certain source, like a renewable generator, for a specific time period at a more favorable price than might otherwise be procured on an open market.[76] The long-term price assurance and standardization of FiTs reduce financing costs and allow for more renewable energy entrants into a market.

Because such renewable energy power purchases can involve wholesale sales from QFs, depending on how the feed-in tariff is structured, it must comply with either the FPA or PURPA.[77] The state can impose this purchasing requirement via the utility's existing QF purchase obligation under PURPA—provided that the utility is not exempt under PURPA Section 210(m)[78]—in which case the seller is excused from FPA compliance. In the alternative, outside of PURPA's purchasing obligation, the wholesale sale becomes jurisdictional under the FPA and less likely to happen because it would require FERC's approval—a difficult prospect because the contract is designed to be more favorable to the renewable energy generator and allows for more than "cost-based rates." Thus, absent an FPA amendment, U.S. FiTs are currently only possible through PURPA.

Even under PURPA, however, regulators have still had difficulty crafting FiT policies that ensure would-be renewable energy generators favorable terms while not exceeding a purchasing utility's "avoided costs." Over the years, though, a handful of FERC-sanctioned approaches have emerged for states to implement, either through legislation or PUC action:

66. So. Cal. Edison Co., 70 FERC ¶ 61,215, 61,676 (1995).
67. As of this writing, there are currently twenty-nine states plus Washington, D.C. that have some form of a renewable portfolio standard ("RPS"). *Renewable Portfolio Standard Policies*, Database St. Incentives for Renewables & Efficiency (Oct. 2015), http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2015/11/Renewable-Portfolio-Standards.pdf.
68. *See* Energy Storage Systems, Assemb. B. 2514 (Cal. 2010) (requiring the state's Public Utility Commission, CPUC, to open a proceeding to require utilities to procure a certain level of energy storage by December 31, 2015). In October 2013, the CPUC approved a mandate that requires utilities to procure a combined total of 1.3 gigawatts of grid storage batteries and technology by 2020. Cal. Pub. Util. Comm'n, RM 10-12-007, *Decision Adopting Energy Storage Procurement Framework and Design Program* (Oct. 17, 2013), docs.cpuc.ca.gov/PublishedDocs/Published/G000/M078/K929/78929853.pdf.
69. *See supra* Section II.A.1.
70. 578 U.S. __, 136 S. Ct. 1288, 1299 (2016) (slip op. at 15), www.supremecourt.gov/opinions/15pdf/14-614_k5fm.pdf.
71. *Id.* at 1294–95, slip op. at 7.
72. *Id.*
73. *Id.*
74. *Id.*
75. *See, e.g.*, Scott Hempling et al., Nat'l Renewable Energy Lab., Renewable Energy Prices in State-Level Feed-In Tariffs: Federal Law Constraints and Possible Solutions 1 (2010), www.nrel.gov/docs/fy10osti/47408.pdf.
76. *Id.* at iv.
77. *Id.* at v–vi.
78. *See* Energy Policy Act of 2005, 16 U.S.C. § 824a-3(m), *supra* note 61.

a. Allow Generators to Produce and Sell Renewable Energy Credits ("RECs")

State renewable portfolio standard ("RPS") laws often allow for the generation and sale of RECs, which provide a much-needed source of funds for renewable energy generators. FERC has determined that REC selling schemes are outside the scope of PURPA and therefore do not factor into the "avoided cost" analysis.[79]

b. Give Utility Purchasers Off-Setting Tax Credits, Grants, or Subsidies Equal to Any Costs Incurred Above "Avoided Costs"

FERC has determined that states are permitted to offer tax-payer-funded tax credits, grants, or subsidies as incentives for buying QF power so long as the net costs borne by the utility still amount to "avoided costs."[80]

c. Specify the Kind of Facility Whose Generation Must Be "Avoided"

Public Utility Commissions are permitted to create "multi-tiered avoided cost rate structures" that consider additional factors beyond costs, such as the types of resources eligible to be "avoided" and whether they are located in, for example, transmission-constrained areas.[81] This was the approach taken by California in 2009 with the passage of AB 1613, which sought to replace older resources with more efficient combined heat and power facilities ("CHP").[82] FERC ultimately approved the subsequent California Public Utility Commission implementing scheme and noted that "avoided" generation need not be the lowest-cost resource available to a utility. Rather, "where a state requires a utility to procure a certain percentage of energy from generators with certain characteristics, generators with those characteristics constitute the sources that are relevant to the determination of the utility's avoided cost for that procurement requirement."[83]

d. Offer a Voluntary Feed-In Tariff Alongside an Already PURPA-Compliant Procurement Scheme

Vermont took this approach with the 2005 passage of its Sustainably Priced Energy Development ("SPEED") Program, a feed-in tariff designed to spur in-state renewables development by offering Standard Offer Contracts for qualifying resources of less than 2.2 MW.[84] FERC rejected a challenge to the SPEED program primarily on the grounds that Vermont already offered utilities and QFs a PURPA-compliant route, and SPEED participants are willingly accepting terms more favorable to renewable developers.[85]

Although the above four options remain available, state PUCs looking to incentivize new renewable energy projects can take heart especially in the third approach. FERC's favorable response to California's "multi-tiered" avoided cost calculation favoring CHP generators indicates that states, or their public utility commissions, can be very specific in the kind of generation that utilities must "avoid" when taking energy from a QF. The more expensive the "avoided" resource (in California's case: less-efficient generators), the higher the "avoided costs" can be, thereby opening the door for qualifying facilities whose costs would otherwise exceed those of less expensive generators.

3. Taking a Broad View of "Prudence"

One way for PUCs to encourage more low-carbon generation is by using "prudence review" to discourage carbon-intensive generation selection. This form of review is one of the major

79. American Ref-Fuel Co., 105 FERC 61,004, at para. 23 (2003), *request for reh'g denied*, 107 FERC 61,006 (2004), *appeal dismissed*, Xcel Energy Servs., Inc. v. FERC, 407 F.3d 1242 (D.C. Cir. 2005); *see also* Hempling et al., *supra* note 75, at 15.

80. *See* CGE Fulton, 70 FERC ¶ 61,290, *reconsideration denied*, 71 FERC ¶ 61,232 (1995) (recognizing that an Illinois law mandating, and subsidizing, utility purchases from certain QFs was PURPA-compliant because any utility costs above and beyond "avoided costs," were covered through the subsidies); Hempling et al., *supra* note 75, at 16–18.

81. AB 1613 obligated California's utilities to purchase power from CHP facilities under 20 MW at a feed-in tariff price to be set by the CPUC. The CPUC sought a declaratory order, and later clarification, that its proposed implementation of AB 1613 would not be preempted by PURPA or the FPA. California Public Utilities Commission, 132 FERC ¶ 61,047 (July 15, 2010), *order granting clarification*, 133 FERC ¶ 61,059 (Oct. 21, 2010).

82. 133 FERC ¶ 61,059, at 61,262.

83. *Id.* at 61,059 ¶ 29–30 (citing SoCal Edison, 71 FERC ¶ 61,269, at 62,078, *reconsideration denied*, 71 FERC ¶ 61,269 (1995) (overruling broader language in that decision that implied that PUCs were not able to specify the characteristics of "avoided" generation, but must make their avoided cost calculations based on "all sources")); *see also* Accord Signal Shasta, 41 FERC ¶ 61,120, at 61,294, 61,296 n. 4 (declining to find that four standard offer contracts with different "avoided cost" calculations for different types of QFs was inconsistent with PURPA). To read more about policy design options under this approach, see Interstate Renewable Energy Council, Unlocking DG Value: A PURPA-Based Approach to Promoting DG Growth (2013), www.irecusa.org/publications/unlocking-dg-value-a-purpa-based-approach-to-promoting-dg-growth.

84. *Standard Offer Program Summary*, VermontSPEED, http://www.vermontstandardoffer.com/standard-offer-program-summary/ (last visited June 12, 2016). In some respects, Vermont's SPEED program is similar to a Renewable Portfolio Standard. The program's goal is to spur renewables development, and has a goal of procuring 20% of statewide retail electric sales from SPEED-qualifying resources by January 2017, with which the state is on track to meet. *Sustainably Priced Energy Enterprise Development (SPEED)*, Database St. Incentives for Renewables & Efficiency, http://programs.dsireusa.org/system/program/detail/1141 (last updated July 1, 2015). Like a typical state RPS, SPEED projects generate RECs that can be traded in the state and throughout New England. Revenue from RECs, along with the feed-in tariff's long-term contract prices, help to bring down financing costs for renewable developers. Unlike a typical RPS, however, Vermont's SPEED program is voluntary. Should legislators wish to increase renewable procurement, it may be necessary to make the program mandatory, which could raise the issue again of whether its favorable contract terms violate PURPA for exceeding "avoided costs." *See generally* Clean Energy States All., Analysis of Renewable Energy Policy Options for Vermont (Aug. 2011), psb.vermont.gov/sites/psb/files/publications/Reports%20to%20legislature/RPSreport2011/CESA%20SEA%20Draft%20Vermont%20Report%208%2026.pdf (discussing the differences between Vermont's SPEED program and typical renewable portfolio standards).

85. Otter Creek Solar LLC, 143 FERC ¶ 61,282, at 4 (June 27, 2013) ("Nothing in the Commission's regulations limits the authority of either an electric utility or a QF to agree to rates for any purchases or terms or conditions relating to any purchases which differ from the rates or terms or conditions which would otherwise be required by the Commission's regulations.").

tools in the toolkit of public utility commissions,[86] and it ensures that regulated utilities are conducting their business "according to sound management practices . . . at a reasonable cost and with reasonable care."[87] At a practical level, regulators often initiate prudence review whenever a regulated utility seeks permission to build a new facility or approve additional costs for an ongoing construction project,[88] or when the utility seeks reimbursement for costs incurred for research and development, environmental compliance, as well as wholesale power purchases.[89] Ultimately, commissions seek to answer the question of whether a utility's investment decision was reasonable at the time it was made.[90]

Although "prudence review" is often exercised by state PUCs on the basis of costs,[91] it also allows, if not requires, regulators to look more broadly at what ratepayer *risks* are involved in a utility's investment decisions.[92] In the case of a utility seeking Commission approval for facility construction costs, there are numerous risks to consider, two of which are particularly relevant for fossil-fuel generation proposals.[93]

First, there is the financial risk that coal- and gas-fired generation will be more costly for ratepayers as a result of almost-certain state or federal carbon emission controls. Whether through the currently-stayed Clean Power Plan, or state-level action, utilities will very likely have to contend with some kind of carbon regulation or tax within the next 10 to 15 years. Indeed, even in the absence of federal action, states and regions are stepping up to enforce carbon restraints, as seen through the cap-and-trade programs in California and the Northeast.[94] Furthermore, many businesses, including Google, Delta Airlines, and the world's five largest oil companies, are not waiting for regulators to step in, and now incorporate a "carbon price" into their long-term financial strategies.[95] A regulator's prudence review authority and obligation to reduce ratepayer risk justify closely scrutinizing any proposal for new fossil-fuel generation in light of these near-inevitable financial costs.[96]

Second, and relatedly, there is the risk posed by environmental compliance, environmental constraints,[97] and fluctuating market conditions, especially for traditional coal-fired plants. As mentioned previously, the costs of environmental compliance are increasing, especially for coal-fired generators.[98] Any regulator contemplating approval of a natural gas or coal-fired generation facility will have to keep these costs in mind.

In addition, there are resource constraints that make certain types of generators more expensive and unstable, notably, water constraints. On average, electric power generators consume 40% of all freshwater withdrawals in the U.S.[99] This becomes a major problem during times of drought, when power plants may be competing with other resource users. Indeed, a 2011 survey of utility industry members revealed that water management topped the ranking of important utility business issues at the time.[100] This water-energy nexus is acutely felt in the Southwest U.S. especially, as a result of already strained water resources and increasing population growth over the past several years.[101]

In response to these and other risks, some regulators exercise their prudence review to require their utilities to prioritize energy efficiency and other demand-side resources

86. *See, e.g.,* Cal. Pub. Util. Code § 454.8 (noting that utility rates must reflect "the reasonable and prudent costs of the new construction"); Ill. Comp. Stat. Ch. 220 § 5/9-212 (prohibiting inclusion of any new utility facility into the rate base exception upon a Commission determination that it is "both prudent and used and useful in providing utility service to the utility's customers."); Kan. Stat. Ann. § 66-128(b)(3) (West) (reserving for the Commission the right to "review[ ] whether expenditures for public utility property were efficient and prudent"); Me. Rev. Stat. tit. 35-A, § 303 (requiring the Commission to consider various factors, such as "prudent acquisition cost to the utility," when determining just and reasonable utility rates); Mich. Comp. Laws § 460.6a (noting that the state Commission will only allow recovery of costs "reasonably and prudently incurred"); N.C. Gen. Stat. Ann. § 62-133 (allowing utility recovery of "reasonable and prudent expenditures for construction work in progress"). For examples of state case law discussing the "prudent investment" standard *see* 73B C.J.S. Public Utilities § 49.
87. RAP Electricity Regulation Report, *supra* note 51, at 26.
88. *Id.* at 63; Brandon Hofmeister, *Roles for State Energy Regulators in Climate Change Mitigation*, 2 Mich. J. Envtl. & Admin. L. 67, 80–81 (2012).
89. Jeremy Knee, *Rational Electricity Regulation—Environmental Impacts and the Public Interest*, 113 W. Va. L. Rev. 739, 754 (2010–2011); *see generally* David Muchow & William Mogel, Energy Law and Transactions § 2.07 (2010).
90. Sw. Bell v. Pub. Serv. Comm'n of Mo., 262 U.S. 276, 312 (1923) ("The term 'prudent investment' is not used in a critical sense. There should not be excluded from the finding of the base investments which, under ordinary circumstances, would be deemed reasonable."); RAP Electricity Regulation Report, *supra* note 51, at 115; Knee, *supra* note 89, at 754–56; Scott, *supra* note 45, at 383.
91. *See, e.g.,* Public Service Company of New Hampshire v. Patch, 167 F.3d 29, 35 (1st Cir. 1998) (denying recovery for clean hydro power purchases on prudence grounds because lesser-cost fossil-fuel resources were available); Re W. Mass. Elec. Co., 80 P.U.R.4th 479 (Mass. 1986) (denying utility recovery of nuclear costs on the ground that more prudent gas-fired generation resources were available at the time); In re Application of Kentucky Power Co. for Approval of Renewable Energy Purchase Agreement for Wind Energy Res. Between Kentucky Power Co. & Fpl Illinois Wind, LLC., No. 2009-00545, 2010 WL 2640998 (June 28, 2010) (denying utility recovery for wind power purchases on the ground that cheaper, fossil-fuel, generation was available).
92. *See generally* Binz et al., *supra* note 14. In that sense, the "prudence review" standard has been likened to the common-law standard for negligence. Scott Hempling, *"Non-Transmission Alternatives" FERC's "Comparable Consideration" Needs Correction*, Electricity Policy.Com 9 (May 2013), http://www.scotthemplinglaw.com/files/pdf/ppr_nta_comparable_consideration_0513.pdf.
93. Other kinds of relevant risks include: initial cost risks; fuel, operation and maintenance and costs risks, water constraint risks, capital shock risks, and planning risks. Binz et al., *supra* note 14, at 34 fig. 13.
94. *See, e.g.,* Calif. Envtl. Prot. Agency Air Resources Bd., Cap-and-Trade Program, www.arb.ca.gov/cc/capandtrade/capandtrade.htm; Regional Greenhouse Gas Initiative, https://www.rggi.org.
95. *See, e.g.*, Coral Davenport, *Large Companies Prepared to Pay Price on Carbon*, N.Y. Times, Dec. 5, 2013, www.nytimes.com/2013/12/05/business/energy-environment/large-companies-prepared-to-pay-price-on-carbon.html; Ctr. for Climate & Energy Sols., Preparing for Carbon Pricing (Jan. 2015), www.c2es.org/docUploads/pmr-technical-note-9-case-studies.pdf (setting out case studies to illustrate how corporations are incorporating climate change policies into business strategies).
96. Hofmeister, *supra* note 88, at 71.
97. One particularly relevant environmental constraint for steam-powered electric generators (such as fossil-fuel plants) is water scarcity, especially in the Western part of the country, like California. Binz et al., *supra* note 14, at 32.
98. *Supra* Section I.B.3.
99. Binz et al., *supra* note 14, at 36.
100. *Id.*
101. U.S. Dept. of Energy, The Water-Energy Nexus: Challenges and Opportunities v (June 2014), energy.gov/sites/prod/files/2014/07/f17/Water%20Energy%20Nexus%20Full%20Report%20July%202014.pdf; *see also, e.g.*, Jonathan Thompson, *Mapping Drought's Impact on Electricity Generation*, High Country News, July 7, 2015, https://www.hcn.org/articles/hydropower-california-drought-water-energy-electricity-dams (discussing the water-energy nexus throughout the West, and especially in California); Binz et al., *supra* note 14, at 32 (discussing the 2011 drought in Texas).

before proposing new costly supply-side resources.[102] Other PUCs are using their prudence review authority to allow regulated utilities to invest in more expensive unconventional technologies, like Integrated Gasification Combined Cycle ("IGCC") coal-fired generation, in anticipation of heightened federal air toxic standards, probable near-term carbon regulations, and price fluctuations of the natural gas markets.[103] Although the commercial viability of IGCC facilities remains in question,[104] and other unconventional resources bring their own uncertainties,[105] these commissions illustrate what more engaged and robust prudence review can look like.

B. *The Stretch*

The previous section explored some of the more direct avenues through which public utility commissions can promote sustainable energy policies. This section explores less obvious possibilities, which might be more of a stretch under typical state regulatory frameworks.

1. Taking a Broad View of "Just and Reasonable"

Unlike "prudence review," which allows Commissions flexibility to consider risks as well as costs, most of the case law and administrative decisions discussing "just and reasonable" do so almost exclusively in cost-based, economic terms.[106] Nonetheless, from the nearly one hundred years' worth of jurisprudence interpreting the "just and reasonable" standard under the Federal Power Act, several principles emerge, some of which may provide legal cover for Commissions looking to use similar standards from their own authorizing statutes.

a. "Just and Reasonable" Is an "Imprecise" Standard and Courts Will Look to the "End Result" of the Ratemaking Process to Determine Whether It Passes Constitutional Muster

In *Smyth v. Ames*, the Supreme Court held that rates must be set such that utilities can earn a "fair return upon the value" of the property used for the public interest.[107] This nebulous "fair value" standard, however, presented a "troublesome mandate" for regulatory agencies and sowed much confusion in the industry as to how to value an asset,[108] ultimately forcing the Court to clarify the property valuation process further in *Bluefield Water Works and Improvement Co. v. Public Service Commission of West Virginia*.[109] In *Bluefield Water Works*, the Court stated that the utility's rates must be such that it can:

> [E]arn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding, risks and uncertainties.[110]

In *Federal Power Commission v. Hope Natural Gas*,[111] the Court expanded on *Bluefield Water Works,* abandoned the simplistic "fair value" standard in *Smyth*, and rejected the need for any "single formula or combination of formulae."[112] Ratemaking under the "just and reasonable" standard, the Court noted, may require regulators to make "pragmatic adjustments" because ultimately, "it is the result reached not the method employed which is controlling."[113]

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102. Such requirements are often part of a larger Integrated Resource Planning ("IRP") requirement imposed on the utilities. Currently, some form of IRP or long-term planning is required in over half the states in the U.S.—mostly the states that did not restructure their utility sectors and therefore retain more direct oversight of utility resource procurement. *See, e.g.,* Rachel Wilson & Bruce Biewald, Best Practices in Electric Utility Integrated Resource Planning 3–5 (June 2013) [hereinafter Best IRP Practices]. Under the typical IRP framework, the utility must prove that its procurement decisions or construction proposals are necessary only after such lower-cost resources have been fully utilized. *See, e.g.*, Bangor Hydro–Electric Co. v. Public Utilities Comm., 589 A.2d 38 (Me. 1991) (upholding the Maine Public Utility Commission's denial of a certificate of public convenience and necessity because the utility had failed to pursue least-cost options and demand-side resource planning as an alternative to the proposed project as required by the state's IRP statute).

103. *See* Joint Petition & Application of Duke Energy Indiana Energy, Inc., No. 43114, slip op. at 42 (Ind. Util. Reg. Comm'n Nov. 20, 2007); Petition of Appalachian Power Co. & Wheeling Power Co., Case No. O6-0033-E-CN, slip op. at 70 (Pub. Serv. Comm'n of W. Va. Mar. 6, 2008); Petition of Miss. Power Co., No. 2009-UA-014, 1 108 (Miss. Pub. Serv. Comm'n, Apr. 24, 2012) (granting a certificate of public convenience and necessity); *see also* Monast & Adair, *Triple Bottom Line*, *supra* note 63, at 38–44 (discussing these PUCs' decisions to approve IGCC facilities, looking especially close at Mississippi's decision).

104. Indeed, as the spiraling costs of Mississippi's IGCC project in Kemper County amply illustrate, this technology has a way to go before its costs can be justified on grounds other than future environmental compliance. *See, e.g.*, Thomas Overton, *Kemper County IGCC Costs Rise and Delays Loom—Again*, Power (Apr. 5, 2016), www.powermag.com/kemper-county-igcc-costs-rise-and-delays-loom-again/ (noting that the costs for the Kemper County IGCC plant have risen substantially from $2.2 billion initially estimated in 2004 to a now projected cost of $6.66 billion).

105. *See, e.g.*, Monast & Adair, *Energy Innovation Cycle, supra* note 62, at 1381-83 (noting that large-scale unconventional energy projects, like IGCC, Off-shore wind, and carbon capture and sequestration, present such challenges as: uncertain costs and benefits and diffuse societal benefits).

106. *See, e.g.*, Scott, *supra* note 45, at 375 (noting the strong focus that utility commissions place on "cost containment and net economic benefits").

107. Smyth v. Ames, 169 U.S. 466, 547 (1898) *overruled by* Fed. Power Comm'n v. Nat. Gas Pipeline Co. of Am., 315 U.S. 575 (1942).

108. *See, e.g.*, State of Missouri ex rel. Sw. Bell Tel. Co. v. Pub. Serv. Comm'n of Missouri, 262 U.S. 276, 290 (1923) (Brandeis, J., concurring) ("The so-called rule of *Smyth v. Ames* is, in my opinion, legally and economically unsound."). Justice Souter, writing for the majority in *Verizon Commc'ns, Inc. v. F.C.C.*, 535 U.S. 467, 481 (2002) explained Justice Brandeis's concern regarding the "troublesome mandate" of *Smyth*—namely, that basing a utility's rates solely on the value of an asset only works when there is a robust market for such an asset (like merchandise or land). Utility assets, however, "are not commonly bought and sold in the market," rather, their value is whatever the ratemaking process determines them to be which makes finding a "fair," i.e., market-based, price difficult. *Id.* at 483; *see also* Hempling, *supra* note 38, at 222 (discussing Justice Souter's opinion in *Verizon Commc'ns, Inc.*).

109. 262 U.S. 679 (1923); *see also* Patrick J. McCormick III & Sean B. Cunningham, *The Requirements of the "Just and Reasonable" Standard: Legal Bases for Reform of Electric Transmission Rates*, 21 Energy L.J. 389, 397–410 (2000) (discussing the evolution of how courts have interpreted the "just and reasonable" standard from *Smyth* to *Bluefield* to *Hope*); Hempling, *supra* note 38, at 219–34; Scott, *supra* note 45, at 378–87.

110. Bluefield Waterworks & Imp. Co. v. Pub. Serv. Comm'n of W. Va., 262 U.S. 679, 692–93 (1923).

111. 320 U.S. 591 (1944).

112. *Id.* at 602.

113. *Id.*

This "end-results" approach gave federal and state regulators the flexibility to craft rates that would best serve their constituents.[114] Indeed, as the D.C. Circuit has noted, the "just and reasonable" standard is "not very precise, and does not unduly confine FERC's ratemaking authority. . . . the words themselves have no intrinsic meaning applicable alike to all situations."[115]

By rejecting a "single theory of ratemaking," *Hope* left open the possibility for states to choose "alternatives [that can] benefit both consumers and investors" to ultimately arrive at a "ratesetting methodology [that] best meets their needs in balancing the interests of the utility and the public."[116] Although perhaps still limited ultimately to "cost containment and net economic benefits,"[117] the flexibility within the "just and reasonable" standard can nonetheless give state PUCs leeway to encourage, for example, construction of cleaner generation sources or distribution-level infrastructure upgrades—the sort of sustainable investments that might not be acceptable under a more strict interpretation of the standard.

b. "Just and Reasonable" Implies a "Zone of Reasonableness" as Opposed to a Set Rate

Hope signaled the Supreme Court's preference for light-handed review of utility ratemaking processes, and subsequent appellate decisions reiterate the notion that "[s]tatutory reasonableness is an abstract quality represented by an area rather than a pinpoint."[118] In several decisions, the Court has noted that utility regulation need only fall within a "zone of reasonableness" to survive a constitutional takings challenge.[119] Importantly, as the D.C. Circuit has noted, the "zone of reasonableness" implied in the "just and reasonable" standard does not require regulators (or courts on review) to consider only financial factors. Rather, "[t]he 'zone of reasonableness' is delineated by striking a fair balance between the financial interests of the regulated company and 'the relevant public interests, both existing and foreseeable.'"[120]

It is also important to note that just because "just and reasonable" implies flexibility, the "zone of reasonableness" is not necessarily boundless. FERC found this out first hand in *North Carolina Utilities v. FERC*[121] when the D.C. Circuit struck down the Commission's use of a "hypothetical capital structure" which resulted in high return on investment for a transmission pipeline project. Acknowledging the challengers' contention that the Commission's rate of return was on the "high end of the zone of reasonableness,"[122] the court ultimately held that the Order was "arbitrary and capricious" under the Administrative Procedure Act ("APA")[123] for FERC's failure to explain its reasoning and justify the "anomalously high" rate of return.[124]

Although *Hope* and subsequent cases give FERC some latitude in determining rates, the "zone of reasonableness" is bounded at least by the "arbitrary and capricious" standard of the APA. Likewise, any state-level APA equivalent will impose similar restrictions on state agencies. Thus, a PUC seeking to encourage more sustainably-minded utility investments through an expanded interpretation of the "just and reasonable" standard must ensure that its decision is grounded in extensive fact-finding and explanations to withstand legal challenge.

c. "Just and Reasonable" Can Be Flexible to Accommodate the Public Interest

The Supreme Court has acknowledged that regulators need flexibility to fashion appropriate rates to "balanc[e] the interests of the utility and the public."[125] "The FPA does not limit FERC to cost-based methodologies, however, and the courts have deferred to the agency's reasoned choice regarding ratemaking methods."[126] Costs are a good starting place, but "non-cost factors may legitimate a departure from a rigid cost-based approach."[127] As the Supreme Court has held, deviation from strict cost-based pricing is permissible, but it must not be unreasonable and must "be consistent with [FERC's] responsibility to consider not merely the interests of the

114. *See, e.g.*, Duquesne Light Co. v. Barasch, 488 U.S. 299, 300 (1989) ("The Constitution within broad limits leaves the States free to decide what ratesetting methodology best meets their needs in balancing the interests of the utility and the public.").

115. Farmers Union Cent. Exch., Inc. v. F.E.R.C., 734 F.2d 1486, 1501 (D.C. Cir. 1984) (quoting City of Chicago v. FPC, 458 F.2d 731, 750 (D.C. Cir. 1971)).

116. *Barasch*, 488 U.S. at 316.

117. Scott, *supra* note 45.

118. Montana-Dakota Util. Co. v. Northwestern Pub. Serv. Co., 341 U.S. 246, 251 (1951); *see also Barasch*, 488 U.S. at 314 ("[t]he economic judgments required in rate proceedings are often hopelessly complex and do not admit of a single correct result."); Public Serv. Co. of New Mexico v. FERC, 832 F.2d 1201 (10th Cir. 1987) ("Although ringing of mathematical precision, the calculation of just and reasonable rate is less a science than an art."); Hempling, *supra* note 38, at 219–34; McCormick & Cunningham, *supra* note 109, at 397–410; Scott, *supra* note 45, at 378–87.

119. *See, e.g.*, In re Permian Basin Area Rate Cases, 390 U.S. 747, 767 (1968) (citing *FPC v. Natural Gas Pipeline Co.* for the rule that courts are without authority to set aside any rate selected by the Commission which is within a "zone of reasonableness."); *see also* Fed. Energy Regulatory Comm'n v. Pennzoil Producing Co., 439 U.S. 508, 517, (1979) (citing *Permian Basin Area Rate Cases* for support of the rule); Fed. Power Comm'n v. Natural Gas Pipeline Co. of Am., 315 U.S. 575, 585, (1942) ("Assuming that there is a zone of reasonableness within which the Commission is free to fix a rate varying in amount and higher than a confiscatory rate.").

120. *Farmers Union Cent. Exch., Inc.*, 734 F.2d at 1502 (quoting *Permian Basin Area Rate Cases*, 390 U.S. at 792).

121. 42 F.3d 659 (D.C. Cir. 1994).

122. *Id.* at 661.

123. *Id.* at 659; *see generally* Administrative Procedure Act, 5 U.S.C. § 706(2)(A) (directing courts reviewing agency orders to "hold unlawful and set aside agency action, findings, and conclusions found to be . . . arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law").

124. North Carolina Utilities Comm'n v. FERC, 42 F.3d 659, 664 (D.C. Cir. 1994).

125. *Barasch*, 488 U.S. at 612.

126. Joseph T. Kelliher, *Pushing the Envelope: Development of Federal Electric Transmission Access Policy*, 42 Am. U. L. Rev. 543, 568 (1993); *see also* FERC v. Pennzoil Producing Co., 439 U.S. 508, 517–19 (1979) (deferring to the "wide discretion of the Commission" in reversing an appellate court decision vacating a FERC order); *Permian Basin Area Rate Cases*, 390 U.S. at 767 (declining to strike down a FERC ratemaking order because it fell within the "zone of reasonableness"); Wisconsin v. FPC, 373 U.S. 294, 309 (1963) (noting that "no single method need be followed" for FERC to arrive at a just and reasonable rate).

127. *Farmers Union Cent. Exch., Inc.*, 734 F.2d at 1502.

producers in 'maintain[ing] financial integrity, attract[ing] necessary capital, and fairly compensat[ing] investors for the risks they have assumed,' but also 'the relevant public interests, both existing and foreseeable.'"[128]

The final principle reveals the clearest path for Commissions seeking to ground a sustainable regulatory agenda in their "just and reasonable" ratemaking authority. This route is perhaps easiest when the choice between a fossil-fuel resource and a cleaner alternative are relatively close in cost (making the business case more plausible for the utility) and other "existing and foreseeable" factors are present to tip the scale in favor of the alternative. This is not to suggest that the "just and reasonable" route allows for only generator-by-generator decisions, as with the IGCC facility approvals in Indiana, West Virginia, and Mississippi.[129] State commissions have used their "just and reasonable" authority to justify wide-reaching endeavors from establishing renewable portfolio standards,[130] to initiating a process to re-envision an entire regulatory process, in the case of New York.[131]

2. Taking a Broad View of "Public Interest"

Another approach that may be available to PUCs, or advocates before such Commissions, is invoking the "public interest" principle in favor of sustainable energy solutions. Generally speaking, interpreting the "public interest" standard in a particular law requires considering the broader purposes of the law itself.[132] The clearest articulation of this principle comes from the Supreme Court's decision in *National Association for the Advancement of Colored People ("NAACP") v. FPC*.[133] In *NAACP*, the Court upheld a decision by the Federal Power Commission, in which the Commission rejected a request by the NAACP to exercise its "public interest" authority and require regulated utilities to institute non-discriminatory hiring practices.[134] The petitioners argued essentially that the Commission had a generalized "public interest" obligation that extended beyond its role as an electricity and natural gas regulator.[135] According to the Court, "in order to give content and meaning to the words 'public interest' as used in the [Federal] Power and [Natural] Gas Acts, it is necessary to look to the purposes for which the Acts were adopted."[136] Although there are certainly subsidiary purposes behind the Natural Gas and Federal Power Acts, such as consideration of conservation, environmental, and antitrust questions,[137] the Court continued, "it is clear that the principal purpose of those Acts was to encourage the orderly development of plentiful supplies of electricity and natural gas at reasonable prices."[138] Following *NAACP*, other appellate courts have held essentially that the farther afield a supposed "public interest" goal is from the central purpose of a regulatory statute, the less likely the regulator is obligated to consider it.[139] Such a rule is considered necessary, because it cabins an agency's discretion "to those areas in which the agency fairly may be said to have expertise."[140]

What falls within the scope of "public interest" utility regulation will depend on the wording of the relevant statute, but generally speaking, the "related objectives [of] cost minimization, nondiscrimination, and adequacy of service form the common nucleus of the 'public interest' as interpreted by utility regulators."[141] These objectives can provide the justification for, among other policies, incorporating the environmental externalities of electricity generation into the retail rate structure,[142] requiring utilities to engage in comprehensive resource planning,[143] or adjusting net metering policies to ensure equitable grid access for non-net-metering customers.[144] Furthermore, if the Supreme Court's decision

128. Mobil Oil Corp. v. Fed. Power Comm'n, 417 U.S. 283, 308–09 (1974) (quoting *Permian Basin Area Rate Cases*, 390 U.S. at 792).
129. *Supra* notes 104–06; Monast & Adair, *Triple Bottom Line*, *supra* note 63, at 37–44 (giving examples of PUCs in Indiana, West Virginia, and Mississippi "act[ing] independently, without a specific mandate to consider potential [environmental] regulations or other future price vulnerabilities").
130. For example, in 2006, Arizona established its Renewable Energy Standard through an administrative order from its PUC, the Arizona Corporation Commission. The Commission based its decision on its broad statutory authority to "do all things, whether specifically [provided by this statute] or in addition thereto, necessary and convenient in the exercise of that power and jurisdiction," A.R.S. § 40-202, which includes the authority to set "just and reasonable standards, classifications, regulations, practices, measurements or service by electric public service corporations," A.R.S. § 40-322.
131. *See* Proceeding on Motion of the Comm'n in Regard to Reforming the Energy Vision, 319 P.U.R. 4th 1, 2, 3, 7 (Feb. 26, 2015) (noting that the Commission's "mandate to ensure safe and adequate service at just and reasonable rates, coupled with the statutory charge to promote efficient planning and use of resources, compels further regulatory action to secure fulfillment of the State's energy needs," and announcing the first order of the Commission's "Reforming the Energy Vision" initiative).
132. NAACP v. FPC, 425 U.S. 662, 669 (1972) (holding that references to the "public interest" in the Federal Power Act do not give FERC "a broad license to promote the general public welfare," rather, the standard must be interpreted in light of the purposes of the FPA).
133. 425 U.S. 662, 671, (1976); *see also* Steven Weissman & Romany Webb, Addressing Climate Change Without Legislation, U.C. Berkeley Cntr. Law, Energy, Envt. 3–4 (July 2014), https://www.law.berkeley.edu/files/CLEE/FERC_Report_FINAL.pdf (discussing the significance of the *NAACP* decision).
134. 425 U.S. at 664.
135. *See id.* at 666.
136. *Id.* at 669-70.
137. *Id.* at 670 n.6 (citing 15 U.S.C. § 717s(a); 16 U.S.C. §§ 803(a), (h); Gulf States Utils. Co. v. FPC, 411 U.S. 747; Udall v. FPC, 387 U.S. 428).
138. *Id.* at 669-70.
139. *See, e.g.,* Pub. Utils. Comm'n of State of Cal. v. FERC, 900 F.2d 269, 281 (D.C. Cir. 1990) (rejecting the argument that FERC had an obligation to consider potential copyright issues when approving a natural gas pipeline under the Natural Gas Act); In re Application No. C-1889 of GCC License Corp., 647 N.W.2d 45, 54–55 (2002) (citing with approval *NAACP*'s holding that "public interest". . . take[s] meaning from the purposes of the regulatory legislation"); Ellis-Hall Consultants, LLC v. Pub. Serv. Comm'n of Utah, 2014 UT 52, ¶ 22, 342 P.3d 256, 261 ("The 'public interest,' in this legal context, does not encompass any and all considerations of interest to the public—such as the nondiscrimination principles cited by [petitioner]."); Rhode Island Hosp. Trust Nat. Bank v. Bd. of Bank Inc. of the State of Rhode Island, No. C.A. 78-401, 1980 WL 336048, at *4 (R.I. Super. Feb. 20, 1980) (agreeing with *NAACP* holding, but distinguishing based on the particular facts in that case).
140. Bob Jones University v. United States, 461 U.S. 574, 611 (1983) (Powell, J., concurring).
141. Knee, *supra* note 89, at 763 (citing James C. Bonbright et al., Principles of Public Utility Rates 385 (2nd ed. 1988) (speaking in terms of "consumer rationing," "fairness to ratepayers," and "capital attraction")).
142. *Id.* at 765–68, 788. This is sometimes referred to as an environmental "adder"—a popular utility planning policy in the 1990s that fell out of favor following the success of EPA's acid rain cap-and-trade program and the rise renewable portfolio standards. Hofmeister, *supra* note 83, at 67, 82.
143. *See infra* Section III.C (discussing integrated resource planning).
144. *See, e.g.*, Nevada Pub. Util. Comm'n, Order on Application of NV Energy for Approval of a Cost-of-Service Study and Net Metering Tariffs, (Docket

in *NAACP* is any guide for how state courts might respond: the closer these proposals are tied to the primary or secondary purposes of a state's utility regulatory framework, the more likely they are to withstand legal challenge.

C. Unsung Hero: Integrated Resource Planning

The foregoing sections illustrate the various routes available to state public utility commissions seeking to promote sustainable, low-carbon, energy policies under their existing authority. One final option for regulators to consider is a process-level approach called Integrated Resource Planning ("IRP") or sometimes referred to as "Least-cost Planning." This planning policy fell out of favor in the 1990s, but with today's convergence of technologies, new market entrants, renewables integration, and unprecedented demands on the electricity system, the need for a comprehensive resource plan and policy outline has never been stronger. This section outlines the basics of Integrated Resource Planning and sets out some concrete first-steps for PUCs interested in adopting IRP.

1. History and Basics of Integrated Resource Planning

The concept of comprehensive resource planning took hold in the late 1980s following the economically crippling 1973 oil embargo and several substantial cost overruns for nuclear generation facilities in the same decade.[145] By requiring a more rigorous analysis of system needs and available resources, IRP proponents argue, unnecessary investments could be deferred or avoided altogether.[146]

In essence, an integrated resource plan is "a utility plan for meeting forecasted annual peak and energy demand, plus some established reserve margin, through a combination of supply-side and demand-side resources over a specified future period."[147] The goal of IRP is to establish a streamlined process through which the lowest-cost resources can be reliably delivered to ratepayers.[148] Even though the motivation behind IRP policies is to reduce system costs, numerous incidental benefits flow to customers and the environment as a result of a more streamlined and efficient resource planning process.[149]

Although no two state IRP laws are the same, generally the process requires utilities to forecast their peak demand and reserve margins for a set timeframe, and to submit a plan for meeting those demands through supply- and demand-side resources.[150] In the words of the Oregon Public Utility Commission, which implemented its "Least-Cost Planning" requirement in 1989, this form of planning differs from traditional resource planning in at least three major ways:

> It requires integration of supply and demand side options. It requires consideration of other than internal costs to the utility in determining what is "least-cost." And it involves the Commission, the customers, and the public prior to the making of resource decisions rather than after the fact.[151]

By 1991, Oregon and thirty-one other states had implemented some form of IRP, nine states had started the IRP design and implementation process, and the remaining nine states had not yet considered IRP policies.[152] However, support for IRP declined as many states restructured their electricity sectors in the mid-1990s and such planning policies were seen as ill-suited to non-generation-owning utilities and largely unnecessary since the market would, in theory, ferret out the least-cost generation solution.[153] As a result, many IRP policies in restructured states were either ignored or repealed.[154] In the intervening years, only a few states have updated or modified their IRP laws; according to a 2013 study, twenty-eight states have some form of IRP policy in place.[155]

2. When Regulators Fail to Prepare, They Prepare to Fail: First-Steps for PUCs

It is time for a resource planning renaissance. Regardless of whether a state is traditionally-regulated or restructured, a rigorous planning process can provide the state with not only a concrete strategy for addressing near-term needs, but also establish a comprehensive roadmap for its energy future.[156]

Nos. 15-07041 & 15-07042) ¶¶ 180–183, pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2015-7/8412.pdf (discussing the "just and reasonable" and equity principles underpinning the Commission's Order to increase net metering fixed charges and reducing excess energy sale prices).

145. Best IRP Practices, *supra* note 102, at 3; *see also* Rachel Wilson & Paul Peterson, A Brief Survey of State Integrated Resource Planning Rules and Requirements 1 (Apr. 2011), www.cleanskies.org/wp-content/uploads/2011/05/ACSF_IRP-Survey_Final_2011-04-28.pdf (noting that high oil prices coupled with runaway nuclear facility construction costs strongly impacted New England and led to several utility bankruptcies in the region).

146. Best IRP Practices, *supra* note 102, at 4–5.

147. *Id.* at 4.

148. *Id.*

149. *See id.*

150. *Id.* at 2.

151. Or. Pub. Util. Comm'n, *In re Investigation Into Least-Cost Planning for Resource Acquisitions by Energy Utilities in Oregon*, Order No. 89-507 3 (Apr. 20, 1989), http://www.puc.state.or.us/admin_hearings/key_puc_cases/89_507.pdf [hereinafter Oregon LCP Rule].

152. Wilson & Peterson, *supra* note 145, at 2.

153. *See* Best IRP Practices, *supra* note 102, at 3; Scott Hempling, *Who Should Do What? How Order 1000's Regional Transmission Planning Can Support State Resource Planning* 6 (May 2012), http://www.scotthemplinglaw.com/files/pdf/ppr_order_1000-state_planning_hempling0612.pdf (noting the persistent view, among some, that resource planning is unnecessary for restructured states) [hereinafter Hempling, *Who Should Do What?*].

154. Best IRP Practices, *supra* note 102, at 3; Wilson & Peterson, *supra* note 145, at 1.

155. Best IRP Practices, *supra* note 102, at 5 fig. 2, 34–36 (setting out the statute citations of the states with IRP laws or regulations).

156. This is true not only for the twenty-two remaining states without IRP planning requirements, but also for the states with IRP policies in place—because there is always room for improvement. *See, e.g.*, Best IRP Practices, *supra* note 102, at 26–33 (setting out "Recommendations For Prudent Resource Planning" based on a survey of well-structured IRP laws, and a detailed analysis of the IRP frameworks in Arizona, Colorado, and Oregon). There are numerous reasons why utility regulators in restructured states should take IRP seriously. First, even where there is retail competition, "providers of last resort," i.e., utilities that continue serving customers that did not switch providers, still have a duty to serve and plan their loads. Second, as mentioned earlier, the case for comprehensive system planning is made more necessary as states implement energy efficiency, demand-side management, net metering, and a host of other popular energy policies. Lastly, solely relying on market forces to meet customer needs can be risky, especially when the market itself is heavily dependent on

Such a policy should be especially appealing to PUCs looking to foster green power solutions, because IRP obligates utilities to consider more than just the usual supply-side resources, which opens the door for more environmentally-friendly solutions like demand-side management, energy efficiency, or energy storage.[157]

One state that has been leading the way on innovative resource planning is California. In 2013 the state legislature passed Assembly Bill ("AB") 327 that, among other things, requires the state's three main investor-owned utilities to submit Distribution Resource Plans ("DRPs") to the California Public Utility Commission. The goal of the DRPs is to move the utilities "towards a more full integration of DERs into their distribution system planning, operations and investment."[158] Essentially, the DRPs must set out a "roadmap" of how each utility will integrate cost-effective DER into its distribution system in a manner that benefits ratepayers and complements the state's broader climate and energy objectives as well as the grid modernization reforms underway in other dockets.[159] The state's three utilities—Southern California Edison Company, Pacific Gas and Electric Company, San Diego Gas & Electric Company—filed their DRPs on July 1, 2015,[160] and, as of this writing, are awaiting the California Public Utilities Commission's approval or modification.

A robust IRP process, of the sort that California requires for its distribution utilities, may require separate statutory authority depending on a state's authorizing statute. However, using the examples of Oregon and Arizona, which adopted their planning regimes administratively through their statutory and "just and reasonable" authority,[161] the following IRP component policies are likely to be within the jurisdiction of other similarly-situated public utility commissions:

a. Require Utilities to Engage in Resource Planning

As the Commissions in both Oregon and Arizona determined, ensuring that ratepayers are charged just and reasonable rates requires a degree of regulation over utilities' business and investment practices. Least-cost planning is therefore one mechanism by which to meet this goal, as well as the other traditional utility regulatory standards mentioned in this Article.[162]

b. Instruct Utilities to Consider Demand-Side Resources and Efficiency Alongside Supply-Side Resources

Only when non-wires alternatives like demand-response and energy efficiency can be fully utilized will ratepayers be getting the best bargain.[163] These options are not only more sustainable and less carbon-intensive, they can also be a win for customers too, as illustrated by one New York utility that was able to defer a nearly $1 billion substation upgrade through such non-wires alternatives.[164]

c. Require Utilities to Factor Uncertainty and Scenario Planning Into Their Plans

Oregon in particular stresses the importance of risk mitigation through its IRP process.[165] At a minimum this forces utilities to consider contingencies for system shortages or overloads, but it should be more complex depending on, among other factors, the utility's resource portfolio and state's typical weather patterns. For example, just as Oregon utilities must consider the impacts of variable hydroelectric power, utilities in sunnier states should consider the impli-

one resource and vulnerable to price fluctuations, as New England customers know well from frigid winter of 2013. Hempling, *Who Should Do What?*, *supra* note 153, at 6–7.

157. *See, e.g.*, Weissman & Webb, *supra* note 133, at 3.

158. Cal. Pub. Util, Comm'n, *Order Instituting Rulemaking Regarding Policies, Procedures and Rules for Development of Distribution Resources Plans Pursuant to Public Utilities Code Section 769*, R. 14-08-013, at 4 (Aug. 14, 2014), docs.cpuc.ca.gov/PublishedDocs/Published/G000/M103/K223/103223470.pdf.

159. *Id.*; Cal. Pub. Util, Comm'n, *Assigned Commissioner's Ruling on Guidance for Public Utilities Code Section 769—Distribution Resource Planning*, R. 14-08-013, at 2–3 (Feb. 6, 2015), docs.cpuc.ca.gov/PublishedDocs/Published/G000/M103/K223/103223470.pdf.

160. *See Distribution Resources Plan (R.14-08-013)*, Cal. Pub. Util. Comm'n, www.cpuc.ca.gov/General.aspx?id=5071.

161. Both Oregon and Arizona established least-cost and IRP policies administratively in reliance on their statutory authority, which included the authority to set "just and reasonable" rates and practices. In re Notice of Proposed Rulemaking Regarding Resource Planning, Ariz. Corp. Comm. Decision No. 71722 ¶ 25-32 (June 3, 2010) [hereinafter Arizona IRP Rule] (relying on the Commission's "just and reasonable" authority as established through the state constitution and statutes. Ariz. Const. art. XV, § 3; Ariz. Rev. Stat. Ann. §§ 40-202, 40-203, 40-281, 40-282, 40-321, 40-322); Oregon LCP Rule, *supra* note 151, at 3 (relying on the Commission's authority under state statute to remedy any "unreasonable," "unjustly discriminatory," or any "unsafe or inadequate" service. Or. Rev. Stat. § 756.515); Best IRP Practices, *supra* note 102, at 26.

162. *See* Arizona IRP Rule, *supra* note 161, at ¶ 35 (internal quotation marks omitted) ("Regulating electric utilities' resource portfolios is an essential part of the Commission's efforts to meet its constitutional obligation to prescribe just and reasonable rates and charges to be made and collected . . . by public service corporations within the State for service rendered therein because a utility's resource portfolio largely dictates its physical assets and expenses."); Oregon LCP Rule, *supra* note 151, at 2–3 ("the Commission concludes that the traditional responsibility of utilities for prudent management now explicitly includes the least-cost planning process and the timely acquisition of the least-cost resources").

163. *See* Arizona IRP Rule*, supra* note 161, Ex. D, at 16 (revising the state's IRP rules to state that "[a] load-serving entity shall by April 1 of each even year file with Docket Control a 15-year resource plan that . . . Selects a portfolio of resources based won comprehensive consideration of a wide range of supply- and demand-side options); Oregon LCP Rule*, supra* note 151, at 7 ("all resources must be evaluated on a consistent and comparable basis").

164. Shortly after the New York utility Con Edison realized that by 2018 demand would overwhelm its Brooklyn- and Queens-serving sub-transmission system—rather than seeking PUC approval upgrade the system—the utility instead opted to install an innovative demand-side management and microgrid system. This latter option will not only be both more efficient and sustainable, but it will mean that ratepayers are spared the likely $1 billion price tag that a traditional system upgrade would cost. *See, e.g.*, Bill Radvak, *New York's Con Ed Deferring Substation Upgrades With Demand Managemen*t, Greentech Media (Sept. 14, 2014), www.greentechmedia.com/articles/read/New-Yorks-Con-Ed-Deferring-Substation-Upgrade-With-Demand-Management.

165. Oregon LCP Rule*, supra* note 151, at 2; *see also* Best IRP Practices, *supra* note 102, at 31–32.

cations of intermittent solar power—a problem that will only increase as solar photovoltaic power generation grows in popularity.

d. Require Utilities to Include the Estimated Cost of Environmental Compliance for Existing and Future Resources[166]

As noted previously, there are already significant environmental costs associated with operating fossil-fuel generation facilities in the U.S., especially coal-fired plants. As state and federal climate change regulatory efforts step-up, these costs are bound to increase. Regulators, therefore, can use the IRP process to help steer utilities away from resource investments that may be more costly in the long run.

Integrated Resource Planning facilitates the prudent and reasonable management of a utility's long-term investments for the benefit of ratepayers as well as the environment. Commissions can therefore fulfill their regulatory prerogatives by requiring utilities to at least consider additional resource options and different contingencies rather than relying solely on variable market forces or a vertically-integrated utility's cost-maximizing impulses. IRP can also enable electric utility regulators to corral their disparate programs, oversight duties, and general obligations into a set of cohesive and complementary, long-range goals.

IV. Conclusion

The challenges bearing down on the nation's electric system create a level of uncertainty and instability that utility regulators are unfamiliar with. With environmental regulators pushing on one side and disruptive market forces pulling on the other, the electricity sector is changing quickly. Although the number of problems to solve can be a daunting prospect, they also reveal an exceptional opportunity for regulators and policymakers to promote a more sustainable energy agenda, especially with regard to generation selection.

As set out in this Article, there exist a number of regulatory avenues by which state PUCs can influence how their electricity systems develop. Whether directly through the authority of Federal Power Act section 201—now somewhat more constrained post-*Hughes*—a PURPA-compliant approach, or through a broadened interpretation of traditional utility regulatory principles, state PUCs, and the sustainability advocates who appear before them, have a number of tools at their disposal.

Over the next few years, substantial investments in electricity infrastructure will be made as part of normal system upkeep as well as in response to new technological innovations and customer demands. With their authority to oversee utility investment decisions and regulate in the public interest, state public utility commissions are uniquely positioned to put utilities, and our electricity system, on a path toward a more sustainable and prosperous energy future.

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166. *See* Arizona IRP Rule, *supra* note 161, at ¶¶ 18(e), (f); Oregon LCP Rule, *supra* note 151, at 10–11.