The PURPA Haze: Clearing the Way for PURPA Implementation in a Changed Energy System

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The Public Utility Regulatory Policy Act was passed in 1978 to protect the U.S. electricity supply under the shadow of fuel insecurity and a looming energy crisis. In 2020, the need to mitigate climate change through reducing greenhouse gas emissions, along with the need to adapt to new extreme weather and climatic realities, pose the greatest challenges and threats to the U.S. electricity grid. The Public Utility Regulatory Policy Act has been only moderately successful in supporting the development of small renewable generators; however, a different implementation framework could make the Act a strong, effective tool for supporting the transition to the renewable and resilient electricity we need.

In this Note, I argue that small, distributed storage and renewable generation are a cost-effective and efficient way to both transition to clean generation and make the grid more resilient against climate-based threats. I then explain why the Public Utility Regulatory Policy Act has not been widely successful as currently implemented and why the Federal Energy Regulatory Commission's October 2019 proposal for revising its regulations under the Public Utility Regulatory Policy Act misses the mark. Finally, I propose two different regulatory frameworks for making the Act work in today's climate change reality.

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INTRODUCTION

In October 2019, the Federal Energy Regulatory Commission (FERC) published a Notice of Proposed Rulemaking ("the NOPR") proposing significant changes to the agency's implementation of the Public Utility Regulatory Policy

Act (PURPA).[1] PURPA, originally passed in 1978, is federal legislation designed to open the wholesale power market in the United States to third-party generators; specifically, its provisions are designed to provide market access to small independent generators that either use renewable fuels or generate combined heat and electricity from natural gas.[2] The NOPR was a response to longstanding controversy over how states should understand and implement powers delegated by FERC under PURPA; the near-constant calls from diverse stakeholders for revision of PURPA; and a promise from then-FERC Chairman Neil Chatterjee to reform the agency's approach to PURPA.[3]

The NOPR follows shortly behind two federal court holdings that would have made PURPA implementation more complicated and difficult for states that also have their own robust renewables programs. *Californians for Renewable Energy v. the California Public Utilities Commission* (*CARE v. CPUC*) and *Winding Creek Solar LLC v. Peevey* (*Winding Creek*) raised issues as to whether several procurement programs created by the California Public Utilities Commission (CPUC) to facilitate utility power purchases from small renewable generators (qualifying facilities under PURPA, or "QFs") conformed with the pricing and contract requirements found in PURPA.[4] In the absence of the NOPR, the results of the two cases would have posed significant policy and administrability challenges for California and other states in the Ninth Circuit that have Renewable Portfolio Standard (RPS) programs.

Among other proposed changes to FERC's current implementation of PURPA, the NOPR 1) removes the requirement that states provide QFs the option to enter long-term power purchase agreements (PPAs) with pricing determined at the time of contract;[5] 2) allows states to determine the pricing of long-term PPA contracts in which pricing is fixed at the time of contract, based on projected power rates at the anticipated time of power delivery;[6] 3) allows states to set QF energy rates "pursuant to a competitive solicitation process;"[7] 4) allows states within organized electric markets (regional transmission

1. Qualifying Facility Rates and Requirements; Implementation Issues Under the Public Utility Regulatory Policies Act of 1978, 84 Fed. Reg. 53246 (proposed Oct. 4, 2019) [hereinafter PURPA NOPR] (to be codified at 18 C.F.R. pts. 292, 375).

2. *See* 16 U.S.C. § 2601 (2018).

3. *See* PURPA NOPR, *supra* note 1, at 53273; *FERC Proposes to Modernize PURPA Regulations*, FERC (Sept. 19, 2019), https://cms.ferc.gov/news-events/news/ferc-proposes-modernize-purpa-regulations; Catherine Morehouse, *FERC Proposal Would Gut' PURPA, Could Lower Rates Utilities Pay to Solar Developers*, UTIL. DIVE (Sept. 20, 2019), https://www.utilitydive.com/news/FERC-PURPA-changes-solar-competition-market-flexibility-Chatterjee/563369/.

4. Californians for Renewable Energy v. Cal. Pub. Utils. Comm'n, 922 F.3d 929, 932 (9th Cir. 2019), *cert. denied*, 140 S. Ct. 2645 (2020); Winding Creek Solar LLC v. Peevey, 293 F. Supp. 3d 980, 981 (N.D. Cal. 2017).

5. PURPA NOPR, *supra* note 1, at 53247.

6. *Id.*

7. *Id.* This revises holdings in *Hydrodynamics, Inc.* and *Windham Solar LLC*, in which FERC ruled that requiring QFs to participate in and win competitive solicitation processes imposed an "unreasonable obstacle" to obtaining legally enforceable obligations for utilities to purchase from QFs. Hydrodynamics, Inc., 146 FERC ¶ 61, 193 (2014); Windham Solar LLC, 156 FERC ¶ 61, 142 (2016).

organizations and independent system operators) to set "as-available" QF energy rates at the locational marginal price;[8] and 5) perhaps most significantly, dramatically lowers the threshold at which a renewable generator is rebuttably presumed to be a QF, from 20 megawatts (MW) down to 1 MW.[9]

Some of these changes speak directly to the holdings in *CARE v. CPUC* and *Winding Creek* and would allow California and other states with robust renewables programs to more effectively implement their state schemes.[10] However, it is likely that the complete package of changes in this NOPR would ultimately undermine the goals of PURPA by allowing non-complying states to effectively opt-out of fulfilling their PURPA obligations to reduce barriers to market entry for small renewable generators.

In this Note, I first argue that PURPA's broad policy goals—renewable, reliable, and resilient[11] electricity service—are just as, if not more, relevant today in the face of the looming climate crisis as they were when PURPA was passed in 1978. Second, I explain in broad strokes why PURPA is currently not as effective as it could be and argue that the NOPR makes matters worse because it delegates too much discretion to states.[12] Third, I argue that PURPA can be reconsidered, consistently with the original legislative intent, as a way to revamp the nation's electricity supply and grid to speed both climate change mitigation efforts through promotion of renewable energy projects, and climate change adaptation through development of smaller and more distributed generation and capacity.[13] Fourth, I briefly outline the features that an effective implementation of PURPA should have. Fifth, I propose two alternative frameworks for FERC's implementation of PURPA, in broad strokes. And finally, sixth, I raise and consider several counterarguments.

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8. PURPA NOPR, *supra* note 1, at 53247.

9. *Id.* at 53248.

10. *See generally* Californians for Renewable Energy v. Cal. Pub. Utils. Comm'n, 922 F.3d 929 (9th Cir. 2019), *cert. denied*, 140 S. Ct. 2645 (2020); Winding Creek Solar LLC v. Peevey, 293 F. Supp. 3d 980 (N.D. Cal. 2017).

11. This Note does not get into the details of what "reliability" and "resilience" are, and whether they are the same thing. For an in-depth and illuminating discussion of this area, *see* Stephanie Phillips, Note, *Federal Regulation for a Resilient' Electricity Grid*, 46 ECOLOGY L.Q. 415 (2019).

12. Given that FERC's proposed regulatory changes are likely to evolve significantly before any possible promulgation, I will not analyze each proposal in the NOPR in detail.

13. There is no universally accepted definition of distributed generation. The Environmental Protection Agency defines distributed generation as "a variety of technologies that generate electricity at or near where it will be used, such as solar panels and combined heat and power." By distributed generation, I mean generation that is connected to the electricity grid, physically located closer to consumers of electricity than are traditional utility generation resources, and lower capacity than traditional utility-scale generation. As I will discuss below in Part II, distributed generation and storage are useful insofar as they make it less likely that electricity consumers will suffer blackouts or other reliability issues because of extreme weather or other environmental effects. Therefore, the location and size of particular distributed resources will likely be determined by local and regional needs and does not need to be baked into the definition of "distributed." *See Distributed Generation of Electricity and Its Environmental Impacts*, ENVTL. PROT. AGENCY, https://www.epa.gov/energy/distributed-generation-electricity-and-its-environmental-impacts (last visited Dec. 14, 2019).

I. THE HISTORY AND INTENT OF PURPA

From the early 1900s through the 1970s, the electricity system in the United States was almost exclusively managed by vertically integrated, investor-owned utilities ("utilities").[14] Utilities owned and operated large power generators and the electricity grid and were responsible for delivering electricity to customers and billing them for it.[15] Most utilities were legal monopolies in their own operating territory, regulated by state utility commissions.[16]

State utility commissions primarily regulate utilities using their power of the purse,[17] holding quasi-judicial administrative proceedings to determine how much revenue utilities may collect through retail electricity rates. These proceedings aim to ensure that retail electricity rates provide the utility with sufficient revenue to 1) cover the utility's operating costs, and 2) provide a reasonable rate of return to utilities on their prudent investments (such as building a new generator to meet capacity), while protecting retail customers from price-gouging and discriminatory rates.[18] Prior to the restructuring of the wholesale energy markets, utilities usually owned their own generation, and thus, the role of state commissions in power procurement was generally limited to evaluating utility proposals to build new generators or retire old ones.[19]

In the wake of the oil and energy crises of the 1970s, Congress enacted PURPA in 1978 to protect "public health, safety, and welfare . . . [and] national security," provide for "increased conservation [and] increased efficiency" in utility use of resources, "equitable retail rates," and "improve . . . wholesale distribution [and] reliability," among other goals.[20] President Jimmy Carter, in a televised speech in 1977, argued that electricity conservation and a switch to renewable energy (and domestic coal) were required to avoid "an economic, social, and political crisis that will threaten our free institutions."[21] And in *Independent Energy Producers Ass'n v. CPUC*, the Ninth Circuit characterized PURPA as being intended to "encourage the development of cogeneration and small power production facilities . . . to reduce American dependence on fossil fuels by promoting increased energy efficiency" and to increase renewable generation capacity.[22]

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14. *See* DAVID P. TUTTLE ET AL., UNIV. OF TEXAS AT AUSTIN ENERGY INST., THE HISTORY AND EVOLUTION OF THE U.S. ELECTRICITY INDUSTRY 3 (2016), http://energy.utexas.edu/the-full-cost-of-electricity-fce/.

15. *Id.* at 2.

16. *Id.*

17. *See* THE REGULATORY ASSISTANCE PROJECT, ELECTRICITY REGULATION IN THE US: A GUIDE 5 (2011).

18. *See* Fed. Power Comm'n v. Hope Nat. Gas Co., 320 U.S. 591, 603 (1944).

19. *See generally* TUTTLE ET AL., *supra* note 14.

20. 16 U.S.C. § 2601 (2018).

21. Jimmy Carter, President of the United States, Address to the Nation on Energy (Apr. 18, 1977), *in* THE AMERICAN PRESIDENCY PROJECT, https://www.presidency.ucsb.edu/documents/address-the-nation-energy (last visited Oct. 3, 2020).

22. Indep. Energy Producers Ass'n, Inc. v. Cal. Pub. Utils. Comm'n, 36 F.3d 848, 850 (9th Cir. 1994).

To achieve the goal of improving U.S. national security through a renewable, efficient, and reliable electric energy supply, PURPA removes barriers to market entry faced by QFs by requiring mandatory interconnection to the grid, mandatory power purchases by utilities, and mandatory rates at non-discriminatory prices.[23] Through the mandatory interconnection requirement, utilities must provide QFs[24] with interconnection to the utility-owned power grid.[25] Under the mandatory purchase requirement, utilities must buy power from any QF seeking to sell it, either through a long-term PPA or as the QF has the power available to sell ("as-available").[26] Finally, PURPA mandates that QFs are entitled to sell power to utilities at rates that are not discriminatory against them given their weak market position[27] and are also "just and reasonable to the electric consumers of the electric utility and in the public interest."[28] PURPA defines this rate as the cost the utility would have incurred to acquire the same amount of power "but for" its purchase of the power from the QF, whether through generating the power itself or buying it from another generator.[29]

The mandatory rate requirement has been the subject of intense litigation since its inception. In implementing PURPA, FERC defined this rate as the "avoided cost," meaning "the incremental cost[] to an electric utility of electric energy or capacity or both which, but for the purchase from the [QF], such utility would generate itself or purchase from another source."[30] In other words, the avoided cost rate is the price the utility would have paid to secure some amount of electricity and/or capacity if it had not purchased that amount of electricity and/or capacity from the QF. Although FERC has clarified limitations on how avoided cost may be calculated, neither PURPA nor FERC have specified a particular avoided cost rate or a method to calculate it, nor the details of the PPAs required to be made available to QFs.[31] Instead, implementation of these

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23. *See* 16 U.S.C. §§ 824i, 824a-3 (2018). PURPA also ensures other rights for QFs, such as mandatory wheeling of QF power by the utilities, but these provisions are not within the scope of this Note. *See* 16 U.S.C. § 824j (2018).

24. QFs are small independent cogenerators or renewable generators, registered with and certified by FERC. As PURPA was originally implemented, QFs could be no larger than 80 MW. However, current FERC rules have effectively lowered the QF threshold to 20 MW. *See* 16 U.S.C. § 796 (2018) (defining "small power production facility"); New PURPA Section 210(m) Regulations Applicable to Small Power Production and Cogeneration Facilities, 117 FERC 61,078 (F.E.R.C. October 20, 2006).

25. 16 U.S.C. § 824i.

26. *Id.* § 824a-3.

27. PURPA is predicated on the assumption that a small, independent power producer like a QF will have a relatively weak market position in the wholesale power market, as compared to an incumbent utility. The utility, by virtue of its near-monopoly power over generation, transmission, distribution, and retail power sales, has the power to effectively box independent producers out of the market by, for example, offering below-market rates for power, refusing to interconnect QFs, or charging exorbitant rates for transmission.

28. 16 U.S.C. § 824a-3(b).

29. *Id.* § 824a-3(d). QFs are also compensated for capacity through PURPA under the same pricing requirements. 18 C.F.R. § 292.304(d) (2019).

30. 18 C.F.R. § 292.101(b)(6).

31. *See generally* 16 U.S.C. § 824a-3.

provisions of PURPA is largely left to the discretion of state utility commissions.[32] PURPA's delegation of wholesale electricity ratemaking to state utility commissions in the case of QF purchases is a rare exception to the general rule that regulation and ratemaking for wholesale electricity transactions lies within the exclusive jurisdiction of FERC.[33]

II. PURPA SHOULD BE USED TO MITIGATE CLIMATE EFFECTS OF THE GRID AND ADAPT TO CLIMATE CHANGE

The ultimate goal of PURPA—its motivating force—is to improve U.S. national security.[34] PURPA specifically addresses the national security risks originating from an unreliable electricity supply, and it does so by strongly promoting domestic, renewable, and efficient power generation by small generators.[35] Today, the challenges posed by climate change mitigation and adaptation significantly threaten the reliability of the U.S. electricity system—and ultimately U.S. national security—perhaps more drastically than did the oil and energy crises of the 1970s that originally gave rise to PURPA. In this Part, I detail these challenges and explain why they lie within the scope of the problems that PURPA can and should address.

A. Climate Change Is a Significant Threat to Our National Security

Today, unlike in 1978, fuel embargoes by foreign nations are not the most significant energy-related threat to our national security; human-driven climate change is. The Intergovernmental Panel on Climate Change's 2018 Special Report on Climate Change projects that global human carbon dioxide emissions must decline from 2010 levels by 45 percent by 2030, and reach net zero by 2050, to limit global warming to 1.5°C.[36] To limit warming to 2°C—which implicates significantly more cost and risk to people, economies, and ecosystems than warming of 1.5°C—emissions must decline from 2010 levels by about 25 percent by 2030 in most pathways, and reach net zero by about 2070.[37] If not dramatically mitigated, climate change will produce millions, if not billions, of climate refugees worldwide due to the effects of rising sea levels, droughts, extreme heat, and extreme storms.[38] These same climatic effects will have major effects inside the United States, endangering infrastructure of all kinds—including energy infrastructure—and potentially forcing the relocation of

32. *See id.*
33. *See id.* § 824.
34. *See* 16 U.S.C. § 2601 (2018).
35. *See generally id.*
36. MYLES ALLEN ET AL., IPCC, *Summary for Policymakers*, *in* GLOBAL WARMING OF 1.5 C, at 12 (Valérie Masson-Delmotte et al. eds., 2018).
37. *Id.*
38. NETA C. CRAWFORD, THE COSTS OF WAR PROJECT, PENTAGON FUEL USE, CLIMATE CHANGE, AND THE COSTS OF WAR 2 (2019).

millions of people living in coastal areas.[39] In fact, the U.S. military considers climate change a significant risk to national security.[40]

In spite of this, U.S. emissions are currently rising.[41] In 2018, about 79 percent of U.S. domestic energy production originated from fossil fuels.[42] Renewables (including hydropower) accounted for about 11 percent of production, with nuclear power accounting for 9 percent.[43] Although this represents a decrease in the percentage of power generated domestically by fossil fuels—from 93 percent in 1966 to 79 percent in 2018—overall production and consumption have continued to rise.[44] Since 2008, production of crude oil, dry natural gas, and natural gas liquids has increased dramatically, more than offsetting the decrease in coal production.[45] The Trump administration, instead of reducing domestic emissions or fossil fuel emissions, fought to remove restrictions on coal generation and on exploitation of as-yet-untapped domestic oil and gas fields.[46]

Furthermore, methodological errors that lead to undercounting of current emissions may mean that even more work is needed to lower emissions. For instance, California, generally considered the premier U.S. state with respect to greenhouse gas (GHG) emissions reductions and regulation, may be running 107 years behind in reaching its 2050 goal of reducing GHG emissions to 80 percent below 1990 levels due to recent economic growth and related increased emissions.[47] Additionally, new studies are suggesting that net emissions from damage to and destruction of tropical rainforests—for example, the enormous

39. *See id.* at 20–24.

40. *Id.*

41. Umair Irfan, *After Years of Decline, US Carbon Emissions Are Rising Again*, VOX (Jan. 9, 2019), https://www.vox.com/2019/1/8/18174082/us-carbon-emissions-2018 (last updated Jan. 9, 2019, 8:37 AM).

42. Allen McFarland, *Fossil Fuels Continue to Account for Largest Share of U.S. Energy*, U.S. ENERGY INFORMATION ADMINISTRATION (Sept. 18, 2019), https://www.eia.gov/todayinenergy/detail.php? id=41353.

43. *Id.*

44. *Id.*

45. *Id.* ("Since 2008, production of crude oil, dry natural gas, and natural gas plant liquids (NGPL) has increased by 12 quadrillion British thermal units (quads), 11 quads, and 3 quads, respectively. These increases have more than offset decreasing coal production, which has fallen 9 quads since its peak in 2008").

46. Jeff Brady, *Trump Administration Weakens Climate Plan to Help Coal Plants Stay Open*, NPR (June 19, 2019, 11:12 AM), https://www.npr.org/2019/06/19/733800856/trump-administration-weakens-climate-plan-to-help-coal-plants-stay-open; Reid Frazier, *Trump Administration Proposes Relaxing Rules on Waste from Coal Plants*, NPR (Nov. 4, 2019, 5:51 PM), https://www.npr.org/2019/11/04/776174139/trump-administration-proposes-relaxing-rules-on-waste-from-coal-plants; Eric Lipton & Hiroko Tabuchi, *Driven by Trump Policy Changes, Fracking Booms on Public Lands*, N.Y. TIMES (Oct. 27, 2018), https://www.nytimes.com/2018/10/27/climate/trump-fracking-drilling-oil-gas.html; Laurel Wamsley, *Trump Administration Moves to Roll Back Offshore Drilling Safety Regulations*, NPR (May 3, 2019, 1:55 PM), https://www.npr.org/2019/05/03/720008093/trump-administration-moves-to-roll-back-offshore-drilling-safety-regulations.

47. Herman K. Trabish, *California May Be a Climate Leader, but It Could Be a Century Behind on Its Carbon Goals Study,* UTIL. DIVE (Oct. 29, 2019), https://www.utilitydive.com/news/california-may-be-a-climate-leader-but-it-could-be-a-century-behind-on-its/565906/.

2019 fires in the Amazon—may be underestimated by a factor of six using current methodology, because the current methods fail to account for the future carbon sink services the destroyed forests will no longer perform.[48] While carbon capture and sequestration can somewhat mitigate the climate effects of natural gas generation, the bulk of carbon dioxide emissions reductions required to avoid climate catastrophe must come from transitioning global energy production to renewables.[49] As the second-largest carbon dioxide emitter after China, the United States must quickly and efficiently develop a significant amount of renewable generation, while retiring and/or retrofitting fossil fuel generators, to avoid the worst effects.[50]

B. Climate Adaptation of the Electricity Grid Is an Urgent Need

In addition to climate change mitigation, the United States must begin to seriously confront the need for climate change adaptation, including adapting the electricity grid. Climate change will not just lead to overall warming of the planet; it will cause more extreme weather such as droughts, storms, tornados, and extreme high and low temperatures.[51] Both high temperatures and extreme weather will require us to make significant changes to preserve the reliability of the electricity grid.

As this Note was being drafted, customers in large swaths of the San Francisco Bay Area and Southern California had no electric power because utilities were prophylactically shutting down distribution lines in high-wind areas to prevent forest fires. In Northern California alone, about 2.5 million people lost power over the weekend of October 26, 2019 due to these "mandatory blackouts."[52] More than 180,000 people in Sonoma County, north of San Francisco, had to evacuate in the same time period due to the Kincade fire; in Southern California, 10,000 homes and businesses in the Los Angeles area were under mandatory evacuation due to the Tick and Getty fires.[53]

It is almost certain that warmer temperatures, high winds, and drought caused by climate change are responsible for the environmental conditions

48. Graham Readfearn, *Climate Emissions from Tropical Forest Damage Underestimated by a Factor of Six'*, THE GUARDIAN (Oct. 30, 2019, 22:32), https:// www.theguardian.com/environment/2019/oct/31/climate-emissions-from-tropical-forest-damage-underestimated-by-a-factor-of-six?CMP=twt_a-environment_b-gdneco; *see also* Roland Hughes, *Amazon Fires What's the Latest in Brazil?*, BBC (Oct. 12, 2019), https:// www.bbc.com/ news/ world-latin-america-49971563.

49. *See* ALLEN, *supra* note 36, at 14.

50. *See Each Country's Share of CO2 Emissions*, UNION OF CONCERNED SCIENTISTS (July 16, 2008), https://www.ucsusa.org/resources/each-countrys-share-co2-emissions.

51. *See* ALLEN, *supra* note 36, at 7.

52. Ian Lovett et al., *California Fires Tens of Thousands Flee Los Angeles Blaze*, WALL ST. J. (Oct. 28, 2019, 8:09 PM), https://www.wsj.com/articles/fire-breaks-out-in-los-angeles-forcing-thousands-to-flee-11572271757.

53. *Id.*

making these and other recent large western fires possible.[54] However, the proximate cause of many of recent wildfires in California has been utility infrastructure failure. The California Department of Forestry and Fire Protection concluded that the deadly Camp Fire, which burned 153,336 acres and killed eighty-five people, was caused by Pacific Gas & Electric Co. (PG&E) transmission lines.[55] In October 2019, PG&E stated in a federal court filing that its equipment likely caused ten wildfires in California that year.[56] Furthermore, PG&E equipment is estimated to have started about 1,500 fires in total in the past three years.[57] Such incidents will likely continue as summers in some locations become drier and hotter due to climate change, unless significant updates are made to the electricity grid.

Higher temperatures also increase the risk of outages and wildfires from transmission lines. As temperatures rise, high voltage lines, in particular, expand and sag, decreasing the distance between multiple lines on the same poles.[58] Decreased distance can, and does, lead to electricity arcing between lines, which can ignite nearby brush and undergrowth—even if the utility has been following vegetation trimming requirements.[59] Climate change will increase the incidence of other extreme weather events that will challenge the electricity grid throughout the United States, such as flooding, tornados, hurricanes, and cyclones.[60]

Furthermore, higher temperatures make for less efficient grids, which means that climate change will require the United States to generate even more electricity than previously generated. In normal conditions, about 6 percent of electricity is lost in long-distance transmission.[61] Increased air temperatures lead to higher rates of energy loss along high-voltage transmission lines,[62] reducing overall transmission capacity even more and requiring a commensurate increase

54. *See Extreme Weather and Climate Change*, CTR. FOR CLIMATE AND ENERGY SOLUTIONS, https://www.c2es.org/content/extreme-weather-and-climate-change/ (last visited Dec. 13, 2019).

55. Adi Robertson, *Investigators Confirm that PG&E Power Lines Started the Deadly Camp Fire*, VERGE (May 15, 2019, 6:16 PM), https://www.theverge.com/2019/5/15/18626819/cal-fire-pacific-gas-and-electric-camp-fire-power-lines-cause.

56. Alejandra Reyes-Velarde, *PG&E Admits Its Equipment May Have Sparked Several Fires this Year*, L.A. TIMES (Oct. 10, 2019, 1:57 PM), https://www.latimes.com/california/story/2019-10-10/pge-admits-equipment-may-have-sparked-several-fires-this-year.

57. Russell Gold et al., *PG&E Sparked at Least 1,500 California Fires. Now the Utility Faces Collapse*, WALL ST. J. (Jan. 13, 2019, 3:19 PM), https://www.wsj.com/articles/pg-e-sparked-at-least-1-500-california-fires-now-the-utility-faces-collapse-11547410768.

58. Interview with Afnajjer Hernandez, MBA 2020, University of California, Berkeley Haas School of Business, in Berkeley, Cal. (Oct. 29, 2019).

59. *Id.*

60. *See Extreme Weather and Climate Change*, *supra* note 54.

61. Jordan Wirfs-Brock, *Lost in Transmission How Much Electricity Disappears between a Power Plant and Your Plug?*, INSIDE ENERGY (Nov. 6, 2015), http://insideenergy.org/2015/11/06/lost-in-transmission-how-much-electricity-disappears-between-a-power-plant-and-your-plug; Jacques Schonek, *How Big Are Power Line Losses?*, SCHNEIDER ELEC. (Mar. 25, 2013), https://blog.se.com/energy-management-energy-efficiency/2013/03/25/how-big-are-power-line-losses.

62. Matthew Bartos et al., *Impacts of Rising Air Temperatures on Electric Transmission Ampacity and Peak Electricity Load in the United States*, 11 ENV. RES. LETTERS, Nov. 2, 2016, at 6.

in energy generation. As temperatures rise, it is likely that average summertime transmission capacity will decrease by about 2 to 6 percent due to losses during transmission, while peak summertime demand will increase by about 4 to 15 percent due to increased need for indoor air conditioning.[63] Because temperatures will rise throughout the country, this effect will be felt across the United States.[64]

C. What We Should Do: Mitigation and Adaptation Strategies

As discussed above, the most straightforward and uncontested climate change mitigation strategy that applies to the electricity sector is to switch from generation that produces relatively high GHG emissions to generation that produces relatively low GHG emissions. This strategy generally means switching from fossil fuel generation to renewable generation. In this Subpart, I will discuss how that overall strategy fits into PURPA's focus on smaller, independent generators, and how smaller and more distributed infrastructure can help to adapt the grid to the effects of climate change.

An extremely promising climate change mitigation and adaptation strategy for the electricity grid is widespread adoption of distributed generation and storage,[65] combined with a finer sectioning of the grid to isolate power outages and diversions.[66] According to the United States Agency for International Development and the National Renewable Energy Laboratory in a joint report on distributed generation, "[r]enewable D[istributed] G[eneration] systems—particularly when paired with energy storage as islanded micro- or minigrids—can spatially diversify the power supply, reduce fuel dependency, allow for back-up energy supplies, decrease [and balance] central grid demand, and reduce [transmission and distribution] losses, all critical aspects to increasing climate

63. *Id.* at 1.

64. These projections are based on modeling 121 planning areas in the United States using downscaled global climate model projections, accounting for about 80 percent of current peak summertime load. *Id.*

65. The United States Agency for International Development and the National Renewable Energy Laboratory define distributed generation as "the production of electricity near its point of use." SADIE COX ET AL., NAT'L RENEWABLE ENERGY LAB., DISTRIBUTED GENERATION TO SUPPORT DEVELOPMENT-FOCUSED CLIMATE ACTION 2 (Sept. 2016). FERC Order 841, completely independently of PURPA, "instructs regional grid operators to open up wholesale markets to the participation of energy storage." This creates interesting jurisdictional issues, such as "'whether FERC or the state should have control over all things wholesale going on [i]n the distribution system[,] because a lot of storage is being connected to the distribution system—as opposed to the transmission system . . . . A large swathe' of distribution system companies and state commissions have 'filed for an appeal of Order 841 on jurisdictional grounds.'" *Open Season The Next Steps for Energy Storage*, 20 PV TECH POWER 21, 21–22 (2019) (quoting Attorney Jennifer L. Key, FERC practice with Steptoe & Johnson); *see also* Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, 83 Fed. Reg. 9580, 9583 (2018) (to be codified at 18 C.F.R. pt. 35) (in which FERC emphasizes the importance of distributed energy resources in a recent rule).

66. Jeff St. John, *PG&E Outlines Path to Easing Future Power Grid Outages*, GREENTECH MEDIA (Oct. 22, 2019), https://www.greentechmedia.com/articles/read/pge-points-to-grid-sectionalization-forecasting-and-microgrids-to-ease-outa.

resilience."[67] For example, in the United Kingdom, 6 MW of distributed behind-the-meter storage installations acted in concert as virtual power plants to respond to a 2019 blackout affecting 1 million customers.[68] In Australia, a 50,000-customer virtual power plant helped to maintain grid stability when a coal plant unexpectedly went offline and reduced supply by 748 MW.[69] In California, PG&E was able to restore power to 77,000 customers during the fall 2019 blackouts even while continuing prophylactic shutoffs, by reconfiguring grid circuits in real time.[70] Furthermore, as of October 2019, PG&E planned to install about 550 more "sectionalizing devices" in 2020.[71] For customers within a grid section that cannot be saved from the effects of line de-powering, PG&E argues that "there is the potential to institute a microgrid solution."[72] So far, PG&E has restricted microgrid generators to climate resilience pilot projects[73] but is looking to expand, to improve resilience more broadly.[74] Also in California, three community choice aggregators serving Alameda, San Mateo, and Santa Clara counties, along with the Santa Clara municipal electric utility, announced a joint solicitation in November 2019 for 30 MW of local, distributed storage combined with new or existing solar generation, to be installed behind the meter in homes and businesses.[75] The agencies intend these new local storage and generation resources to provide backup power in the case of future power shutoffs, "lower[]

67. COX ET AL., *supra* note 65, at 13.

68. *Open Season The Next Steps for Energy Storage*, *supra* note 65, at 23, 114. Behind-the-meter energy storage is storage that is not "on the grid" but instead is associated with a single energy consumer. For instance, a home, apartment building, factory, or office building subject to time-of-use rates could have behind-the-meter storage that allows them to bank energy from their solar PV installations when use is low, and then use the stored energy, rather than grid energy, during times when use is high and prices are higher. *What Are Time-Of-Use Rates (And How Do They Impact Your Business)?*, AETERNA ENERGY (Oct. 28, 2019), https://www.aeternaenergy.com/solar-battery-storage-blog/what-are-time-of-use-rates-and-how-do-they-impact-your-business.

69. Robert Walton, *Tesla's Australian Virtual Power Plant Propped up Grid during Coal Outage*, UTIL. DIVE (Dec. 11, 2019), https://www.utilitydive.com/news/teslas-australian-virtual-power-plant-propped-up-grid-during-coal-outage/568812/.

70. St. John, *supra* note 66.

71. *Id.*

72. *Id.*; *see also* Scott Aaronson, *Microgrids Alone Cannot Eliminate Wildfire Risk*, UTIL. DIVE (Oct. 25, 2019), https://www.utilitydive.com/news/microgrids-alone-cannot-eliminate-wildfire-risk/565838/ (arguing that although microgrids can provide reliability, they should not be disconnected from the grid due to cost, efficiency, and ramping concerns). The United States Agency for International Development and the National Renewable Energy Laboratory define a microgrid as "[distributed generation] and interconnected loads within a clearly defined electrical boundary that acts as a single controllable entity with respect to the grid. Microgrids can either be connected to the grid or apart from it." COX ET AL., *supra* note 65, at 2.

73. *See* Julian Spector, *Will PG&E's Blackouts Catalyze California's Microgrid Market?*, GREENTECH MEDIA (Nov. 12, 2019), https://www.greentechmedia.com/articles/read/will-pges-power-blackouts-catalyze-californias-microgrids-market.

74. *See* Jeff St. John, *Bay Area CCAs Solicit 30 MW of Distributed Batteries to Weather Grid Outages*, GREENTECH MEDIA (Nov. 5, 2019), https://www.greentechmedia.com/articles/read/bay-area-cca-solicit-30mw-of-distributed-batteries-to-weather-grid-outages.

75. Larry Pearl, *Bay Area Energy Agencies Launch Distributed Storage Solicitation amid PG&E Power Shutoffs*, UTIL. DIVE (Nov. 5, 2019), https://www.utilitydive.com/news/bay-area-energy-agencies-launch-storage-solicitation-amid-pge-power-shutof/566665/.

energy bills, increas[e] grid reliability and serv[e] the grid at large."[76] These reliability benefits, although explicitly aimed at mitigating harm from intentional power shut-offs, would accrue equally in cases of transmission or distribution system failure.

Energy storage not only provides benefits when installed behind the meter or in microgrid-level systems, but it can also be used to replace fossil-fuel baseload and capacity resources to help level out system load. For instance, in August 2019, Hawaii issued a bid for proposals for a total of 900 MW of dispatchable generation and storage to replace a coal plant on Oahu and an oil plant on Maui, including traditional and demand-side demand response and lower-capacity (thirty minute and four hour) batteries.[77] The closer such generation and storage resources are sited to the loads they serve, the more resiliency benefits they will add to the grid.[78] Distribution of our energy resources will be a key tool in planning a climate resilient grid.

D. Moving Forward with PURPA

When PURPA was enacted, the vertically integrated, monopolistic utilities that generated and supplied electricity lacked incentives to develop new renewable infrastructure: They had already sunk huge sums into fossil fuel plants and their attendant technologies, were generating sufficient power, and were reliably recouping that investment in rates.[79] On the other hand, the risks and benefits associated with developing renewable power generation—still a relative novelty in the 1970s—were unknown, and costs were significant. These same concerns around unknown risks and benefits may have given state public utility regulators pause with respect to renewable generation because ultimately the cost of those unknown risks would fall on ratepayers. It made sense, therefore, to conceive of PURPA as helping entrepreneurial third-party developers to enter the power market.

It would be a mistake, though, to think of the scope of the legislative intent behind PURPA as restricted to providing market access to renewable generators that otherwise could not compete at all. Although the mechanisms in PURPA are framed in terms of ways to provide market entry for small renewable generators, this framing is merely the means that Congress selected to achieve PURPA's ultimate end goal of minimizing threats to national security arising from our electricity supply.[80] As discussed in this Part, climate change is one of the largest current threats to a reliable electric energy supply in the United States. The policy goals of PURPA—to increase penetration of renewables in the U.S. generation

76. *Id.*; St. John, *supra* note 74.

77. Jeff St. John, *Hawaiian Electric Seeks Bids for 900MW of Dispatchable Renewables' and Storage*, GREENTECH MEDIA (Aug. 23, 2019), https://www.greentechmedia.com/articles/read/hawaiian-electric-seeks-bids-for-900mw-of-dispatchable-renewables-storage-a.

78. *See* COX ET AL., *supra* note 65, at 13–17.

79. *See* TUTTLE ET AL., *supra* note 14, at 7.

80. *See* 16 U.S.C. § 2601 (2018); *see also* Carter, *supra* note 21; *supra* Part I.

market and improve the reliability of our electricity supply—are therefore still very relevant today.

III. PURPA IS BOTH TOO RIGID AND TOO FLEXIBLE AS CURRENTLY IMPLEMENTED

PURPA's success in incentivizing new QF power generation has varied widely state by state, depending largely on the avoided cost rates, PPA length, and capacity limits set by each state's utility commission. States that set more favorable policies saw more QF development, while states that set low avoided cost rates have seen very little renewable development through PURPA.[81] While there are certainly plausible reasons for different pricing and contract outcomes in different states—not least of which is that different states have different energy resources and costs of generation—this legitimate variation likely does not fully account for the pricing disparity between states. Instead, states that were enthusiastic about renewables ended up implementing PURPA in ways that would support investment in renewable generation and states that were entrenched in older technologies or with more entrenched electric utilities did not.[82]

A. PURPA Allows States to Disincentivize QF Development

State utility commissions currently have significant discretion under PURPA. Commissions can determine avoided cost rates themselves or accept utility determinations of avoided cost, and they can set the duration of standard PPAs provided under PURPA.[83] States with below-average PURPA penetration generally often offer less attractive terms on the standard contracts required by PURPA, lower capacity thresholds on those contracts, and most commonly, avoided cost rates that are too low to support QF development.[84] This combination leads to fewer QF-type projects being developed and is a common pattern in states with low PURPA penetration.[85]

In Florida, for example, there are ample solar resources but relatively little solar capacity in part because "[n]one of the utilities has an incentive to offer prices to QFs that will permit the financing of independent solar power."[86] At least part of the fault for Florida utilities' "lack of incentive" lies with the Florida

81. Robert Mudge et al., *New Technologies and Old Issues under PURPA*, PROJECT FIN. NEWSWIRE (Feb. 20, 2018), https://www.projectfinance.law/publications/new-technologies-and-old-issues-under-purpa; Manussawee Sukunta, *North Carolina Has More PURPA-Qualifying Solar Facilities than Any Other State*, U.S. ENERGY INFORMATION ADMIN. (Aug. 23, 2016), https://www.eia.gov/todayinenergy/detail.php?id=27632.

82. *See* Mudge et al., *supra* note 81; Sukunta, *supra* note 81.

83. Robert Shapiro, *PURPA and Solar*, PROJECT FIN. NEWSWIRE (Apr. 6, 2017), https://www.projectfinance.law/publications/purpa-and-solar; *see generally* 16 U.S.C. §§ 824, 2601 (2018).

84. Shapiro, *supra* note 83; Mudge et al., *supra* note 81.

85. Shapiro, *supra* note 83.

86. *Id.*

Public Service Commission, which has approved utility-determined avoided cost rates that are too low to support QF development.[87] Likewise, in North Carolina (which does have significant PURPA development overall),[88] Wake Electric (one of the state's utilities) set an avoided cost rate effective in 2014 for solar power that was *below* the utility's average wholesale power cost.[89] And Arizona, although it has excellent solar resources which should be able to support a significant amount of profitable solar generation, has some of the lowest levels of PURPA development in the country.[90] This is largely because, since 1981, the state has allowed utilities to set avoided cost rates below what would be necessary to generate profit for a QF, as well as not requiring any minimum power purchase contract length.[91]

Each of these examples shows how states are gaming PURPA's cooperative federalist framework to ensure low QF development. PURPA only works to incentivize the development of small renewable generators if states set rates and contract terms that make QF development economically feasible.[92] By following the letter of the law but providing unattractive (and often below-market) terms to QFs, these states have effectively undermined the goals of PURPA and effectively boxed QFs out of the wholesale power market that PURPA was designed to open.

B. PURPA Punishes States that Have Robust Renewables Programs

On the other hand, "good actor" states[93] with robust state-level renewables programs are being punished by PURPA. As 1) the dangers of climate change have become more salient; 2) renewable generation has become technologically and economically competitive with fossil fuels; and 3) the United States has continued to fail to pass a general clean energy statute, states have developed and implemented alternative policy frameworks for incentivizing renewable

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87. *Id.*

88. Sukunta, *supra* note 81.

89. "*Avoided Cost" Value of Solar*, WAKE ELECTRIC MEMBERSHIP CORP. (Feb. 2014), https://wemc.com/avoided-cost-value-of-solar/.

90. Sukunta, *supra* note 81.

91. David Wichner, *Arizona Regulators Look to Revamp Rules Requiring Utilities to Buy Renewable Power*, TUCSON.COM (Apr. 20, 2019), https://tucson.com/business/arizona-regulators-look-to-revamp-rules-requiring-utilities-to-buy/article_d914f58e-14b4-536f-82aa-44cd04c35aac.html. However, Arizona has recently changed its approach to PURPA, approving more attractive avoided cost rates and a standard purchase contract of eighteen years at the end of 2019. *See* Kavya Balaraman, *Arizona Rejects APS Push for 2-year PURPA Contracts, Approving 18-Year Terms*, UTIL. DIVE (Dec. 13, 2019), https://www.utilitydive.com/news/arizona-approves-18-year-term-purpa-contracts-solar-aps-renewables-competition/569036/; John Weaver, *Arizona Regulators Mock Utility, Set Solar Power Standard Contract at 18 Years Long – Is a PURPA Solar Boom Coming?*, PV MAG. (Dec. 16, 2019), https://pv-magazine-usa.com/2019/12/16/arizona-regulators-mock-utility-increase-solar-power-contract-lengths/.

92. *See* Shapiro, *supra* note 83.

93. By "good actor" states, I refer to states that have set PURPA avoided cost rates and contract terms in a way that makes QF development financially feasible and attractive and/or have developed their own robust and successful programs to incentivize significant renewable power generation development.

generators of all sizes.[94] The most prevalent, and arguably most successful, of these frameworks is the renewable portfolio standard (RPS).[95] However, as witnessed in California's case below, RPS programs and other state-level initiatives can run into problems with PURPA compliance, often in unexpected ways. In other words, these conflicts with PURPA hold these "good actor" states back from building on their successes to hasten the transition towards clean energy.

California's current situation illustrates this tension. The California Public Utilities Commission (CPUC) recently lost a PURPA-based challenge in the Ninth Circuit to its RPS program in *CARE v. CPUC*, undermining California's method for setting avoided cost rates for QFs between 3 and 20 MW.[96] This case came on the heels of a prior Ninth Circuit decision, *Winding Creek*, which effectively gutted another of California's PURPA programs.[97] Both of these cases involve alleged tensions between PURPA's requirements with respect to how states must regulate QF power purchases and California's efforts to effectively implement its very successful RPS program. The Ninth Circuit resolved the tensions in both cases by invalidating parts of California's state energy policy.

In 2002, California's legislature instituted an RPS program mandating that 20 percent of electricity retail sales by California electricity providers—including utilities, independent electric service providers (ESPs), and community choice aggregators —be generated from renewable resources, such as solar and wind power, by 2017.[98] The RPS renewables goal was accelerated in 2015 to 50 percent renewable power by 2030, and in 2018, Senate Bill 100 increased the RPS goal to 60 percent renewables by 2030 and 100 percent carbon neutral electricity in California by 2045.[99]

California's RPS program works by requiring every retail electricity provider to purchase and retire from the market a certain number of renewable energy credits (RECs) by the end of each enforcement period, usually three years, calculated as the proportion of the total electric load they serve that meets the goals of that enforcement period.[100] Typically RECs are purchased as a "bundle" with renewable energy, but they can be purchased separately if a

94. *See* Mudge et al., *supra* note 81.

95. *See id.*

96. *See* Californians for Renewable Energy v. Cal. Pub. Utils. Comm'n, 922 F.3d 929, 932 (9th Cir. 2019), *cert. denied*, 140 S. Ct. 2645 (2020).

97. *See* Winding Creek Solar LLC v. Peevey, 293 F. Supp. 3d 980 (N.D. Cal. 2017).

98. CAL. PUB. UTIL. CODE §§ 399.11–33 (West, Westlaw through Ch. 37 of 2020 Reg. Sess.) (establishing California's RPS).

99. *Renewables Portfolio Standard (RPS) Program*, CAL. PUB. UTILS. COMM'N, https://www.cpuc.ca.gov/rps/ (last visited Dec. 14, 2019); *see also* S.B. 350, 2015–16 Reg. Sess. (Cal. 2015); S.B. 100, 2017–18 Reg. Sess. (Cal. 2018).

100. *50% RPS Procurement Rules*, CAL. PUB. UTILS. COMM'N, https://www.cpuc.ca.gov/RPS_Procurement_Rules_50/ (last visited Dec. 14, 2019). Though note that per Cal. Pub. Util. Code § 399.21(c), QF power does not generate or get accorded RECs—it is merely accounted for in the RPS program as if it does.

renewable generator has additional RECs to sell—which could happen if, for example, the generator had previously sold power out of state to a purchaser that does not participate in the California RPS.[101] On the generator side, renewable generators are allotted RECs to sell, either in conjunction with power purchases or separately.[102]

State RPS programs like California's have been extremely effective in incentivizing the rapid deployment of renewable generation.[103] California leaped to implement PURPA through the 1980s and '90s with significant success.[104] Since 2010, when it finalized PURPA rule revisions brought on by an earlier spate of lawsuits, California has implemented PURPA through three distinct procurement programs differentiated by the size of QF eligible to participate in each program and the contract and pricing options available.[105] Utilities were also encouraged to satisfy their RPS requirements to acquire RECs through renewable power purchases in these programs; therefore, the pricing and contract options in these programs were tailored to fit with California's overall electricity and renewables policies.[106]

Californians for Renewable Energy (CARE), a non-profit organization that advocates for clean energy policy and environmental protection in California,[107] sued the CPUC in *Solutions for Utilities v. CPUC* on the basis that these procurement programs violated PURPA by setting an illegitimate avoided cost rate, not compensating certain QFs for the value of their capacity, and imposing illegal restrictions on the standard purchase contracts, among other claims.[108] The avoided cost rates at issue involved market-based rates that were not derived specifically from market prices for *renewable* energy.[109] CARE argued that because avoided cost pricing under PURPA must be based on alternative power purchase options, the price of non-renewable power should not be used to calculate avoided cost when utilities are purchasing renewable power to satisfy

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101. *Id.*
102. *Id.*
103. *See* Mudge et al., *supra* note 81.
104. *See* Decision Adopting Proposed Settlement, CAL. PUB. UTILS. COMM'N, D.10-12-035 5 (Dec. 16, 2010).
105. *See id.*
106. *See Renewable Auction Mechanism*, CAL. PUB. UTILS. COMM'N, https://www.cpuc.ca.gov/Renewable_Auction_Mechanism (last visited Dec. 14, 2019); *Renewable Feed-In Tariff (FIT) Program*, CAL. PUB. UTILS. COMM'N, https://www.cpuc.ca.gov/RPS_Feed-In_Tariff/ (last visited Dec. 14, 2019); *Net Energy Metering (NEM)*, CAL. PUB. UTILS. COMM'N, https://www.cpuc.ca.gov/General.aspx?id=3800 (last updated June 29, 2020).
107. *Articles of Incorporation of Californians for Renewable Energy*, CALIFORNIANS FOR RENEWABLE ENERGY, http://www.calfree.com/index4.html (last visited August 23, 2019); *see* Decision Adopting Proposed Settlement, *supra* note 104, at 11 (describing CARE's dissatisfaction with the QF Settlement substance and process).
108. Sols. for Utils., Inc. v. Cal. Pub. Utils. Comm'n, 2016 U.S. Dist. LEXIS 179984, at *22 (C.D. Cal. 2016).
109. Californians for Renewable Energy v. Cal. Pub. Utils. Comm'n, 922 F.3d 929, 933–34 (9th Cir. 2019), *cert. denied*, 140 S. Ct. 2645 (2020).

their RPS requirements.[110] Instead, the price of renewable power purchased from QFs must be calculated using only other renewable power alternatives in order to reflect the true avoided cost under PURPA, called "multi-tiered" pricing.[111] Prior to *CARE v. CPUC*, FERC had held that states were permitted, but not required, to use multi-tiered pricing.[112]

The trial court awarded summary judgment to the CPUC on all claims, and CARE appealed in *CARE v. CPUC*.[113] On appeal, the Ninth Circuit considered whether the pricing programs created by the QF settlement violate PURPA when they are used to satisfy the utilities' RPS procurement obligations, among other issues.[114]

The Ninth Circuit held that, contrary to California's practice, PURPA *requires* states to use multi-tiered pricing for PURPA transactions that are part of an RPS-type program,[115] because when a utility purchases RPS-eligible energy from a QF to fulfill its RPS requirement it avoids a purchase of alternative RPS-eligible energy *specifically*.[116] Therefore, PURPA prohibits the calculation of avoided costs for power purchases that fulfill RPS requirements based on market rates for energy that is not RPS-eligible.[117]

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110. *Id.* at 936.

111. Appellants' Opening Brief at 16, Californians for Renewable Energy v. Cal. Pub. Utils. Comm'n, 922 F.3d 929, 932 (9th Cir. 2019), *cert. denied*, 140 S. Ct. 2645 (2020) (No. 17-55297); *Californians for Renewable Energy*, 922 F.3d at 936–38, 940; *see also Renewable Auction Mechanism*, CAL. PUB. UTILS. COMM'N, https://www.cpuc.ca.gov/Renewable_Auction_Mechanism/ (last visited August 16, 2019). But note that procurement under the Feed-In Tariff Program has been suspended pursuant to a finding of preemption under PURPA in *Winding Creek Solar LLC v. Peevey*, 293 F. Supp. 3d 980, 994 (N.D. Cal. 2017).

112. Order Granting Clarification and Dismissing Rehearing, Cal. Pub. Utils. Comm'n, 133 F.E.R.C. 61,059, 61,265 (Oct. 21, 2010); *see also Sols. for Utils., Inc.*, 2016 U.S. Dist. LEXIS 179984, at *41; 18 C.F.R. § 292.304(c)(3)(ii) (2019) (in which FERC specifies that states can "differentiate among qualifying facilities using various technologies on the basis of the supply characteristics of the different technologies").

113. *See Californians for Renewable Energy*, 922 F.3d at 935.

114. The court considered several other significant issues, such as whether 1) the pricing schemes in the QF Settlement procurement programs fail to account for full avoided cost because they do not adequately consider capacity costs and 2) the net energy metering program for rooftop solar QFs (under 1 MW) violates PURPA's mandatory interconnection requirement because customers are automatically enrolled in the program and are charged interconnection fees. I will focus on only one here as an example. *See id.* at 938–39, 940; *see also* Appellants' Opening Brief, *supra* note 111, at 18.

115. The appellate court cited language in a 2010 FERC order in which the CPUC asked FERC to clarify whether it could offer special pricing to combined heat and power facilities consistently with PURPA, holding that when a state has an RPS program, a non-RPS-eligible generator does not count as "'able to sell' to that utility for the specified renewable resources segment of the utility's energy needs, and thus would not be relevant to determining avoided costs for that segment of the utility's energy needs." Order Granting Clarification and Dismissing Rehearing, Cal. Pub. Utils. Comm'n, 133 F.E.R.C. 61,059, 61,267 (Oct. 21, 2010); *Californians for Renewable Energy*, 922 F.3d at 937. The 2010 order goes on to specify that RPS-eligible generators "constitute the sources that are relevant to the determination of the utility's avoided cost for [an RPS] procurement requirement." *Id.* The appellate court remanded this issue back to the district court to determine whether any of the utility power purchases from renewable QFs with disputed pricing were in fact used to fulfill the utility's RPS requirements.

116. *Californians for Renewable Energy*, 922 F.3d at 937–38.

117. *Id.*

This outcome has thrown California's implementation of its RPS program into disarray. Although it is plausible that the Ninth Circuit's holding in *CARE v. CPUC* is consistent with the plain language of PURPA and its implementing FERC regulations,[118] it also typifies the problems that "good actor" states face when trying to incentivize renewable generation. In this case, the court has made it impossible for California to successfully implement a QF procurement program that serves the needs of both PURPA and the RPS, because any QF power sold to the utility under the aegis of PURPA, which the utility also uses to satisfy RPS requirements, will likely fetch a lower price than power sold through a power market. This is because renewable power prices are going down relative to fossil fuel power prices,[119] and therefore renewable power sold in competition with fossil fuels is likely to sell for more than renewable power sold at a price that is benchmarked against only other renewable power. In order to avoid these artificially low prices, QFs would rationally either 1) sell outside of the PURPA framework or 2) sell outside of the RPS framework. Either result is counterproductive to the goals of PURPA: the first outcome reduces the extent to which QFs can benefit from PURPA, and the second reduces the effectiveness of California's RPS.

C. A Frustrated Purpose

The purpose of PURPA—improving national security through developing domestic, sustainable power sources and a reliable electricity grid[120]—has been frustrated on both ends. States that would rather not comply have taken advantage of the statute's flexibility to effectively opt-out of renewable development through PURPA. Conversely, states that are committed to renewable generation beyond the floor set by PURPA—both in size of generation and degree of intervention—have been stymied by PURPA's limits on QF avoided-cost pricing and PPA requirements. It is clear that PURPA needs to be reworked and reinterpreted to meet the challenges of the modern era.

118. PURPA defines the incremental cost to the electric utility of alternative electric energy as "the cost to the electric utility of the electric energy which, but for the purchase from such cogenerator or qualifying small power producer, such utility would generate or purchase from another source." 16 U.S.C. § 824a-3(d) (2018). FERC's implementing regulations define "avoided cost" as "the incremental costs to an electric utility of electric energy or capacity or both which, but for the purchase from the qualifying facility or qualifying facilities, such utility would generate itself or purchase from another source," essentially repeating that language. Because state RPS programs are legal requirements placed on utilities to purchase minimum amounts of certain kinds of power, a utility that is purchasing renewable power from a QF in order to fulfill its RPS requirement only avoids the cost of other RPS-eligible power it could have purchased or generated instead. *See Californians for Renewable Energy*, 922 F.3d at 937–38.

119. U.S. ENERGY INFO. ADMIN., LEVELIZED COST AND LEVELIZED AVOIDED COST OF NEW GENERATION RESOURCES IN THE ANNUAL ENERGY OUTLOOK 2018 5–8 (Mar. 2018).

120. *See* 16 U.S.C. § 2601 (2018); *see also* Carter, *supra* note 21; *supra* Part I.

IV. PURPA CAN BE RELEVANT AND EFFECTIVE TODAY

As discussed above, the goal of PURPA is a broad one: to reduce reliability- and supply-based threats to U.S. national security arising from our electric energy supply.[121] PURPA serves that goal by giving third-party renewable generators and cogenerators certain rights and privileges in the power markets,[122] but it would be a mistake to think that, because relatively open wholesale power markets now exist in much of the United States, the ultimate purpose of PURPA has been achieved and it can be cast aside. Instead, we face a new, but related, risk: Our current fossil fuel energy supply is itself a threat to national security because generating energy from fossil fuels further contributes to climate change. Climate change will seriously impact the nation's food and water supplies and the survival of most of our coastal cities, and it poses serious challenges to our electricity supply, both in terms of the costs of the green energy transition itself and the climate adaptation-based changes we will need to make to our electricity system.[123]

Although the United States is the second-largest carbon emitter in the world, burning fossil fuels causes climate change, and climate change poses a significant risk to national security—not to mention the persistence of human life on this planet as we know it—as of 2018 only about 17 percent of the U.S. electricity supply was generated from renewable sources, with another 20 percent generated by nuclear reactors.[124] PURPA is the most substantial federal legislation that incentivizes renewable generation specifically, and its scope is limited to independent generation at small facilities.[125] Furthermore, there is no federal-level legislation that addresses or incentivizes climate adaptation.

Given all of this, we should give serious thought to how PURPA can be reinterpreted into an effective piece of national legislation, even if its current implementation is out of date. FERC's October 2019 NOPR,[126] although

121. *See* 16 U.S.C. § 2601 (2018); *see also* Carter, *supra* note 21; *supra* Part I.

122. Qualifying facilities under PURPA fall into two categories: small renewable generators, 16 U.S.C. § 796 (17), and gas-powered cogenerators, which produce both heat and electricity through the combustion of natural gas. 16 U.S.C. § 796(18). These cogenerators are more efficient than traditional gas combustion systems, which are only designed to produce *either* usable heat *or* electricity, and they are entitled to avail themselves of PURPA's mandatory purchase, contract, and price provisions, among others. However, cogenerators still produce significant GHG emissions—a problem that was not on the horizon in 1978 when PURPA was passed. Therefore, gas-powered cogeneration is not very interesting as a forward-looking technology with respect to mitigating and adapting to climate change, and I have not focused on it in this Note. For more information, *see PURPA Qualifying Facilities*, FED. ENERGY REG. COMM'N, https://www ferc.gov/qf (last visited Nov. 27, 2020).

123. *See supra* Subparts II.A–B.

124. *Electricity Explained Electricity in the United States*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/electricity/electricity-in-the-us.php (last visited Dec. 14, 2019).

125. Other federal support includes the wind and solar production and investment tax credits, which are currently set to expire in 2022. *See* 26 U.S.C. § 48 (2018).

126. *See generally* PURPA NOPR, 84 Fed. Reg. 53246 (proposed Oct. 4, 2019) (to be codified at 18 C.F.R. pts. 292, 375).

misguided, demonstrates that it is possible to depart from the current implementation. But, unlike FERC's proposals in the NOPR, this Note argues that we should reimagine PURPA implementation in a way that will shore up the reliability and supply weaknesses in the U.S. electricity system and adapt the grid to our new climate change reality.

In this Part, I first review the provisions and goals of PURPA. Then, I identify several desiderata for PURPA implementation going forward and briefly discuss why the 2018 NOPR gets PURPA reform wrong. Finally, I propose a few different regulatory changes that would go some way towards achieving those goals.

A. A Deeper Look at the Major Provisions of PURPA

Before I discuss the details of my proposals for changing FERC's implementation of PURPA, it is worth going deeper into the legislation's major relevant provisions and regulatory hooks. First, as mentioned previously, PURPA designates certain independent power producers as QFs, which are then able to avail themselves of PURPA privileges in the power market.[127] Originally, QFs were third-party renewable generators or efficient cogenerators under 80 MW in size.[128] However, utilities can now end their requirement to enter into new QF purchase contracts or obligations if FERC finds that a QF has nondiscriminatory access to certain categories of wholesale electric markets.[129] Rather than initiate hundreds of individual proceedings as utilities petitioned to be released from their must-purchase obligations, FERC implemented this provision by instituting a rebuttable presumption that QFs that are 20 MW or smaller lack non-discriminatory access to most organized wholesale markets, whereas larger facilities do not.[130]

127. *See* 16 U.S.C. § 824a-3 (2018).

128. *Id.*

129. *See* 16 U.S.C. § 824a-3(e) (2018). Section 824a-3(e)(1) requires FERC to determine a set of rules under which small power production facilities under 80 MW, *see* 16 U.S.C. § 796(17)(A) (2018), which would previously have been entitled to the protections and privileges of PURPA regarding market entry and competition, *see* 16 U.S.C. § 796(17)(C) (2018), are no longer so entitled, so long as "the Commission determines such exemption is necessary to encourage cogeneration and small power production." 16 U.S.C. § 824a-3(e)(1) (2018). PURPA was originally crafted to prevent market discrimination against small power producers. This provision is therefore effectively a requirement that FERC determine a new set of standards for whether a small power producer would need the protections of PURPA to avoid market discrimination or whether the protections might actually be hindering market entry. FERC's gloss on the provision in its Order 688 makes this explicit, as it characterizes the provision as providing "for termination of the requirement that an electric utility enter into a new contract or obligation to purchase electric energy [under PURPA] from . . . qualifying small power production facilities [] if [FERC] finds that the QF has nondiscriminatory access" to certain power markets. New PURPA Section 210(m) Regulations Applicable to Small Power Production and Cogeneration Facilities, 117 FERC 61,078, at ¶ 1 (Order No. 688), *order on reh'g* 119 FERC 61,305 (2007), *aff'd sub nom.* Am. Forest & Paper Ass'n v. F.E.R.C., 550 F.3d 1179 (D.C. Cir. 2008).

130. Such wholesale markets include those run by the regional transmission operators and independent system operators, such as the California Independent System Operator, PJM Interconnection LLC, or the Midcontinent Independent System Operator. *See* New PURPA Section 210(m) Regulations

Second, PURPA designates two significant rights to QFs that are relevant here: 1) the right to sell power to utilities as-available and/or by long-term contract, at the QF's discretion,[131] and 2) the right to sell power at a particular rate, the "[i]ncremental cost of alternative electric energy," which is "the cost to the electric utility of the electric energy which, but for the purchase from such cogenerator or small power producer, such utility would generate or purchase from another source."[132] The only statutory boundaries on avoided cost rates other than that bare directive are that they must be "just and reasonable to the electric consumers of the electric utility and in the public interest," "shall not discriminate against qualifying cogenerators or qualifying small power producers," and that FERC may not prescribe a rule that requires utilities to pay more than this incremental cost.[133]

One thing to note here is that the statute says "cost," not "price" or "payment," which suggests that costs in addition to price could be taken into account in determining the avoided cost rate.

Finally, PURPA specifically requires FERC to

> [P]rescribe, and from time to time thereafter revise, such rules as it determines necessary to encourage cogeneration and small power production . . . which rules require electric utilities to offer to –
>
> (1) sell electric energy to qualifying cogeneration facilities and qualifying small power production facilities and
>
> (2) purchase electric energy from such facilities.[134]

All in all, Congress granted FERC quite broad discretion in implementing the requirements of PURPA, giving FERC leeway to make PURPA a relevant and effective statute that plays a significant role in the U.S. effort to transition to a cleaner and more reliable electricity system in our climate-altered future.

B. FERC Should Be Using PURPA for Climate Mitigation and Adaptation

Given the problems posed by how PURPA is currently implemented, and the new climate-related challenges that the U.S. electricity system will face, a revised implementation of PURPA should differentiate between states with robust renewables programs and those that are skirting their duty, and follow up that differentiation with different treatment. While this is counter to the more

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Applicable to Small Power Production and Cogeneration Facilities, 117 FERC 61,078, at ¶ 9-12 (Order No. 688), *order on reh'g* 119 FERC 61,305 (2007), *aff'd sub nom.* Am. Forest & Paper Ass'n v. F.E.R.C., 550 F.3d 1179 (D.C. Cir. 2008).

131. 16 U.S.C. § 824a-3(a) (2018); PURPA also specifies other important rights, such as the right for QFs to be interconnected to the grid and the right to get QF power wheeled over utility transmission lines, that are not as critical to this discussion. *See id.* §§ 824i–824j.

132. *Id.* § 824a-3(d).

133. *Id.*

134. *Id.* § 824a-3(a).

"hands-off" approach that FERC has historically taken, a worthwhile PURPA implementation should have the following features:

> 1: Distinguish between good- and bad-actor states: PURPA implementation should have mechanisms for determining whether a state is a good actor or bad actor with respect to renewable generation. A good actor is a state, like California, that is implementing the provisions of PURPA in good faith in order to incentivize renewable generation, has its own successful state-level renewable energy policies, or both.[135] A bad actor is a state, like Florida, that has not achieved any significant level of QF, or other renewable, generation or procurement, as a result of making the PURPA process too onerous or financially infeasible, or otherwise making the state energy sector hard to enter for renewable generation.[136]
>
> 2: Provide flexibility for states that already have robust renewables programs: The purpose of PURPA is ill-served by blocking independent state programs that successfully incentivize renewable generation and grid climate adaptation. A useful implementation of PURPA should have a mechanism to allow good actor states to less rigidly implement the requirements of PURPA when they conflict with successful state-level programs. This way, a state with a strong renewables program can continue to build on its progress without being subject to litigation, as California was in *CARE v. CPUC*.[137]
>
> 3: Provide for more stringent control, or stronger incentives, for states that are lagging behind on implementation: States that game the system to avoid QF development also thwart the purpose of PURPA. Climate change mitigation and adaptation is a national issue—both in the sense that GHG emissions cross state and national boundaries and in the sense that electric system reliability is of national concern[138]—and any energy policy like PURPA must be implemented by all states to some degree for it to be effective. Thus, a useful implementation of PURPA should have controls or incentives in place to motivate states that are not achieving some threshold of renewable development or procurement. Otherwise, states with low levels of renewables will continue to lag behind, like Florida.[139]
>
> 4: For all states, provide regulatory incentives for renewable and distributed generation and distributed storage: PURPA is designed specifically to support third-party, smaller renewable generators,[140] and this support should be preserved and expanded in any future implementation of PURPA. In addition, as discussed above in Part II, one of the most promising

135. *See supra* Subpart III.A.

136. *See supra* Subpart III.B. There may also be states that would be amenable towards better implementing PURPA or incentivizing renewables but that possess limited renewable resources (such as solar) and so would have a relatively high cost of renewable generation. Although these states may not be "bad actors" in the sense of being blameworthy, in this framework they are "bad actor states" just insofar as they have failed to begin the transition to renewable energy that is required to avert climate catastrophe.

137. *See generally* Californians for Renewable Energy v. Cal. Pub. Utils. Comm'n, 922 F.3d 929, 933–34 (9th Cir. 2019), *cert. denied*, 140 S. Ct. 2645 (2020).

138. *See e.g.* 16 U.S.C. § 2601 (2018).

139. *See supra* Subpart III.B.; *see* Mudge et al., *supra* note 81; Shapiro, *supra* note 83.

140. *See generally* 16 U.S.C. § 824a-3 (2018).

applications of small-scale renewable generation is distributed generation and storage, due to its potential for improving grid reliability and resiliency and contributing to the transition to renewable resources.

FERC's proposed changes to PURPA implementation do not achieve these goals. The NOPR delegates even more discretion to states with respect to pricing for QF power and the terms of long-term PPAs for QFs, without regard to present or past performance.[141] It radically lowers the threshold for the size of generator that is presumed to lack non-discriminatory access to the wholesale market (and therefore qualifies as a QF) from 20 MW to 1 MW, reducing the scope of PURPA's application drastically.[142] The NOPR also reduces the must-buy obligations of utilities in cases where retail customers may choose to purchase power from a third party, such as a community choice aggregator, which may significantly reduce the applicability of PURPA in states like California with robust consumer choice programs.[143]

These changes will give states, including good actors like California, New York, and Massachusetts, more freedom to pursue their renewables programs because the NOPR requires less of states for PURPA compliance. However, it will allow bad actor states to even more effectively shirk their responsibility, for the same reason. Although there is value in respecting state autonomy in some cases, GHG emissions from each state affect every other state and every other nation.[144] For this reason, the NOPR's proposed rule changes are on precisely the wrong track.

In the rest of this Part, I lay out two ways that PURPA implementation could be changed, without modifying the legislation, to satisfy these goals: a traditional "command and control" scheme and a market-based—but progressive—mechanism. Both work, and my purpose in presenting both is to demonstrate that PURPA can be made into a relevant and effective piece of legislation no matter what one's prior preferences are with respect to regulatory style.

C. PURPA as Command-and-Control Regulation.

PURPA and its implementing regulations focus on process over results.[145] PURPA only requires that QFs have certain kinds of options and rights available to them, and gives FERC broad authority to implement those options.[146] FERC's implementing regulations more specifically outline these options and rights and

141. PURPA NOPR, *supra* note 1, at 53255.

142. *Id.* at 53248.

143. *Id.*; *see also* Jeff McMahon, *Community Choice Is Driving California's Precocious Energy Revolution*, FORBES (Aug. 2, 2018, 3:00 AM), https://www.forbes.com/sites/jeffmcmahon/2018/08/02/community-choice-is-driving-californias-precocious-energy-revolution/#584d306a7d82.

144. *See, e.g.*, *Improving Air Quality While Fighting Climate Change*, UNECE, https://www.unece.org/unece-and-the-sdgs/climate-change/sustainable-developmentclimate-changeunece-and-climate-change/improving-air-quality-while-fighting-climate-change.html (last visited Apr. 15, 2020).

145. *See generally* 16 U.S.C. § 824a-3 (2018); 18 C.F.R. § 292.304 (2019).

146. *See* 16 U.S.C. § 824a-3 (2018).

set relatively broad standards for when state implementation succeeds in complying with PURPA, such as that contracts must be available for long-term PPAs, prices must be set at avoided cost rates, and others.[147] However, FERC's current implementation of PURPA does not establish any kind of standard—even a defeasible one—for when the amount of QF electricity or capacity procured in a state suffices as a measure of the state having effectively implemented the statute.[148]

In contrast, PURPA should be reimagined more along the lines of the Clean Water Act and Clean Air Act. Both of those statutes are also broadly organized on a theory of cooperative federalism, in which a federal agency sets broad rules and standards, and the states implement them based on the state's knowledge of facts on the ground and the state's individual policy priorities.[149] However, when a state's air or water quality falls below certain standards, both statutes empower the federal government to step in and regulate more closely.[150] In effect, both of those statutes contain mechanisms for the relevant federal agency to "take back" the federal power that it delegated to the state if the state is not acting in substantial compliance with the statute.[151] PURPA lacks such a mechanism; this could be part of the reason that so many states have, effectively, failed to comply.

To directly confront this issue, FERC could revise their implementation of PURPA to:

1. *Set a (Defeasible) Floor for the Percentage of QF Penetration That Counts as Compliance with PURPA*

This Note does not go into details of how the threshold at which states are considered to have complied with PUPRA should be calculated; instead, I will make some broad suggestions that FERC should consider when setting that threshold. First, the compliance threshold should allow states time to adapt to the new system. This goal could be achieved with a schedule mandating a minuscule minimum QF penetration, to begin with, then ramping up over a period of years to a meaningful level of penetration, reflecting real-world QF development timelines. This timeline would give bad actor states fair notice and opportunity to comply before any consequences kick in. Second, a meaningful level of penetration does not mean maximum penetration; the United States likely does not need all of its energy resources to be distributed, or QF-sized, to reap the benefits of having distributed renewable energy and storage on the grid.[152] Instead, the goal level of penetration could be guided by looking at what good actor states have achieved, or at well-grounded models of how a particular state's

147. *See* 18 C.F.R. § 292.304 (2019).
148. *See generally id.*
149. *See* 42 U.S.C. §§ 7401–7671q (2010); 33 U.S.C. §§ 1251–1387 (2017).
150. *See generally* 42 U.S.C. §§ 7401–7671q; 33 U.S.C. §§ 1251–1387.
151. *See* 42 U.S.C. §§ 7410(c)(1), 7410(k), 7410(m), 7413, 7501–04; 33 U.S.C. § 1313.
152. *See* COX ET AL., *supra* note 65, at 12.

energy grid would respond to varying levels of distributed QF resources. Third, this new system should take the implications of membership in a multi-state independent system operator or regional transmission organization into consideration—including jurisdictional issues and resource adequacy programs. Fourth, FERC should consider what the average cost of power is in the state and the effect that might have on how attractive that power market might be to QF developers. For instance, a state that has a lower cost of electricity, in general, may have a harder time attracting QFs than a state with higher market rates.

2. Delegate More Power to States That are Meeting or Exceeding the Baseline Threshold for QF Power Procurement in the State:

Many of the changes in the NOPR, although they are counterproductive if universally applied, would be productive if applied only to good actor states. First, for good actor states, FERC could reduce or eliminate the QF must-buy requirement. This requirement makes utility procurement needs hard to predict because the utility does not know how much power it will in fact be purchasing from QFs, and therefore makes state-level resource planning and procurement programs more difficult to implement—including the programs that serve renewable and QF generators. Second, good actor states would likely benefit from more flexibility in setting QF PPA terms and avoided cost rates. If California, for example, had just a bit more freedom in setting avoided cost rates under PURPA, the outcome in *CARE v. CPUC* could have been avoided.[153] Third, these states could have more flexibility in determining whether a facility qualifies as a QF. For example, it is unlikely that virtual power plants aggregated from thousands of behind the meter solar + storage installations[154] count as QFs under current rules, even though they are renewable and provide valuable electricity and capacity to the grid. FERC could, of course, just designate such arrangements as QFs, but it may be more supportive of innovation to allow good actor states to incentivize promising local opportunities and technologies as they are developed.

3. Impose a More Stringent Command-and-Control Regime on States That Fail to Meet the Baseline Threshold for QF Power Procurement in the State

To more closely regulate states that fail to meet the compliance threshold, FERC could develop its own standard purchase contract forms and determine a

153. *See generally* Californians for Renewable Energy v. Cal. Pub. Utils. Comm'n, 922 F.3d 929, 933–34 (9th Cir. 2019), *cert. denied*, 140 S. Ct. 2645 (2020).

154. For example, home solar and storage vendors like SunRun use batteries installed in many customers' homes to provide demand response, capacity, voltage support, and other services. *See Sunrun Solar Plans & Services*, SUNRUN, https://www.sunrun.com/solar-plans-and-services (last visited Feb. 20, 2020); *Grid Services Planning for a Changing Future*, SUNRUN, https://www.sunrun.com/grid-services (last visited Feb. 20, 2020).

default avoided cost calculation that would be imposed if states failed to meet the threshold. Ideally, this default would lean in favor of QFs, giving states an incentive to craft policies that are specific and well suited to the energy market in their state. Alternatively, FERC could also take the contracting and procurement process for QFs out of the states' hands and manage it itself.

A framework that incorporates the above three features would reward states that are investing in renewable energy and encourage states that are not complying to catch up. While this system may seem burdensome to states that are not currently in compliance, climate change is a threat that will impact each and every state in the union, and the cost of dealing with the fallout is likely on a completely different scale than the cost of compliance with a re-tooled implementation of PURPA.[155]

D. A Progressive Market-Based Solution

There are also compelling reasons for avoiding a command-and-control-type approach to PURPA implementation, not the least of which is the fact that the energy sector has long been moving away from strong regulatory frameworks and in the direction of deregulation and market-based rates and interventions.[156] In this Subpart, I present and explain a set of market-based mechanisms that would achieve all of the desiderata for PURPA implementation outlined above, based on a modified definition and calculation method for avoided cost rates.

As part of this market-based approach, FERC would require states to set avoided cost rates as the sum of:

(1) the rate for power in either some baseline-setting fuel-agnostic actual market or based on an average of some collection of fuel-agnostic market prices in the relevant state or region;[157]

(2) an adder for the social cost of carbon ("social cost of carbon adder," hereinafter SCCA) calculated for each state based on the ratio of power procured in that state that is generated from fossil fuels (the more fossil fuel power, the greater the SCCA onto rates for QF power procured in that state);[158] and

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155. *See* Dana Nuccitelli, *Climate Change Could Cost the U.S. Economy Hundreds of Billions a Year by 2090*, YALE CLIMATE CONNECTIONS (Apr. 29, 2019), https://www.yaleclimateconnections.org/2019/04/climate-change-could-cost-u-s-economy-billions/.

156. *See generally* TUTTLE ET AL., *supra* note 14.

157. How to determine the actual market baseline rate for power is outside the scope of this Note, but California's approach, based on fuel-agnostic liquid hub pricing, is one example of an unproblematic way of determining market rate. *See generally* Californians for Renewable Energy v. Cal. Pub. Utils. Comm'n, 922 F.3d 929, 933–34 (9th Cir. 2019), *cert. denied*, 140 S. Ct. 2645 (2020).

158. Note that the SCCA is not tied to the percentage of *QF* power procured by a state, but to the percentage of *renewable* power. This is because the SCCA is accounting for the benefits of the renewable feature of QF power; the RA accounts for the reliability benefits of the size and siting features of QF power (such as being distributed). On a less pedantic level, this is also because one of the main benefits of PURPA is that it incentivizes *renewable* power, and if a state is doing well at siting lots of renewable generators it does not make sense to impose a high SCCA just to get more QFs in, if the *distributed resource* benefits of QFs are being accounted for by the RA anyway.

(3) an adder for reliability ("reliability adder," hereinafter RA) that would only apply to QFs that, because of their size and site, improve overall grid performance—and by this, I mean distributed resources.[159]

Each state would still be required to offer standardized long-term PPAs to QFs, but there would be no option to fix the purchase price at the time of contract. Instead, the price for QF power for those PPAs would be recalculated every enforcement period (such as every two years) based on the components of avoided cost: the current market rates for power, the current SCCA in that state or region, and the RA. The market rate would just be set by the market, and the RA would likely be determined on a project-by-project basis. The SCCA, on the other hand, would be progressively adjusted once every enforcement period, based on the current proportion of power procured in that state that was generated from fossil fuels. All of this would apply, to the extent allowed by PURPA, to capacity rates as well; thus, freestanding energy storage facilities could likely participate as well, as capacity suppliers.

Before diving into some of the technical and policy concerns that this proposal brings up, I would like to offer a few arguments in its favor. First, the social cost of carbon (SCC) framework and calculation has already been developed by the federal government, and FERC has laid the groundwork for using it in other contexts.[160] The Obama administration had already developed a framework for calculating the SCC to allow federal agencies to consider downstream and externalized costs of GHG emissions in their decisions.[161] In broad strokes, this calculation uses three models of climate change damage—the FUND, DICE, and PAGE models—to "combine climate processes, economic growth, and feedbacks between the climate and the global economy into a single modeling framework."[162] These models take emissions levels as input and generate economic damages as output.[163] Additionally, FERC commissioners have considered applying the SCC to determine the impact of various siting

159. The degree of improvement accounted for by the RA could be based on many factors and would be a fact-specific inquiry: A QF could be placed so as to create a microgrid that could be islanded in case of a system-wide issue; a QF could be sited so as to reduce congestion on transmission or distribution lines, reducing the need for grid upgrades; a QF could reduce the distance between generation and use for some community, thereby reducing power loss over high-voltage transmission lines; or a QF, because it allows islanding and prophylactic transmission shut-offs, could reduce risks and liabilities to utilities (which are ultimately paid for by ratepayers). Ideally, FERC would describe a list of reliability benefits that would qualify a QF for a reliability adder, and the state inquiry would then involve determining to what extent a QF (or proposed QF) actually supplied these benefits.

160. *See*, *e.g.*, Concurrence in Part, Dissent in Part of Commissioner Cheryl LaFleur on Millennium Pipeline, Eastern System Upgrade Project, F.E.R.C. Docket No. CP16-486-001 (July 24, 2018) [hereinafter Millennium Pipeline].

161. *See* INTERAGENCY WORKING GRP. ON SOC. COST OF CARBON, U.S. GOV'T, TECHNICAL SUPPORT DOCUMENT: - SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS - UNDER EXECUTIVE ORDER 12866 1 (2010), https://obamawhitehouse.archives.gov/omb/oira/social-cost-of-carbon.

162. *Id.* at 5.

163. *Id.*

decisions under their jurisdiction, but FERC has not done so as of yet.[164] Although under the Trump administration FERC abstained from considering the SCC,[165] the Obama SCC framework is a robust calculation available to the agency that is well supported by an empirical record, making the transition easier because FERC would not have to start from scratch.

Second, adding an SCCA to the market rate for fuel-agnostic power would better reflect the actual costs of procuring alternative power. Based both on the language of PURPA and on FERC's interpretation of the statute, PURPA requires avoided cost rates to reflect the cost a utility would have incurred in generating or procuring alternative electricity or capacity.[166] However, market rates are not the whole story on the cost of power. Fossil fuel power is underpriced in the market relative to its true cost because fossil fuel generators externalize the costs of releasing GHGs into the atmosphere.[167] Instead of being reflected in the price of fossil fuel power, these climate costs are borne by all humans (therefore all utility ratepayers), in the form of rising seas, increased incidence of extreme weather, droughts, floods, wildfires, etc.[168] Thus, tying the SCCA to the overall proportion of fossil-fuel-generated power will generate avoided cost rates that more accurately reflect the true cost of the alternative power that the utility could have procured, had it not procured the power from the QF.

Third, the SCCA mechanism will automatically distinguish good and bad actor states and most strongly incentivize renewable generation in states with the most fossil-fuel-dominated power supplies. States supplied by more fossil-fuel-generated power will have higher SCCAs because they are putting more carbon into the atmosphere, which means that pricing incentives for QFs will be higher in states with dirtier energy supplies. On the other hand, states with higher levels of renewable power will have rates for QF power that are much closer to the baseline fuel-agnostic rates, such as those that the Ninth Circuit rejected in *CARE v. CPUC*.[169]

As more of a state's power is procured from renewable generators, the SCCA amount will decrease; as power production increases, market rates will go down; and as distributed resource installations increase, the value of further distributed installations may go down as well. All of these price decreases will be reflected in the avoided cost calculation as it is updated over time, sending a market signal that will slow, but not stop, QF development as renewable

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164. *See* Millennium Pipeline, *supra* note 160.

165. Kevin Randolph, *Senators Urge FERC to Use Social Cost of Carbon in Decision-Making*, DAILY ENERGY INSIDER (July 31, 2018), https://dailyenergyinsider.com/news/13951-senators-urge-ferc-to-use-social-cost-of-carbon-in-decision-making/.

166. 16 U.S.C. § 824a-3 (2018).

167. *See* INTERAGENCY WORKING GRP. ON SOC. COST OF CARBON, *supra* note 161, at 2, 10.

168. *See id.*

169. *See* Californians for Renewable Energy v. Cal. Pub. Utils. Comm'n, 922 F.3d 929, 937–38 (9th Cir. 2019), *cert. denied*, 140 S. Ct. 2645 (2020).

procurement increases. The avoided cost rate will never be less than the fuel-agnostic market rate for power.

Because QF power prices will decrease as a state's renewable power procurement increases, the state, the utilities, and the ratepayers have incentives to increase renewable power procurement from all sources, not just QFs. Additionally, because QF power rates will be recalculated over time, even those in PPAs, to match the current avoided cost rate, ratepayers will not be locked into rates for renewable power with higher SCCAs than their state currently warrants; however, QF developers will still reap the benefit of guaranteed power purchases at rates equivalent to or higher than market rate, and there will still be a financial incentive to be the first in line.

Because a market-based mechanism to determine both 1) a state's obligations under PURPA and 2) its QF power pricing under PURPA is relatively novel, I will address a few more questions and concerns more directly before concluding this section.

1. How to Determine the Amount of the SCCA

Discussion of specific details of the SCCA is outside of the scope of this Note. However, here are some considerations that seem important. First, the SCCA should, as much as possible, be tied to factual determinations about the actual social cost of the carbon emitted by the generation of the fossil-fuel power procured in the state; this would be a relatively straightforward calculation under the Obama SCC framework.[170] This measure will help ensure that the SCCA is tracking the actual costs externalized by the total power mix currently sold in the state, including the fossil fuel power, and therefore the actual cost of procuring alternative power. Investigating the facts underlying the SCCA calculation will also establish a rulemaking record to help protect against judicial challenges to the ultimate SCCA determination. Second, the SCCA should not be set so high that it unreasonably impacts ratepayers, as this will violate the basic tenets of electricity ratemaking,[171] nor so high that it will swamp market signals from the RA or the market-based component of the total avoided cost.

2. The SCCA Should Distinguish between Fossil Fuel Generation Types with Different Emissions Levels

Just as natural gas generators emit more GHGs than solar, coal generation emits more GHGs than natural gas per kilowatt-hour.[172] There is good data on the amount of GHGs emitted by various sizes and types of fossil fuel

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170. *See generally* INTERAGENCY WORKING GRP. ON SOC. COST OF CARBON, *supra* note 161.

171. *See, e.g.*, REGULATORY ASSISTANCE PROJECT, ELECTRICITY REGULATION IN THE US: A GUIDE 50 (Mar. 2011).

172. *How Much Carbon Dioxide Is Produced When Different Fuels Are Burned?*, U.S. ENERGY INFO. ADMIN. (June 17, 2020), https://www.eia.gov/tools/faqs/faq.php?id=73&t=11.

generators,[173] and since the ultimate goal of the SCCA is to account for the externalized costs of GHG emissions, it is appropriate that fossil fuel generators with higher emissions be counted as such in the SCCA determination. Thus, I believe that the SCCA should distinguish between types of fossil fuel generation that produce different levels of GHG emissions per kilowatt-hour. This would mean that, for example, a state that generates most of its power from coal will likely, all else being equal, have a higher SCCA than a state that generates most of its power from natural gas.[174]

3. The Market Rate Scheme May Impose Regressive Rate Increases on Ratepayers Least Able to Afford Them

Because this scheme accounts for the externalized costs of fossil fuel power by *increasing* the price of QF power to shift the economics of the power market, the end result is likely overall higher prices. These higher wholesale power prices will likely produce higher retail power rates. Higher marginal electricity rates most significantly impact low-income and vulnerable people and communities,[175] which means that this mechanism will result in a regressive electricity rate increase—with the greatest effective increases potentially affecting those ratepayers already suffering from the more local environmental effects of fossil fuel generation.[176]

However, there are a few considerations in defense of this approach. First, the difference in price between QF power and market price will only be relatively large when renewable (and thus QF) penetration is very low, thereby limiting the overall price increases. If the SCCA and RA work and increase penetration of QF power, and hopefully other renewable power, the size of the SCCA (and likely the RA) will go down. This will limit the overall price increases. The fact that pricing on long-term QF PPAs cannot be fixed at the initial contracting rates, but must be updated to the current avoided cost, should also help to diffuse this issue over the long run. Finally, as renewable power, in general, becomes more dominant, overall market prices for power will likely decline as well because the

173. *See e.g.*, *How Much Carbon Dioxide Is Produced per Kilowatthour of U.S. Electricity Generation?*, U.S. ENERGY INFO. ADMIN. (Feb 20, 2020), https://www.eia.gov/tools/faqs/faq.php?id=74&t=11; *Does EIA Have Data on Each Power Plant in the United States?*, U.S. ENERGY INFO. ADMIN. (Jan 8, 2020), https://www.eia.gov/tools/faqs/faq.php?id=767&t=3.

174. This is only likely, not certain, because the SCCA could take into account lifecycle GHG emissions for generation. In that case, coal-producing states with no natural gas production could potentially end up with higher lifecycle emissions for natural gas than coal generation, due to fuel transportation. However, neither is likely to compete on lifecycle emissions with wind or solar generation, so the overall incentivizing effect of the SCCA will persist.

175. *See* Erin Mundahl, *Costs of Carbon Tax Who Pays? And How Much?*, INSIDE SOURCES (July 18, 2018), https://www.insidesources.com/costs-of-carbon-tax-who-pays-and-how-much/.

176. *See, e.g.*, Gabrielle Levy, *Report Energy Costs Are a Higher Burden on the Rural Poor*, U.S. NEWS (July 20, 2018, 6:38 PM), https://www.usnews.com/news/national-news/articles/2018-07-20/report-energy-costs-are-a-higher-burden-on-the-rural-poor.

cost of renewable generation is already dramatically lower than the cost for most fossil fuel electricity, and that trend is projected to continue.[177]

Second, there is already a federal program to help low-income and vulnerable people with their electricity bills, and many state programs as well.[178] The government, whether federal or the states, could—and should—choose to create or expand ratepayer support programs to offset the distribution of the negative effects of price increases resulting from these proposed changes. Expansion of these programs, while not within the jurisdiction of FERC, could offset the regressive nature of the rate increases.

Third, imposing a tax or fee directly on fossil fuel producers (such as a carbon tax) to effectively charge them for their pollution would have a similar effect to setting the SCCA at a market rate.[179] It would raise the rates on fossil fuel power, and thereby raise retail rates to some degree with the larger increases borne by those communities served by more fossil fuel generation.[180] In the case of a carbon tax, however, because it is a tax the additional cost would be paid to the government.[181] These funds could be used to offset the rise in electricity costs for low-income ratepayers, but they could also end up in the general treasury or in a government account designed to fund clean energy, climate mitigation/adaptation, or other policy-related programs.[182] The virtue (or vice) of the plan that I have outlined in Subpart IV.D is that the "additional" funds injected into the market through the SCCA and RA, designed to incentivize renewable and resilient generation and grid development, go directly to QF owners as an incentive and reward for socially desirable behavior. If such QFs were then subject to other state programs designed to benefit vulnerable communities, such as community jobs programs, these extra dollars from the entire state would not only incentivize desirable behavior but would benefit some of the communities most impacted by rate increases.

It is vitally important to seriously consider the effects of policy on vulnerable communities and to avoid regressive price increases and taxes wherever possible. In the case of this market mechanism for PURPA implementation, however, the actual negative effects are likely to be small and easy to mitigate through existing programs and funding streams.

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177. *See generally* U.S. ENERGY INFO. ADMIN., LEVELIZED COST AND LEVELIZED AVOIDED COST OF NEW GENERATION RESOURCES IN THE *ANNUAL ENERGY OUTLOOK 2019* (Feb. 2019).

178. *See Low Income Home Energy Assistance Program (LIHEAP)*, BENEFITS.GOV, https://www.benefits.gov/benefit/623 (last visited Dec. 14, 2019); *Income Qualified Assistance Programs*, CAL. PUB. UTILS. COMM'N, https://www.cpuc.ca.gov/iqap/ (last visited Dec. 14, 2019).

179. *See* Mundahl, *supra* note 175.

180. *See id.*

181. *See id.*

182. *See id.*

4. *This Framework Can Be Applied Independently of PURPA*

Although I am presenting this framework as a way to modify PURPA, there is a version of this market mechanism that could be implemented beyond the scope of PURPA, to incentivize renewable generators that are too large to qualify as QFs. States, of course, could not implement these mechanisms at the wholesale level for non-QF power sales, because wholesale power prices are in general under federal jurisdiction. But the federal government could do so through new legislation, or states could implement a similar adder on the retail side with proceeds redistributed to qualifying renewable generators, storage, or demand response projects—basically, the projects that move us towards a more renewable and resilient electric system.

CONCLUSION

Climate change poses an undeniably significant threat to the human species, and to the United States. One aspect of that threat involves the impact that climate change will have on the reliability of the U.S. electricity supply. In this Note, I have argued that the intent of PURPA was broad: to address significant reliability problems in the U.S. electricity system that impaired national security. Furthermore, the mechanisms contained in PURPA can be deployed to mitigate the threat of climate change and adapt to its consequences. PURPA, therefore, is still extremely relevant to the challenges currently facing the U.S. electricity system.

However, PURPA's current implementation does not fulfill the statute's goals. This is because current implementation lacks an accountability mechanism for bad actor states that fail to comply, and it lacks the flexibility necessary to allow good actor states to pursue successful renewables programs that complement the goals and requirements of PURPA.

As an alternative to the current implementation, I have presented two contrasting approaches to updating implementation of PURPA to make it applicable to our current energy landscape: a command-and-control style implementation and a more market-based approach.

Of course, updating PURPA is not the only way that the federal government can begin to address the looming problem of how to mitigate the U.S. energy system's contribution to climate change in what little time we have left, or how to adapt our energy infrastructure to the changed environmental circumstances we will be facing. But, compared to passing new federal legislation, updating PURPA implementation may be relatively quick and straightforward. New federal legislation will have to come, but, while we wait, FERC could be a climate leader now.