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Tightening the Legal ‘Net’: The Constitution’s Supremacy Clause Straddle of the Power Divide

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TIGHTENING THE LEGAL ‘NET’: THE CONSTITUTION’S SUPREMACY CLAUSE STRADDLE OF THE POWER DIVIDE

Steven Ferrey*

This article analyzes Constitutional Supremacy Clause tensions in preempting state law that addresses climate change and the rapid warming of the Planet. Net metering laws, enacted in 80% of U.S. states, are a primary legal mechanism to control and mitigate climate warming. This article analyzes three recent federal court decisions creating a preemptive Supremacy Clause stand-off between federal and state law and presents a detailed state-by-state analysis of which those 80% of states’ laws could be preempted by legal challenge.

If state net metering laws affected only ordinary technologies, this issue would not be front and center with global warming. However, state net metering laws are the most widely deployed U.S. incentive for renewable energy to address climate warming. This article examines and documents, state-by-state, that 75% of the states with questionable legal practices a decade ago have changed their laws to avoid legal prohibitions, while some others have not.

At the federal level, the federal government recently revised regulations substantially restricted four decades of federal regulatory incentives for small renewable energy projects pursuant to the key statute that President Jimmy Carter characterized as the federal response to fight the “moral equivalent of war!” In its conclusion, this article provides a legal path for states to insulate their state laws from Constitutional challenge while still effectively addressing climate change. There is much at risk in the legal structure of U.S. state net metering laws, as world climate approaches the tipping points that will alter regional and global environmental balances irreversible within the time span of our current civilization.

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I. STATE BACK-DOOR LEGAL SUBSIDIES

When addressing global climate change, the tension between state environmental and energy regulations and the Supremacy Clause telescopes the issue from domestic to international controversy. While Constitutional challenges have resulted in some recent state restrictions in its use, net metering has been and remains the most substantial incentive and subsidy for renewable energy in the United States legal system.

- Geographically, 80% of U.S. states have adopted net metering,¹ exceeding the extent of all other renewable power incentives
- Net metering can compensate renewable energy at 600% the actual market value of the power supplied²
- Net metering subsidizes the life of renewable energy projects, unlike federal investment tax credits which provide a one-year tax subsidy³
- The electric sector is responsible for one-quarter of global warming emissions and is projected to bear approximately two-thirds of the burden of reducing U.S. carbon emissions.⁴

Net metering, which allows consumers with renewables to sell power back to their utilities at an above-market rate, is a state-created legal foundation used in

1. See *infra*, Section IV.A and Figure 1.

2. See *infra*., Section II.A.

3. For discussion of the federal Investment Tax Credit, see Steven Ferrey, *The 'Green New Deal': Constitutional Limitations; Rerouting Green Technology Through a Different 'Back-Door'*, 44 VERMONT L. REV. 778, 801 (2020).

4. *Global Greenhouse Gas Emission Data*, EPA, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions> (last visited Apr. 14, 2021).

approximately 80% of U.S. states' and the District of Columbia's policies for addressing climate change. But net metering may be running into a Constitutional roadblock. Two federal decisions, in *MidAmerican*⁵ and *SunEdison*,⁶ raised and left unanswered certain questions about whether some states' net metering programs may violate federal law and the Constitution's Supremacy Clause.⁷ This year, another case again deferred addressing whether state net metering programs violate the Supremacy Clause and the Federal Power Act, although concurring opinions suggested they could.⁸

Separately, the Executive branch in July 2020 promulgated a regulatory restriction on federal renewable energy law that limited federal incentives for small renewable energy projects by:⁹

- Making less certain the date and time that a small renewable energy project can obtain a legally enforceable obligation from a utility to purchase its power output;
- Permitting utilities in certain markets to opt out of their obligations to purchase power from small renewable power projects larger than 5 MW;
- Making it easier and less expensive to challenge a small renewable power project's federally established rights and benefits; and
- Reducing the potential level of 'avoided cost' prices that small renewable energy projects receive for the power they produce, and allowing the price to include monthly-varying prices,¹⁰ a new revenue fluctuation which makes it difficult to borrow money to construct renewable power generation facilities which have high up-front capital costs and low operating cost.¹¹

The challenge to net metering laws in thirty-nine states is more than a legal footnote; it threatens the primary U.S. legal tool for addressing climate change. This

5. *MidAmerican Energy Co.*, 94 F.E.R.C. ¶ 61,340 (2001).

6. *Sun Edison LLC*, 129 FERC 61146, 61620 (2009).

7. *See infra*. Section IV.

8. *See infra*. Section IV.A.

9. FERC Order No. 872, *Qualifying Facility Rates and Requirements Implementation Issues Under the Public Utility Regulatory Policies Act of 1978*, 172 FERC 61,041 ¶ 4, 63, 357 (July 16, 2020). For an analysis of the impact of this, *see* STEVEN FERREY, *LAW OF INDEPENDENT POWER* § 4:6 (53rd ed. 2020).

10. This is contrary to the recent ruling in *Winding Creek Solar L.L.C. v. Peevey*, 293 F. Supp. 3d 980, 989–90 (N.D. Cal. 2017), *aff'd sub nom.* *Winding Creek Solar, L.L.C. v. Peterman*, 932 F.3d 861, 865 (9th Cir. 2019).

11. FERC Order No. 872, *supra* note 10.

article will dissect this looming challenge in net metering, provide a state-by-state analysis of possible preemption, analyze and document the changes states have made to avoid preemption over the last decade,¹² and examine the federal retreat from renewables with the wind-down of the Investment Tax Credit and the re-sculping of the Public Utility Regulatory and Policies Act (“PURPA”) in 2020.

Section II will describe how net metering operates, how it has become more complex and diverged from its scientific roots, and how its use has decreased as its legality and costs have been questioned.¹³ Section III will look at recent federal precedents suggesting that certain state net metering programs if not carefully designed could be found to violate the Supremacy Clause of the U.S. Constitution, as well this section will look at the new 2020 federal regulations.

Section IV will compare the states’ net metering programs—how each moves money and which ones trigger the key Constitutional challenges. Section IV will also survey each of the thirty-nine net metering states, plus the District of Columbia and four territories, to highlight how each may have altered its net metering programs to protect them from Constitutional challenges. Section V will knit the financial flow into the legal precedents analyzed in Section III. The rate at which states compensate and create credits for surplus net metering is the lynchpin of whether each state’s net metering policies is or is not well insulated legally to survive legal challenge.

II. THE MOSAIC OF STATE NET METERING REGULATION

A. *The Financial Shift at the Meter*

Net metering is the most substantial incentive for renewable energy in the United States. Net metering is a policy that allows retail electricity customers to receive credits on their utility bills for on-site renewable energy generation exported to the state’s electric grid that is in excess of their electric load.¹⁴

When a customer uses electricity from the utility, the meter is running forward—but when the amount of electricity produced by the consumer exceeds the amount used, the excess generation causes the consumer’s meter to run in reverse, therefore allowing consumers to receive credits from the utility ultimately passed on as costs to other utility customers for this excess generation.¹⁵ Net metering compensation is not premised on the “fair or equitable price based on ratemaking

12. See *infra* Section IV.B.

13. See *infra* Section II.B.

14. See *Net Metering*, NAT’L GRID (2019), https://www.nationalgridus.com/masselectric/business/energyeff/4_net-mtr.asp.

15. See, e.g., Steven Ferrey, *Torquing the Levers of International Power*, 15 WASH. U. GLOBAL STUD. L. REV. 255, 287 n.170, 288 (2016) (noting that excess electricity produced flows back to the grid and credits and costs are passed through to customers’ energy bills). See also *Net Metering*, *supra* note 15.

law;” rather, customers generally receive an amount above the utilities’ avoided costs of acquiring power in the marketplace.¹⁶ Net metering provides benefits to net metering customers and may provide for less loss of distributed electricity from centralized energy generation.¹⁷

Customers are given credit by the utility for every kWh of electricity exported to the utility, turning the meter in reverse direction during export.¹⁸ Since only a single rate applies to the net amount of electric use registered on a single retail customer meter, net metering effectively credits and compensates the generator at, or near, the full retail rate.¹⁹ The value received for that net metered power by the customer is an amount above the utility’s avoided cost pursuant to federal law²⁰ and in excess of the wholesale rate set by FERC or federally-regulated independent system operators (“ISOs”) which manage the utility grids and wholesale power transactions for more than half of U.S. electricity consumers.²¹

Net metering’s popularity has ebbed and flowed. Net metering enjoyed federal encouragement in 2005. Section 1251(a)(11) of the Energy Policy Act of 2005 provides that “each electric utility shall make available upon request net metering service to any electric consumer that the electric utility services.”²² State regulatory agencies were required to “consider” the implementation of net metering at the state level.²³

16. See STEVEN FERREY, LAW OF INDEPENDENT POWER, *supra* note 12, §§ 4:28, 7:1 (52d ed. 2020) (suggesting that avoided cost is the wholesale cost of purchasing or producing electricity, at an amount far less than the retail price of wholesale power).

17. See Steven Ferrey, *The Medium Is the Message*, 35 VA. ENV’T L.J. 231, 245 n.191 (2017) (finding that transmission and distribution losses of 4%–8% are not realized with distributed generation).

18. See *Net Metering*, NAT’L GRID (Jan. 20, 2021), <https://ngus.force.com/s/article/MA-BUSINESS-Net-Metering>.

19. See *Glossary*, DATABASE OF STATE INCENTIVES FOR RENEWABLE ENERGY, <http://www.dsireusa.org/support/glossary> (last visited May 5, 2021) (“In effect, the customer uses excess generation to offset electricity that the customer otherwise would have to purchase at the utility’s full retail rate.”). As to whether electricity is a “good” or a “service” and how it should be treated under the law, see STEVEN FERREY, THE NEW RULES: A GUIDE TO ELECTRIC MARKET REGULATION 211–31 (2000).

20. 16 U.S.C. § 824 (2012).

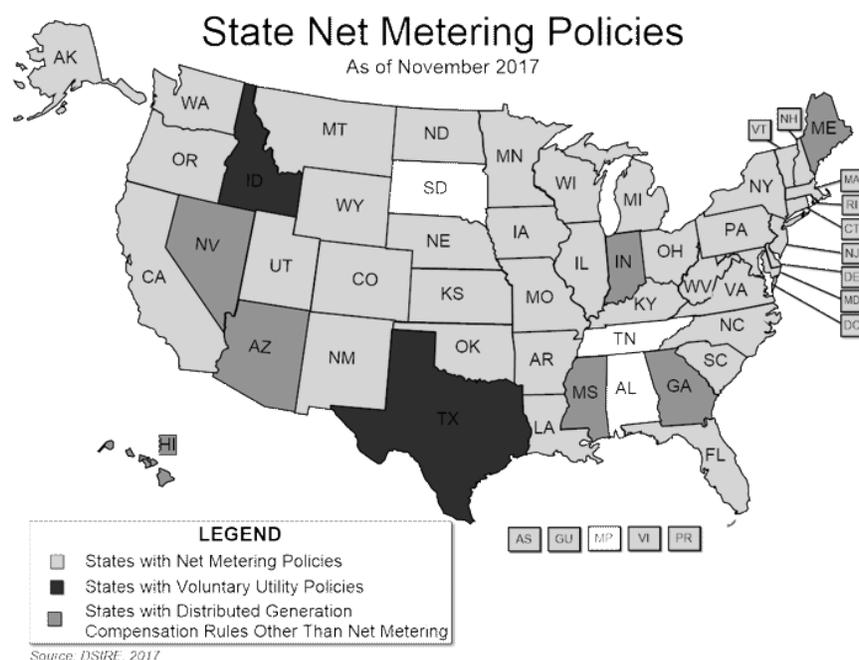
21. Ferrey, *supra* note 16, at 257; see generally *Electric Power Markets*, FERC, <https://www.ferc.gov/industries-data/market-assessments/electric-power-markets> (last updated Oct. 23, 2020). A “sale of electric energy at wholesale” is defined as a “sale of electric energy to any person for resale. 16 U.S.C. § 824(d).

22. Energy Policy Act of 2005, Pub. L. 109–58 § 1251(a)(11) (2005) (codified at 16 U.S.C. § 2621(d)(11)).

23. RUSTY HAYNES AND CHRIS COOK, ASES ANNUAL CONFERENCE, ANALYSIS OF U.S. INTERCONNECTION AND NET METERING POLICY 5 (May 2006), <http://ncsolarcenterprod.s3.amazonaws.com/wp-content/uploads/2015/01/2006-Haynes-Anaysis-of-U.S....pdf> (“Section 1251 of the Energy Policy Act [] implements a national net-metering scheme, and Section 1254 requires interconnection based on the IEEE 1547 standard.”). This included unregulated utilities that qualify under PURPA (there are some unregulated municipal and cooperative electric utilities that do not qualify).

Net metering's high-water mark came in 2015, when forty-four states and the District of Columbia, Guam, Puerto Rico, American Samoa, and the United States Virgin Islands had adopted some form of mandatory net metering policies for their regulated utilities.²⁴ Utilities in three additional states—Idaho, South Carolina and Texas—have implemented voluntary individual net metering programs for one utility.²⁵ See Figure 1 for net metering states.

Figure 1²⁶



States also must “consider” net metering and interconnection rules. *Id.* “[T]he IEEE 1547 series of standards has helped shape the way utilities and other businesses have worked together to realize increasing amounts of [distributed energy resources] interconnected with the distribution grid.” NAT’L RENEWABLE ENERGY LAB., IEEE 1547 AND 2030 STANDARDS FOR DISTRIBUTED ENERGY RESOURCES INTERCONNECTION AND INTEROPERABILITY WITH THE ELECTRICITY GRID, iv (2014), <https://www.nrel.gov/docs/fy15osti/63157.pdf>.

24. 24 *Net Metering*, DATABASE OF ST. INCENTIVES FOR RENEWABLE ENERGY, <http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2015/04/Net-Metering-Policies.pdf> (last visited Dec. 2, 2019).

25. See *State Net Metering Policies*, NATIONAL CONFERENCE OF STATE LEGISLATURES (Nov. 20, 2017), <http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx>; NC CLEAN ENERGY TECH. CTR., 50 STATES OF SOLAR 5 (2020), https://nccleantech.ncsu.edu/wp-content/uploads/2020/10/Q3-20_SolarExecSummary_Final.pdf.

26. *State Net Metering Policies*, *supra* note 26.

After the attrition discussed below,²⁷ thirty-nine states, Washington, D.C., and four territories currently use net metering programs.²⁸ Depending on state policies, net metering credits can be turned into cash for the net metering customer at the end of the month or billing period, carried as credits into the next billing period, or go to the utility to apply towards unpaid bills of other nonpaying customers.²⁹

Some states have capacity limits on the size of net metered systems expressed in either total kilowatt size of a net-metered generation unit (for example, half of states allow net metering for systems up to one or two MW in capacity) or a percentage limit as a function of an individual customer's retail net metering consumer demand.³⁰ Most states allow unused net metering credit carry-over to the next monthly billing period.³¹ The longevity of such carried-over credits vary by state, with some states causing credits to expire in twelve months or at the end of the year, while other states allow perpetual carry-over.³²

The net metered customer enjoys a free virtual energy banking service even though the utility, in reality, cannot "bank" electricity.³³ A net metering customer does not financially compensate the utility for moving its power on the grid to effectuate this energy banking or for any share of distribution system investments made by the utility or its operating cost. Though the net metering customer uses the distribution grid twice, exporting and receiving power, she never pays for use of these grid services. Traditional net metering escapes federal electric wholesale price regulation, according to the case law, in two cases where its scope was limited.³⁴

The utilities credit or pay the net metering customer for the kilowatt hours of electricity sent on a wholesale basis to the grid although credited at a bundled retail rate, even though the utility could buy power elsewhere at a dramatically cheaper

27. See *infra* Section II.B.

28. *State Net Metering Policies*, *supra* note 26.

29. *Id.*

30. *State Net Metering Policies*, *supra* note 26. In terms of limits, Wisconsin has a limit up to twenty kilowatts, Arizona at 125 percent of a customer's total connected load, South Carolina, Virginia, and Wisconsin up to twenty kilowatts. New Jersey and Ohio have no capacity limit, Massachusetts allows systems for public off-takers up to ten megawatts, and New Mexico allows up to eighty megawatts per facility. *Id.*

31. *Id.* North Dakota pays for any excess credits each month at the 'avoided cost' PURPA rate. *Id.*

32. *Id.*

33. See, e.g., *Electricity and Energy Storage*, WORLD NUCLEAR ASS'N (last updated Dec. 2020), <https://www.world-nuclear.org/information-library/current-and-future-generation/electricity-and-energy-storage.aspx> ("Electricity itself cannot be stored at any scale.").

34. Steven Ferrey, *Virtual "Nets" and Law: Power Navigates the Supremacy Clause*, 24 GEO. INT'L ENV'T L. REV. 267, 318 (2012) ("Net metering may not be applicable to free-standing renewable power generation entities that have a meter mostly for export of power, with little or no on-site use of power.").

wholesale rate.³⁵ The utility and its non-net-metering customers who ultimately incur the cost pass-through of all revenue lost by the utility through net metering are paying more—often triple or quadruple the price—for the net-metered power than they could pay for traditional wholesale power produced and available in the market. As one example, the author’s current retail rate in Boston is an average cost of \$0.26/kWh, at which a net metered customer would be credited at near this retail rate; wholesale power in the New England region, and in most other areas of the country, for the past decade has been selling for approximately \$0.02 - 0.04/kWh or less.³⁶ This is a 6:1 differential or more in terms of the premium value afforded to net metering credits compared to the market price or market value of power.

In the 39 currently net metered states, the utility has to accept and credit or pay for this power whenever an eligible distributed renewable generation unit produces it, rather than when the utility needs more power to distribute to its customers. There is no advance notice required from the net metered customer to the utility for production or duration.³⁷ Aggregate net metering, allowed in several states, allows a single customer to apply and distribute net metering credits earned from a single renewable generation facility at multiple retail service accounts on its property.³⁸

B. State ‘Revisionism’ on Maintaining Net Metering

The solar energy industry in the United States has experienced rapid expansion in recent years, with a compound annual growth rate of more than sixty percent in the past decade.³⁹ A significant portion of this growth was in residential solar installations, which saw nineteen percent growth between 2015 and 2016.⁴⁰ One

35. For example, the author’s retail, or net metering, rate is \$0.26/kWh, although abundant wholesale power is available for approximately \$0.04/kWh. *Wholesale Electricity Prices Were Generally Lower in 2019, except in Texas*, ENERGY INFO. ADMIN. (Jan. 21, 2020), <https://www.eia.gov/todayinenergy/detail.php?id=42456> (noting the average wholesale electricity prices averaged \$38 per megawatt hour).

36. See INDEPENDENT SYSTEM OPERATOR NEW ENGLAND, <http://www.ISO-NE.com> (last visited Mar. 8, 2019).

37. ISOs in the nation accept 100% of all solar and wind net metered power, whenever it is able to be produced, into their wholesale power markets, so there is always a market. See 16 U.S.C. §§ 2621–27, 16,161; 18 C.F.R. §§ 35.36, 35.37; see also *Qualifying Facility Rates and Requirements Implementation Issues Under the Public Utility Regulatory Policies Act of 1978*, 172 FERC 61,041, ¶¶ 521–23 (describing solar and wind facilities).

38. *State Net Metering Policies*, *supra* note 26.

39. See Press Release, *U.S. Solar Market Has Record-Breaking Year, Total Market Poised to Triple in Next Five Years*, SOLAR ENERGY INDUSTRIES ASS’N (Mar. 8, 2017), <http://www.seia.org/news/us-solar-market-has-record-breaking-year-total-market-poised-triple-next-five-years>.

40. See *Solar Industry Growing at a Record Pace*, SOLAR ENERGY INDUSTRIES ASS’N, <http://www.seia.org/research-resources/solar-industry-data> (last visited May 9, 2017).

factor behind the rise of the solar energy industry in the United States is the proliferation of state net metering programs.⁴¹

Utilities express concerns about the cost-shifting that occurs from those engaged in net-metering to those who are not; some ratepayers express the same concern regarding cost being shifted to them.⁴² In 2016, twenty-eight of the (then) forty-four states considered curtailing net metering.⁴³ Five states abandoned net metering and implemented alternative compensation schemes in its place: Arizona, Hawaii, Indiana, Maine, and Nevada.⁴⁴

Regardless of which side of the issue one identifies with, what is clear is that net metering with a credit set at or near the retail rate (which includes the cost of poles, wires, meters, and significant government taxes) does not carefully or properly attempt to value solar or other renewable power.⁴⁵ However, there is a dispute as to how it is off-value: Some assert that net metering under-values solar

41. See *State Net Metering Policies*, *supra* note 26; Sean Paul, *The Solar Industry in a Period of Transition*, GEO. PUB. POL. REV., Nov. 15, 2016, <http://gppreview.com/2016/11/15/solar-industry-period-transition/>.

42. See *The Fight to Put a Value on Rooftop Solar Power*, CLIMATE NEXUS, <http://climatenexus.org/net-metering-fight-understanding-latest-issue-nation's-rapidly-changing-electricity-market>; Mark Muro & Devashree Saha, *Rooftop Solar: Net Metering is a Net Benefit*, BROOKINGS INSTITUTION (May 23, 2016), <https://www.brookings.edu/research/rooftop-solar-net-metering-is-a-net-benefit/>.

43. See N.C. CLEAN ENERGY TECH. CTR., 50 STATES OF SOLAR: Q4 2016 QUARTERLY REPORT AND ANNUAL REVIEW EXECUTIVE SUMMARY 5 (2017), http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2017/02/Q42016_ExecSummary.pdf; N.C. CLEAN ENERGY TECH. CTR., 50 STATES OF SOLAR: A QUARTERLY LOOK AT AMERICA'S FAST-EVOLVING DISTRIBUTED SOLAR POLICY & REGULATORY CONVERSATION 8 (2015), https://nccleantech.ncsu.edu/wp-content/uploads/The-50-States-of-Solar_FINAL.pdf. Utilities, government entities, ratepayers, and even solar energy proponents raised concerns, which follow three main arguments: (i) net metering unfairly shifts costs to non-participating ratepayers or generally fails to properly value solar energy, (ii) it has the potential to overburden the grid when it is too saturated, and/or (iii) such subsidies are no longer necessary. See, e.g., INTERSTATE RENEWABLE ENERGY COUNCIL, A REGULATOR'S GUIDEBOOK: CALCULATING THE BENEFITS AND COSTS OF DISTRIBUTING SOLAR GENERATION 4, 10, 13 (2013), <http://www.irecusa.org/2013/10/experts-propose-standard-valuation-method-to-determine-benefits-and-costs-of-distributed-solar-generation/>; Mike O'Boyle, *Harnessing the Power of the People Through "Value of Solar" ... And Beyond*, FORBES (Feb. 2, 2017 8:00 AM), <https://www.forbes.com/sites/energyinnovation/2017/02/02/harnessing-the-power-of-the-people-through-the-value-of-solar-and-beyond/#6b255d766c80>; Diane Cardwell, *Solar Power Battle Puts Hawaii at Forefront of Worldwide Changes*, N.Y. TIMES (Apr. 18, 2015), https://www.nytimes.com/2015/04/19/business/energy-environment/solar-power-battle-puts-hawaii-at-forefront-of-worldwide-changes.html?_r=0.

44. *State Net Metering Policies*, *supra* note 26.

45. *Experts Propose Standard Valuation Method to Determine Benefits and Costs of Distributed Solar Generation*, INTERSTATE RENEWABLE ENERGY COUNCIL (Oct. 4, 2013), <http://www.irecusa.org/2013/10/experts-propose-standard-valuation-method-to-determine-benefits-and-costs-of-distributed-solar-generation/>; Herman K. Trabish, *A Rising Tension: 'Value-of-Solar' Tariff Versus Net Metering*, GREENTECH MEDIA (Apr. 10, 2014), <https://www.greentechmedia.com/articles/read/A-Rising-Tension-Within-the-Solar-Industry-Value-of-Solar-Versus-NEM>; O'Boyle, *supra* note 44.

power; others assert that net metering over-values power from solar installations.⁴⁶ Distributed solar energy in the states of Arizona, California, and Hawaii has caused surges in power that threatened “unanticipated voltage fluctuations that can overload circuits, burn lines and lead to brownouts or blackouts.”⁴⁷

Net metering results in cross-subsidization of the current one percent of national net metering customers by all other traditionally-served customers.⁴⁸ Two different reports found the cost of subsidies to wind power generation in the U.S. to be \$19/MWh, or \$0.019/kWh.⁴⁹ In 2014, a large Massachusetts and New England utility calculated the added cost to ratepayers of net metering and other intermittent renewable subsidies administered by utilities pursuant to state law to be more than \$1 billion annually with an impact on customers of more than \$0.02/Kwh, as set forth in Figure 2.

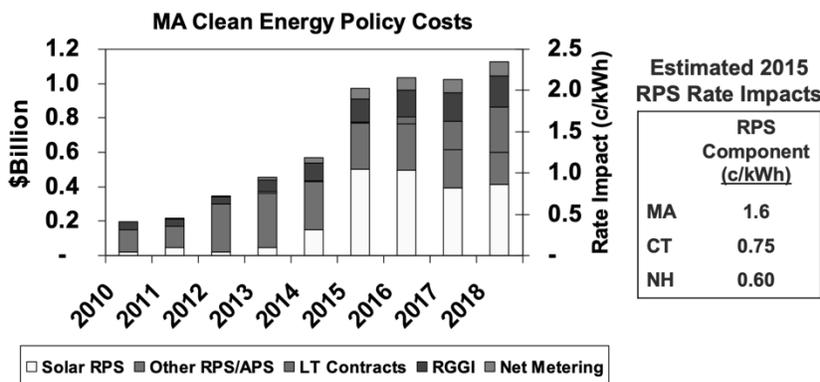
46. See *Experts Propose Standard Valuation Method to Determine Benefits and Costs of Distributed Solar Generation*, INTERSTATE RENEWABLE ENERGY COUNCIL (Oct. 4, 2013), <http://www.irecusa.org/2013/10/experts-propose-standard-valuation-method-to-determine-benefits-and-costs-of-distributed-solar-generation/>; Benefits that are not incorporated into the retail rate offered in standard net metering include avoided regional and in-state transmission costs, avoided costs of “wear and tear” on the grid (as energy does not need to travel so far), avoided greenhouse gas emission costs, and market price suppression (the result of the influx of lower-cost solar energy into the marketplace). See PUBLIC SERVICE DEPARTMENT, EVALUATION OF NET METERING IN VERMONT CONDUCTED PURSUANT TO ACT 125 OF 2012, at 28–29 (2013), <https://publicservice.vermont.gov/sites/dps/files/documents/Act%20125%20Evaluation%20of%20Net%20Metering%20in%20Vermont.pdf>.

47. See Cardwell, *supra* note 44.

48. See Benjamin Hanna, *FERC Net Metering Decisions Keep States in The Dark*, 42 BOS. C. ENV'T AFFAIRS L. REV. 133, 153 (2015) (“[N]et metering customers still compromise a small fraction of one percent of energy consumers in the United States.”).

49. LAZARD, LAZARD'S LEVELIZED COST OF ENERGY ANALYSIS - VERSION 8.0 4 (2014), https://www.lazard.com/media/1777/levelized_cost_of_energy_-_version_80.pdf; GEORGE TAYLOR & THOMAS TANTON, AM. TRADITION INST. CTR. FOR ENERGY STUDIES, THE HIDDEN COSTS OF WIND ELECTRICITY ES-1 10 (2012), <http://www.atinstitute.org/wp-content/uploads/2012/12/Hidden-Cost.pdf>.

Figure 2. Cost Impact of Net Metering and Other Subsidies⁵⁰



Utilities in California estimate that net metering may mean as much as \$1.4 billion a year in lost revenue that will have to be added to the bills of non-net-metering customers.⁵¹ The California Public Utility Commission reported that by 2020, net metering could cost non-solar electricity customers between \$370 million and \$1.1 billion per year.⁵² Stanford University economist Frank Wolak calculated that the state’s renewable energy strategy could cause electricity rates to rise by ten to twenty percent, depending on a number of factors.⁵³ “It is easily in the billions of dollars,” he said.⁵⁴

Ultimately, neither the net metered customer nor the utility incurs the costs of net metering. The utility’s revenue loss and the costs of implementing the accounting and distribution of these net metered credits are passed on to the utility’s ratepayers. Some studies noted the regressive nature of passing along expenses

50. James Daly, *Restructuring Roundtable: New England Electric Rates and Market Drivers*, NE. UTILS. 7 (Nov 21, 2014), <http://www.raabassociates.org/Articles/Daly%20Presentation%20Final%2011.21.14.pptx>.

51. Diane Cardwell, *On Rooftops, A Rival Utility*, N.Y. TIMES (July 26, 2013), <https://www.nytimes.com/2013/07/27/business/energy-environment/utilities-confront-fresh-threat-do-it-yourself-power.html>.

52. Ker Than, *As Solar Power Grows, Dispute Flares Over U.S. Utility Bills*, NAT’L GEO. (Dec. 24, 2013) <https://www.nationalgeographic.com/science/article/131226-utilites-dispute-net-metering-for-solar>; see also Tom Tanton, *A Critique of Brookings Institution’s Mark Muro and Devashree Saha: Rooftop Solar: Net Metering Is A Net Benefit*, <https://elegal.org/taanton-a-critique-of-brookings-institutions-mark-muro-and-devashree-saha-rooftop-solar-net-metering-is-a-net-benefit/>.

53. Evan Halper et al., *Taxpayers, Ratepayers Will Fund California Solar Plants*, L.A. TIMES (Sept. 20, 2012, 12:00 AM), <http://articles.latimes.com/2012/sep/20/local/la-me-bigsolar-20120921>.

54. *Id.*

associated with more affluent customers' renewable energy investments to the general utility customer base.⁵⁵

Assessing the impacts of a distributed solar PV facility on a utility and its ratepayers, one analysis concluded that most 'value of solar' and other previous analyses did not consider the equity impacts on remaining utility customers which now still comprise the vast majority of residential customers: "ratepayers will be stuck paying the utility for its stranded costs of capital expenditure, which is not used because of the "must take" obligation of the utility to take all private solar power before operating its own installed or contracted generation."⁵⁶ Other studies have evaluated the cross-subsidization to solar PV owners from non-owners.⁵⁷

III. TIGHTENING THE NET: LAW IN A FEDERALIST SYSTEM

The many differences in state net metering policies⁵⁸ adds layers to the metering onion and the legality of the program. This section analyzes federal adjudicatory orders that call into question the legality of some aspects of some state net metering programs.

A. Federal Net Meter Orders and Rulings

As a base principle, the Federal Power Act grants FERC the ability to regulate "the sale of electric energy at wholesale in interstate commerce."⁵⁹ The same statutory section, however, does not permit FERC to regulate several other types of electricity transactions grouped in what the Supreme Court has termed the "retail

55. See *Net Metering in the States*, UTAH STATE CENTER FOR GROWTH AND OPPORTUNITY (July 31, 2018), <https://www.thecgo.org/research/net-metering-in-the-states/>. As of now, only about 1% of the population has net metered solar power, and with that, they purchase and consume a much-reduced amount of conventional centrally supplied power, and thus incur very little of future increased retail utility rates for the cost of net metering subsidies and administrative costs. The other 99% of the population continues purchasing conventional centrally supplied power with these increased costs passed on their rates. One study summarizes the studies of rooftop net metering, although not field-mounted net metering which in many states constitutes the majority of generating capacity, where the studies were completed by five years ago or earlier. It found that while some concluded that non-participating customers cross-subsidized the net metering customers, several other studies found that there were benefits to all customers. See Muro & Saha, *Rooftop Solar*, *supra* note 43.

56. Peter Cappers et al., *Financial Impacts of Net-Metered Distributed PV on a Prototypical Western Utility's Shareholders and Ratepayers*, 12 *ENERGIES*, at 1, 1-19 (2019).

57. Cherrelle Eid, *The Economic Effect of Electricity Net-metering with Solar PV: Consequences for Network Cost Recovery, Cross Subsidies and Policy Objectives*, 75 *ENERGY POL'Y* 244, 245 (2014). distributed generation: Quantifying cross-subsidies from consumers to prosumers. *Utilities Policy* 2015, 37, 23-33.

58. See *infra* Section V.

59. 16 U.S.C. § 824(b)(1).

sale of electricity.”⁶⁰ The Court has recognized that when FERC exercises regulatory power over these wholesale transactions, it does so in an exclusive manner.⁶¹ Since under the current field preemption doctrine when Congress exclusively occupies a field of regulation there is no room for any supplementary state legislation,⁶² the question of whether net metering constitutes a wholesale transaction or a retail sale of electricity determines whether this crucial tool for fighting climate change can survive under the Federal Power Act.

In 2001, FERC held in *MidAmerican*,⁶³ the first of two cases adjudicating the legality of net metering, that no sale occurs when net metering accounts for less power export from the renewable power generator than the amount of power sold back by the utility to the distributed generator in a given billing period (usually one month)—put differently, net metering is not a wholesale transaction if the customer consumes more energy from the utility than she transmits back to the utility.⁶⁴ Such state net metering decisions were not preempted by the Federal Power Act and the Supremacy Clause of the Constitution.⁶⁵ FERC defined allowed net metering in the following context:

A participant in a net metering program must be a net consumer of electricity—but for portions of the day or portions of the billing cycle, it may produce more electricity than it can use itself. . . . Since the program participant is still a net consumer of electricity. . . .⁶⁶

Under the facts in this case, no net metering credits were transferred to other customers by the recipient customer, and the net flow of power transfer was to the customer, despite net metering, over the course of the billing period.⁶⁷ If there is zero net transfer of power back to the utility, there is no net wholesale sale of power, which is the threshold for federal FERC jurisdiction.⁶⁸

60. *Id.*; *Hughes v. Talen Energy Marketing, L.L.C.*, 136 S. Ct. 1288, 1292 (2016).

61. *Talen Energy*, 136 S. Ct. at 1292. .

62. *Murphy v. Nat'l Collegiate Athletic Ass'n*, 138 S. Ct. 1461, 1480 (2017).

63. *MidAmerican Energy Co.*, 94 FERC 61,340 (2001).

64. *Id.* ¶¶ 62,261, 62,263. In March 2001, MidAmerican Energy Company challenged before FERC the state of Iowa's regulations directing MidAmerican to interconnect with three “[a]lternate [e]nergy facilities and to offer net billing arrangements to those facilities.” *Id.* ¶ 62,261. MidAmerican also requested a declaratory order that federal law preempted these regulations. *Id.* MidAmerican asked the commission to undertake enforcement action against the Iowa Board or to issue a declaratory order that the final orders of the Iowa Board are preempted by PURPA. *Id.*

65. *Id.* ¶¶ 62,261, 62,263.

66. *Sun Edison L.L.C.*, 129 FERC 61,146, 61,620 (2009).

67. *Id.*

68. *See supra* Section II.A.

Subsequently, the Iowa Supreme Court held, in a case called *Windway Technologies*,⁶⁹ that FERC held that state laws requiring rate-regulated utilities to use net metering are not inconsistent with PURPA, which sets an allowable sale rate for alternate energy providers to utilities.⁷⁰ Put differently, the Iowa Supreme Court held that PURPA specifically allowed net-metering users who produce electricity to sell to utilities at an avoidable cost rate.⁷¹ However, the Iowa court found no federal case or regulatory decision holding that net metering is required by PURPA.⁷² It held that the district court erred when it ordered Iowa retail utility Midland to use net metering in selling energy to and obtaining energy from the plaintiffs.⁷³ Conversely in, *Gregory Swecker*, FERC determined that Midland must provide net metering.⁷⁴ It held that the Iowa Utility Board's requirement that state regulated utilities within the state must not offer net metering to small generators is consistent with PURPA, and does not result in a rate exceeding a utility's avoided costs.⁷⁵

In *Sun Edison LLC*,⁷⁶ in 2009, FERC reiterated that net metering practices under state regulations are not wholesale power sale transactions but merely meter reading conventions:⁷⁷

We agree that, where the net metering participant (i.e., the end-use customer that is the purchaser of the solar-generated electric energy from Sun Edison) does not, in turn, make a net sale to a utility, the sale of electric energy by Sun Edison to the end-use customer is not a sale for resale, and our jurisdiction under the FPA is not implicated. That is, under the holding of

69. *Windway Technologies, Inc. v. Midland Power Co-op.*, 696 N.W.2d 303 (Iowa 2005). Customers, who were also alternate energy producers ("AEPs"), sued a nonrate-regulated electric utility to determine whether the utility was required to use "net metering" or separate billing for AEP usage and AEP sales to utility. The court reasoned that net metering was not required because a decision to uphold the lower court's decision would mean that all non-rate-regulated utilities in Iowa would be required to use net metering for all AEPs. *Id.* at 307.

70. *Id.* at 307; see also *MidAmerican*, 94 FERC at ¶¶ 62,263–64.

71. See *Windway Technologies*, 696 N.W.2d at 307.

72. *Id.* at 307–09 (“(1) the specialized and technical nature of the net-metering issue, (2) the absence of any meaningful guidance for case-by-case determinations of when net metering is appropriate and when it is not, (3) the broad precedential effect of requiring net metering in this case, which would be contrary to FERC’s position that net metering is appropriate ‘in some situations,’ (4) the authority of the Iowa legislature and the utilities board to require net metering for non-regulated utilities and their failure to do so, and (5) the authority of FERC to regulate the implementation of PURPA by nonrate-regulated utilities, including ordering net metering.”).

73. *Id.* at 308.

74. *Gregory Swecker*, 111 FERC 61,365, ¶ 62,585 (2005).

75. *Id.*

76. *Sun Edison L.L.C.*, 129 FERC 61,146 (2009).

77. *Id.* at 61,621.

MidAmerican, where there is no net sale over the applicable billing period to the local load-serving utility, there is no sale.

Note that the “net” flow of net-metered power again was in the traditional direction from the utility supplier to the user or project owner. FERC in *Sun Edison* noted that the retail customer’s net consumption of electricity from the grid is critical: “A participant in a net metering program must be a net consumer of electricity—but for portions of the day or portions of the billing cycle, it may produce more electricity than it can use itself.”⁷⁸

Limited strictly to the applicant’s warranties of the net direction of power flow, FERC found that these sales are not wholesale sales in interstate commerce under the Federal Power Act and therefore concluded they don’t involve FERC jurisdictional wholesale sales at impermissible prices under the Act:⁷⁹

Because we have found that, where the end-use customer makes no net sale to the local load-serving utility with which it has a net metering arrangement, the sale of electric energy by SunEdison to the end-use customer in such circumstances does not constitute a sale for resale (and also would not involve transmission in interstate commerce), and in such circumstances the sales are not subject to the Commission’s jurisdiction under Part II of the FPA...⁸⁰

It was stipulated by the parties that the Sun Edison power project size required the end-use customer to purchase 100% of its power output, which was only about 30% of the total electric requirements of the customer, from the third-party solar rooftop owner SunEdison, with the remaining 70% provided by the utility—that is, the net flow of electricity was from the utility to the end user.⁸¹ This was pivotal in FERC’s legal determination:

Only if the end-use customer participating in the net metering program produces more energy than it needs over the applicable billing period, and thus is considered to have made a net sale of energy to a utility over the applicable billing period, has the Commission asserted jurisdiction. If the entity making a net sale is a QF that has been exempted from section 205 of the FPA by section 292.601 of our regulations, no filing under the FPA is

78. *Id.* at 61,620. Like *MidAmerican*, the *Sun Edison* order was an adjudication and thus is limited to the particular facts of the case.

79. *Id.*

80. *Id.* at 61,621 (emphasis added).

81. *Id.* at 61,619.

necessary to permit the net sale; however, if the entity is either not a QF or is a QF that is not exempted from section 205 of the FPA by section 292.601 of our regulations, a filing under the FPA is necessary...⁸²

Both decision that have squarely addressed the legality of net metering *only* did so in the context of the facts specific to their cases that net metering having a net flow of electricity from the utility to an end user.

There is a third FERC decision. In an April 2020 petition to FERC, the New England Ratepayers Association (“NERA”) asserted that net metering caused inequitable cost-shifts among customer categories and was a wholesale power sale subject to FERC’s jurisdiction.⁸³ This petition sought a declaratory order of exclusive federal jurisdiction over energy sales from distributed generation where the output exceeds the customer’s demand, and is required to be valued and priced at avoided cost as a section 210 PURPA sale, or as a wholesale power sale pursuant to sections 205 and 206 of the Federal Power Act.⁸⁴

This was a generic petition, without raising facts regarding a certain state net metering program or an affected project, which hamstrung it procedurally. FERC determined that the issues presented in the petition “do not warrant a generic statement from the Commission at this time . . . [because they did not] identify a specific controversy or harm that the commission should address in a declaratory order,” according to FERC Chairman Neil Chatterjee at FERC’s July 2020 open meeting.⁸⁵ FERC Commissioners Bernard McNamee and James Danly supported the procedural discretion in concurring statements suggesting that certain basic federal and state jurisdictional issues raised in the petition may warrant further attention if specific state facts were raised. Commissioner McNamee’s opinion noted:

Though I support the Commission’s Order dismissing, on procedural grounds, New England Rate Payers Association’s (NERA) Petition for Declaratory Order (Petition) concerning net metering, I write separately to make clear that today’s Order does not address any of the important, substantive issues underlying the Petition.

82. *Id.* (footnotes omitted) (emphasis added).

83. Petition for Decl. Order, No. EL20-42, at 1, 42 (filed Apr. 14, 2020); *see also* Jasmin Melvin, *FERC Rejects Anti-Net Metering Petition but Issues Raised Could Resurface*, S&P GLOBAL (July 16, 2020), <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/ferc-rejects-anti-net-metering-petition-but-issues-raised-could-resurface-59467688>.

84. Petition for Decl. Order, No. EL20-42, at 1, 45 (filed Apr. 14, 2020) (requesting that the Commission “find unlawful, and therefore reject, state net metering laws which assert jurisdiction over such wholesale sales and establish a price in excess of what PURPA or the FPA allows for wholesale sales subject to this Commission’s exclusive jurisdiction”).

85. Melvin, *supra* note 86.

To that end, the Commission's Order is not a decision on whether the Commission lacks jurisdiction over the energy sales made through net metering; nor is it a decision on the merits of the issues raised by and contained in the Petition. I also note, that as a general proposition, I think it is best to decide important legal and jurisdictional questions, like the ones raised in in the Petition, when applying the law to a specific set of facts, such as in a Section 206 complaint, or through a rulemaking proceeding.⁸⁶

Commissioner Danly expressed concern that there was a need going forward to address the substantive issue to avoid inconsistent federal court treatment of wholesale power transfers in a "patchwork quilt of conflicting decisions. . . . Confusion, delay and inconsistent rules—some of which will apply to individual states or parts of states—will be the inevitable result."⁸⁷ FERC has not yet had a specific case in which to address the legal question of what happens when substantial amounts of net excess generation under net metering is credited or purchased by the utility, the flip-side of the coin in the *MidAmerican* and *Sun Edison* cases.

In 2020, FERC issued regulatory Order No. 2222, which offered a way to monetize surplus self-generated power as an alternative to state retail net metering. FERC Order No. 2222 allows distributed energy resources ("DERs") to operate on a level playing field in the organized capacity, energy, and ancillary services markets operated by regional grid operators.⁸⁸ While regulating wholesale electricity transactions, the Order leaves state net metering untouched as a retail transaction in the thirty-nine states that have state net metering laws.⁸⁹

The rule also directs power grid operators to allow DERs that participate in one or more retail programs to participate in its wholesale markets and to provide multiple wholesale services but also to include any appropriate, narrowly designed restrictions necessary to avoid double-counting of retail and wholesale market financial benefits.⁹⁰ The rule does not allow retail regulatory authorities to broadly

86. *New England Ratepayers Ass'n*, 172 FERC ¶ 61,042, ¶ 61,370 (July 16, 2020) (footnote omitted).

87. *Id.* (Danly, Comm'r, concurring).

88. *See* Order No. 2222, RM18-9-00, 172 FERC 61,247 (September 17, 2020). Each transmission tariff must set a size requirement for resource aggregations that may not exceed 100 kilowatts and address technical considerations of locational requirements for DER aggregations, distribution factors and bidding parameters, information and data requirements, metering and telemetry requirements, and coordination among the regional grid operator, the DER aggregator, the distribution utility, and the relevant retail regulatory authority. *Id.* at 62,639. *See also* Order No. 841, 162 FERC 61,127, ¶ 35 (2018), in which the court affirmed the Commission's exclusive jurisdiction over the regional wholesale power markets and the criteria for participation in those markets.

89. 172 FERC 61,247, 62,646..

90. *Id.* at 62,670. FERC Order No. 2222 takes effect 60 days after publication in the Federal Register. Grid operators must make compliance filings FERC within 270 days of publication in

prohibit DERs from participating in the regional markets, but it does allow them to continue preventing these aggregated sources from bidding.⁹¹

The rule explains that state and local authorities remain responsible for the interconnection of individual DERs for the purpose of participating in wholesale markets through a DER aggregation.⁹² Order No. 2222 has a size limitation: To participate a DER must be of an individual or aggregated size of at least 100 kW to participate directly in FERC-regulated wholesale markets.⁹³ A key difference in eligibility between state net metering and FERC Order 2222 wholesale market participation is that while FERC has a minimum size limitation, some state net metering programs have maximum size limitation.⁹⁴ The “sweet spot” created by Order 2222 may be to create a market to aggregate individual projects of sizes less than 100 kW each which can’t otherwise participate at their individual small sizes. Moreover, several states already have hit their net metering caps and cannot include any additional projects; such project might therefore resort to Order 2222 wholesale power participation with their surplus power.

FERC Order No. 2222 has the potential to fundamentally transform net metering by allowing distributed energy resources to aggregate and sell at wholesale their output to the grid,⁹⁵ instead of net metering their power as a shadow retail transaction. An obvious aggregator would be the utility, which has access to all information on its utility customers, and could optimize monetization of the excess power produced the net metering requires it to accept and credit from its net metering customers in 39 states.⁹⁶ FERC does not preempt state net metering, although it does not currently allow surplus power to participate in wholesale markets. This order provides another alternative that allows states with net-flow of consumer produced electricity to the utilities to work around the *MidAmerican* and *SunEdison* decisions. However, states that allow naïve aggregation could run afoul of the limits placed by *MidAmerican* and *SunEdison* and could end up having net metering policies that violate the Federal Power Act.

the Federal Register. See generally FERC Order No. 2222: Fact Sheet, FERC, <https://www.ferc.gov/media/ferc-order-no-2222-fact-sheet> (last updated Sept. 28, 2020).

91. 172 FERC 61,247, 62,687; Order No. 2222: Fact Sheet, *supra* note 93.

92. *Id.* at 62,658.

93. *Id.* at 62,676–77. See also Order No. 841, 162 FERC 61,127, ¶ 265.

94. E.g., *State Net Metering Policies*, *supra* note 26. Some states limit net metering size to that of a two to four family house typical consumption of ten to twenty kilowatts, although a significant segment of the net metering states allow large projects up to one to two megawatt size or no limit at all. *Id.*

95. 172 FERC 61,247, 62,645–46. Any DER aggregator will extract payment to cover ongoing expenses to be a member and participate in ISO/RTO FERC-regulated markets.

96. *Id.* at 62,646 (describing how certain aggregators constitute public utilities).

IV. ANALYZING LEGAL CONTOURS IN RELEVANT U.S. STATE LAWS

Below, this section outlines and compares each state's net metering program, noting any key changes in the last five to ten years and the result found in today's net metering regulations. Each previous iteration and current changes affect the legality of net metering in the U.S. federalist system by whether the net metering 'cash-out' at the end of the billing period, if any, is at the federally-allowed avoided cost rate under PURPA, or at a higher retail net metering rate. The latter retail rate is not allowed for a wholesale market transaction where power is purchased by a utility, and is not subject to state determination since it is entirely within federal jurisdiction under the Federal Power Act.⁹⁷

A. The Current State of Net Metering Laws

Alaska. Alaska allows retail customers to be credited at a non-firm power rate for the amount of energy net metered.⁹⁸ The credits can be transferred from month to month for an indefinite period of time.⁹⁹ The customer cannot receive a cash payment for surplus credits produced either at the end of the month or end of the billing year.¹⁰⁰ In terms of system size, a customer is allowed to install a maximum of twenty-five kilowatts per premises,¹⁰¹ which must be located on the customer's property to be eligible to net meter.¹⁰²

American Samoa. American Samoa's net metering program allows residential and small commercial customers to net meter output from a maximum size of thirty kilowatts per system, and the policy may be extended to larger industrial customers in the future.¹⁰³ At the end of the annual billing period, the unused credits are forfeited to the utility company,¹⁰⁴ without an option of a cash payment or rolling over the credits to the next billing period.¹⁰⁵

97. See, e.g., 16 U.S.C. § 824(d).

98. ALASKA ADMIN. CODE tit. 3, §§ 50.930(a)(2) (2010). For relevant net metering standards, see id. § 50.900–30.

99. *Id.* § 50.930(b).

100. *Id.*

101. *Id.* § 50.920(2)(A).

102. *Id.* § 50.920(2)(B).

103. *American Samoa—Net Metering*, NC CLEAN ENERGY TECHNOLOGY CTR., <http://programs.dsireusa.org/system/program/detail/3218> (last visited Feb. 20, 2020).

104. *Id.*

105. *Id.*

Arizona. Customers are allowed to roll over surplus credits to future utility bills at the retail rate.¹⁰⁶ At the end of the calendar year, the customer can either receive a cash payment or credits valued at the avoided cost rate.¹⁰⁷ Avoided cost rate is defined as “the incremental costs to an Electric Utility for electric energy or capacity or both, which but for the purchase from the Net Metering Facility, such utility would generate itself or purchase from another source.”¹⁰⁸

Arkansas. Arkansas allows retail or commercial customers to net meter credits.¹⁰⁹ The maximum residential size system is twenty-five kilowatts, or at 100% of the customer’s highest monthly usage in the past twelve months, while a commercial customer can have a system of a maximum of three hundred kilowatts.¹¹⁰ There is no option for the customer to receive a cash payment for surplus credits, however, the customer can roll over the credits indefinitely to future utility bills.¹¹¹ Once unused credits are over two years old and total at least one hundred dollars, the customer has the option to have the electric utility company purchase the unused credits at the average avoided cost rate for wholesale energy.¹¹²

California. California allows commercial and retail customer net metering.¹¹³ Net excess generation is credited to a customer’s next bill at retail rate.¹¹⁴ At the end of a twelve-month cycle, the customer may opt to roll over its earned credits for an indefinite period of time, or it can opt for a cash payment.¹¹⁵ The rate for payment is calculated by the price of electricity from 7 am to 5 pm,¹¹⁶ California’s peak energy demand period. California also gives their customers with multi-tenant properties and distributed generation technologies the option of virtual net metering or community net metering, where members of the community may allocate and share net metering credits.¹¹⁷

106. ARIZ. ADMIN. CODE § R14-2-2306 (2009).

107. *Id.* § R14-2-2306(F).

108. *Id.* § R14-2-2302(1).

109. *See* ARK. CODE ANN. §§ 23-18-603(7)–(8), 23-18-604 (2012).

110. *Id.* §§ 23-18-603(8)(B)(i), 23-18-605(c).

111. *Id.* § 23-18-604(b)(8)(A)(i).

112. *Id.* § 23-18-604(b)(8)(A)(ii).

113. CAL. PUB. UTIL. CODE. § 2827 (West 2012).

114. *Id.* § 2827(i)(3).

115. *Id.* § 2827(h).

116. Cal. Pub. Util. Comm’n, Decision Adopting Net Surplus Compensation Rate, (D) 11-06-016 (2011), https://docs.cpuc.ca.gov/PublishedDocs/PUBLISHED/FINAL_DECISION/137431.htm

117. *See* Cal. Pub. Util. Comm’n, Decision 15-01-027 (2015); <https://www.cpuc.ca.gov/General.aspx?id=3752>.

Colorado. Colorado allows net metering for residential, commercial, and industrial customers.¹¹⁸ The customer is allowed to roll over credits to its next bill at the retail rate.¹¹⁹ At the end of the year, the customer can roll over the credits for the next billing year indefinitely or receive a cash payment at the average hourly incremental cost.¹²⁰ A residential customer is allowed to install up to ten kilowatts of eligible generation capacity, while a commercial or industrial customer is allowed to install up to twenty-five kilowatts.¹²¹ Colorado also has an extremely successful “community solar gardens” virtual net metering program that all customer classes are allowed to utilize, so long as there is a minimum of ten people participating per generation account,¹²² comprised of individual-consumers, commercial, or industrial consumers.¹²³

Connecticut. In May 2018, Connecticut made significant changes to the state’s net metering policies, ending net metering to new customers when the Residential Solar Investment Program ends, or when regulators establish the new compensation program.¹²⁴ Any existing net metering customers were grandfathered until December 2039.¹²⁵ For current net metering customers, the credits are carried over for one year and the customer is allowed to receive a cash payment at the avoided cost rate of wholesale power at the end of the year.¹²⁶ Connecticut also allows virtual net metering or community net metering for municipal, state, or agricultural customers.¹²⁷

Delaware. In Delaware, customer can roll net metering credits over to the next bill.¹²⁸ At the end of the twelve-month billing period, the customer can either roll over its credits indefinitely or receive a cash payment at the utility’s avoided cost wholesale power rate.¹²⁹ Delaware also allows community net metering where

118. COLO. REV. STAT. § 40-2-124(7)(b)(V) (2012).

119. *Id.* §§ 40-2-124(7)(b)(I)–(II).

120. *Id.* § 40-2-124(1)(e)(I)(B).

121. *Id.* § 40-2-124(7)(b)(V).

122. *See* COLO. REV. STAT. § 40-2-127(2)(b)(I)(A) (2010) (defining market participants eligible for “community solar gardens” and requirements).

123. *See id.*

124. CONN. GEN. STAT. § 16-244c; *Connecticut Net Metering*, NC CLEAN ENERGY TECHNOLOGY CTR., <https://programs.dsireusa.org/system/program/detail/277> (last visited Mar. 1, 2020).

125. CONN. GEN. STAT. § 16-243h (2012).

126. *Id.*

127. *Id.* § 16-244u.

128. DEL. CODE ANN. Tit. 26, § 1014(e)(2) (2012).

129. *Id.*

customers can aggregate individual meters to community-owned systems.¹³⁰ However, the program has not been vastly used by Delaware residents and has not motivated much development of shared renewable facilities.¹³¹

Florida. In Florida,¹³² the customer can roll over net metering credits to the next bill at the retail rate for up to twelve months.¹³³ At the end of the year, the utility pays the customer for any remaining credits at the avoided cost rate.¹³⁴

Georgia. Until it terminated its net metering program, Georgia allowed customers to sell back their surplus electric energy to the utility at the wholesale price.¹³⁵ Otherwise, any unused credits were credited to the customer's next bill at the avoided cost rate.¹³⁶ A residential customer was allowed to install a maximum of ten kilowatts, while a commercial customer was allowed to install a system up to 125% of its actual or expected electric demand.¹³⁷ Prior to termination, Georgia allowed both residential and commercial customers to work with third parties to install, operate, lease, and/or finance distributed solar systems.¹³⁸

Guam. In 2010, Guam amended its net metering policies to raise residential customer size caps to a maximum of twenty-five kilowatts per system or one hundred kilowatts for non-residential systems.¹³⁹ A customer was allowed to choose when it will be billed, such as monthly, quarterly, semi-annual, or on an annual period.¹⁴⁰ At the end of the twelve-month billing period, the customer is entitled to compensation at a rate determined by the Guam Public Utility Commission.¹⁴¹

130. *Id.* § 1014(e)(1).

131. *See, e.g.,* Tim Sylvia, *Delaware Lifts Rooftop Solar Restrictions*, PV MAG. (Aug. 30, 2019), <https://pv-magazine-usa.com/2019/08/30/delaware-lifts-rooftop-solar-restrictions/>.

132. FLA. ADMIN. CODE ANN. § 25-6.065(8) (2012).

133. *Id.* § 25-6.065(8)(f).

134. *Id.* § 25-6.065(8)(g).

135. GA. CODE ANN. § 46-3-56.

136. *Id.* § 46-3-55.

137. *Id.* § 46-3-62(2). *See generally* *Georgia—Net Metering*, NC CLEAN ENERGY TECHNOLOGY CTR., <http://programs.dsireusa.org/system/program/detail/574> (last updated Mar. 11, 2021).

138. GA. CODE ANN. § 46-3-62(12). H.R. 57 (Ga. 2015), <https://www.legis.ga.gov/api/legislation/document/20152016/145473> (amending Article 1 of Chapter 3 of Title 46 of the O.C.G.A., relating to the generation and distribution of electricity by retail customers).

139. 12 GUAM CODE ANN. § 8502(c)(2) (2019).

140. *Id.* § 8505(a).

141. *Id.* § 8505(c)(3).

Hawaii. Before Hawaii terminated its net metering program, customer credits for grandfathered customers roll over from month to month but at the end of each year, the credits are returned to the utility company for no customer value.¹⁴² In October 2015, the Hawaii Public Commission voted to terminate net metering and replace it with three different options: (1) grid supply option, (2) self-supply option, or (3) time-of-use of tariff.¹⁴³ Hawaii also has a community-based renewable energy program available to all.¹⁴⁴

Hawaii terminated net metering because the solar panels installed on twelve percent of rooftops in Hawaii¹⁴⁵ produced more power than was being used¹⁴⁶ and created the risk that “the energy (could) flow back to the substation...which (could) lead to reliability problems and possibly surges.”¹⁴⁷ Hawaii eliminated its net metering program entirely in 2015, replacing it with two options: “self-supply”¹⁴⁸ and “grid supply.”¹⁴⁹

“Self-supply” is intended to serve those who primarily generate their own electricity, and “does not allow customers to export any rooftop PV energy back to the grid, except very limited amounts for a short duration.”¹⁵⁰ Any exported solar energy is not compensated by the utility.¹⁵¹ Self-supply benefits those with energy storage systems.¹⁵² “Grid supply” allows customers to export energy back to the grid,

142. HAW. REV. STAT. § 269-108 (West 2021).

143. *Hawaii*—

Net Metering, NC CLEAN ENERGY TECHNOLOGY CTR., <http://programs.dsireusa.org/system/program/detail/596> (last updated Nov. 28, 2018).

144. HAW. ADMIN. R. §§ 15-36-01–15-36-11.

145. See Christian Roselund, *Hawaii Shuts Down Net Metering to New Customers*, PV MAG. (Oct. 14, 2015), https://www.pv-magazine.com/2015/10/14/hawaii-shuts-down-net-metering-to-new-customers_100021550/.

146. Anne C. Mulkern, *A Solar Boom So Successful, It's Been Halted*, SCI. AM. (Dec. 20, 2013), <https://www.scientificamerican.com/article/a-solar-boom-so-successfull-its-been-halted/>.

147. *Id.*

148. See *Hawaii Just Ended Net Metering for Solar. Now What*, RMI OUTLET (Oct.16, 2015), http://blog.rmi.org/blog_2015_10_16_hawaii_just_ended_net_metering_for_solar_now_what.

149. *Id.* Grid supply allows customers to export energy to the utility grid and earn a net metering credit lower than the full retail rate, based on a 12-month average on-peak PURPA avoided cost. Phil Cross, *Net Metering Skirmishes in Hawaii, California, Mississippi, Nevada*, PUB. UTIL. FORT., at 56 (2016); see Krysti Shallenberger, *Hawaii Regulators Nix Bid to Raise Caps on Grid-supply Rooftop Solar Incentive*, UTILITY DIVE (Dec. 15, 2016), <http://www.utilitydive.com/news/hawaii-regulators-nix-bid-to-raise-caps-on-grid-supply-rooftop-solar-incent/432464/>.

150. *Hawaii Just Ended Net Metering for Solar. Now What*, RMI OUTLET (Oct.16, 2015), http://blog.rmi.org/blog_2015_10_16_hawaii_just_ended_net_metering_for_solar_now_what.

151. *Id.*

152. See Krysti Shallenberger, *Growing Pains: Hawaii Solar Sector Howls as Grid-Supply Incentives Hit Caps*, UTILITY DIVE (Sept. 13, 2016), <http://www.utilitydive.com/news/growing-pains-hawaii-solar-sector-howls-as-grid-supply-incentives-hit-caps/426149/>.

earning a credit determined by “the 12-month average on-peak avoided cost,” which is less than the retail rate.¹⁵³

Illinois. In Illinois, at the end of the annual billing period, customers credits roll over to the next bill at the retail rate, and expire at the end of a twelve-month billing cycle.¹⁵⁴ Illinois also passed legislation mandating electricity providers to allow virtual net metering to meter-aggregated customers within a single building as well as community-owned renewable projects.¹⁵⁵

Indiana. In Indiana, facilities with a maximum of up to 1 megawatt capacity are eligible for net metering.¹⁵⁶ Customers can roll over credits at the retail rate indefinitely.¹⁵⁷ Customers are not allowed to receive a cash payment for excess credits at the end of the annual billing period.¹⁵⁸ In Indiana, only about one tenth of a percent of residents participated in net metering as of 2017.¹⁵⁹ In 2017, Indiana legislators proposed a bill to eliminate net metering, relying on arguments focused on the undue burden cost shifting places on ratepayers and utilities, and noting that net metering might not be necessary any more given the fact that solar is increasingly a competitive option in the market.¹⁶⁰ Indiana’s proposed legislation would implement a “buy all, sell all” requirement applying wholesale (relatively low) rates to energy credited by utilities, and retail (relatively high) rates to energy purchased from utilities by those with solar installations.¹⁶¹

153. Cross, *supra* note 152, at 56..

154. ILL. COMP. STAT. ANN. § 16-107.5.

155. *Id.* § 16-107.5(b). See also *Illinois Net Metering*, NC CLEAN ENERGY TECHNOLOGY CTR., <https://programs.dsireusa.org/system/program/detail/2700> (last visited Mar. 2, 2020).

156. 170 IND. ADMIN. CODE 4-4.2-1(j)(1).

157. *Id.* § 4-4.2-7(3).

158. *Id.*; see generally *Net Metering for Home Solar Panels*, ENERGY SAGE (Feb. 11, 2021), <https://www.energysage.com/solar/101/net-metering-for-home-solar-panels/>.

159. See Kari Lydersen, *Indiana Energy Bill Would Eliminate Net Metering, Move to ‘Buy-all, Sell-all’ Solar Model*, MIDWEST ENERGY NEWS (Jan. 24, 2017), <http://midwestenergynews.com/2017/01/24/indiana-energy-bill-would-eliminate-net-metering-move-to-buy-all-sell-all-solar-model/>.

160. See Jeff Brooks-Gillies, *Net Metering Bill Would Make Indiana an Outlier on Solar Policy*, MIDWESTERN ENERGY NEWS (Jan. 31, 2017), <http://midwestenergynews.com/2017/01/31/net-metering-bill-would-make-indiana-an-outlier-on-solar-policy/>; Stephanie Wang, *Controversial Bill to Cut Solar Incentive Heads to Gov. Eric Holcomb’s Desk*, INDY STAR (Apr. 10, 2017), <http://www.indystar.com/story/news/politics/2017/04/10/bill-cut-solar-incentive-heads-holcombs-desk/100291880/>; Stephanie Wang & Robert King, *House Panel Advances Bill to Trim Solar ‘Subsidy’*, INDY STAR (Mar. 29, 2017), <http://www.indystar.com/story/news/politics/2017/03/29/house-panel-advances-bill-trim-solar-subsidy/99774592/>.

161. Brooks-Gillies, *supra* note 163 (internal quotation marks omitted).

This model provides only a modest benefit to those with solar installations.¹⁶² Despite the small number of residents who currently use net metering, there was significant outcry at the legislation as initially proposed, and it later was amended before enacted.¹⁶³ The amended version of the bill signed by the governor in May 2017,¹⁶⁴ abandons the “buy all, sell all” requirement at alternate wholesale rates; instead, it reduces credits for energy traded back to the grid from the full retail rate to the marginal cost rate, plus twenty-five percent, by 2022 (plus another ten years for those already involved in the net metering program).¹⁶⁵ Indiana’s change does not base a rate on a complex assessment of solar’s true benefits to or burdens on ratepayers, but instead implements a flat rate.

Iowa. In Iowa, any unused credits are transferred to the customer’s next utility bill at the retail rate,¹⁶⁶ and at the end of each year, excess credits are cashed out at the avoided cost rate.¹⁶⁷

Kansas. Effective July 1, 2014, a non-residential customer is allowed to install for net metering a maximum of one hundred kilowatts, fifteen kilowatts for a residential customer, and one hundred and fifty kilowatts for schools.¹⁶⁸ Net metering credits expire on March 31st of each year.¹⁶⁹ If a customer started net metering before July 1, 2014, it is allowed to roll over its credits at the retail rate for their next bill.¹⁷⁰ If the customer opted into net metering on or after July 1, 2014, the customer is allowed to roll over credits at the average cost rate instead of the retail rate.¹⁷¹

Kentucky. In Kentucky, customers are allowed to apply unused credits from month to month indefinitely,¹⁷² but cannot receive a cash payment for their unused

162. See Danielle Ola, *End is Nigh for Indiana Net Metering as Senate Committee Passes Controversial Bill*, PV TECH (Feb. 17, 2017), <https://www.pv-tech.org/news/end-is-nigh-for-net-metering-in-indiana-as-senate-committee-passes-controvere>.

163. *Id.*

164. See *The Fight to Put a Value on Rooftop Solar Power*, CLIMATE NEXUS, <http://climatenexus.org/net-metering-fight-understanding-latest-issue-nation%E2%80%99s-rapidly-changing-electricity-market> (last visited May 9, 2017).

165. See Robert Walton, *Indiana House Approves Bill to Phase out Retail Net Metering*, UTILITY DIVE (Apr. 6, 2017), <http://www.utilitydive.com/news/indiana-house-approves-bill-to-phase-out-retail-net-metering/439883/>.

166. IOWA CODE § 476.49(3) (2008).

167. *Id.* § 476.49(3)(a)(2).

168. KAN. STAT. ANN. § 66-1267(b) (2014).

169. *Id.* § 66-1266(a)(5).

170. *Id.* § 66-1266(a).

171. *Id.* § 66-1266(b).

172. KY. REV. STAT. ANN. § 278.466(4) (West 2008).

credits. Customers are allowed to install for net metering a maximum of forty-five kilowatts of generation capacity.¹⁷³

Louisiana. Louisiana allows net metering for investor-owned utilities, municipal utilities, and electric cooperatives.¹⁷⁴ Commercial and agricultural customers are allowed to install for net metering a maximum of three hundred kilowatts, twenty-five kilowatts for residential customers, and systems larger than three hundred kilowatts will be evaluated on a case-by-case basis.¹⁷⁵ At the end of each month, the customer is allowed to roll over unused credits to the customer's next bill at the retail rate.¹⁷⁶ At the end of the twelve-month billing period, the customer can carry over credits for an indefinite period of time.¹⁷⁷ At the end of net metering service, the utility company will pay the customer at the avoided cost rate for surplus credits.¹⁷⁸

Maine. Before Maine terminated its net metering program in 2017 and switched to gross metering,¹⁷⁹ at the end of each month, the customer could use unused credits from previous months to be applied for their current bill.¹⁸⁰ Any unused credits, after one year, were reclaimed by the utility without any option for a cash payment to the customer.¹⁸¹ Surplus credits were only of value to the customer for one year.¹⁸² In April 2019, Maine's governor signed legislation to restore net metering and eliminate gross metering.¹⁸³ Also, Maine allows virtual net metering where participants are required to have an actual ownership stake in the generation facility, limited to no more than ten participants per virtual net metering facility.¹⁸⁴

173. *Id.* § 278.465(2)(c).

174. LA. REV. STAT. ANN. § 51:3062(2) (2008).

175. *Id.* § 51:3062(5)(b); In re: Review of Policies Related to Customer-Owned Solar Generation and Possible Modification of the Commission's Current Net Energy Metering Rules, R-33929, 2019 WL 4668398 (La. P.S.C.), at *5 (La. Pub. Serv. Comm'n September 19, 2019).

176. In re: Review of Policies Related to Customer-Owned Solar Generation and Possible Modification of the Commission's Current Net Energy Metering Rules, R-33929, 2019 WL 4668398 (La.P.S.C.), at *4 (La. Pub. Serv. Comm'n September 19, 2019).

177. *Id.*

178. *Id.* at *5.

179. An Act to Eliminate Gross Metering, Pub. L. HP0077, LE 91, 129th Me. Legis. (2017) (codified at Me. Rev. Stat. tit. 35-A § 3209-A).

180. ME. REV. STAT. tit. 35-A § 3209-A(1)(C) (2011).

181. *Id.* § 3209-B(5)(C).

182. *Id.*

183. *Governor Mills Signs Legislation to Restore Net Metering & Incentivize Growth of Solar Power in Maine*, MAINE.GOV (Apr. 2, 2019), <https://www.maine.gov/governor/mills/news/governor-mills-signs-legislation-restore-net-metering-incentivize-growth-solar-power-maine>.

184. ME. REV. STAT. tit. 35-A § 3209-A(3).

Maryland. Maryland customers are allowed to roll over their credits from month to month at the retail rate.¹⁸⁵ At the end of the twelve-month billing period, compensation for any unused credits is paid to the customer at the commodity energy supply rate.¹⁸⁶ Maryland permits net metered facility outright ownership by the customer as well as third-party ownership structures.¹⁸⁷ In May 2015, the Maryland legislature enacted House Bill 1087, which allows the Public Service Commission to establish a three-year pilot program for community solar projects within the state, a form of virtual net metering, similar to what has existed in Massachusetts.¹⁸⁸

Massachusetts. Massachusetts is an order of magnitude more advanced in its net metering program than any of the other states which employ net metering. Massachusetts has “virtual net metering” that permits any or all credits to be transferred for value to any other customer in the utility service territory.¹⁸⁹ The Green Communities Act in 2008 expanded the Massachusetts net metering program.¹⁹⁰

In Massachusetts, net metering participants are defined as producers belonging to one of three classes based on type, size, and ownership of the renewable energy generating facility, and they receive different net metering credit amounts for their net metered power.¹⁹¹ The rule adopted outlines that “a net metering facility is the generating equipment associated with a single parcel of land, interconnected with the electric distribution system at a single point, behind a single meter.”¹⁹²

There are three different classes of customers net metering:¹⁹³ Class I customers can install up to sixty kilowatts in capacity, Class II customers can install between sixty kilowatts and one megawatt in capacity, Class III customers can install between one to two megawatts in capacity.¹⁹⁴ Class I and II can roll over their credits

185. MD. CODE. ANN. PUB. UTIL. COS. §§ 7-306(e)–(f) (West 2011).

186. *Id.* § 7-306(f).

187. *Id.* § 7-306(a)(4).

188. H.D. 1087 (Md. 2015) (codified at MD. CODE. ANN. PUB. UTIL. COS. §§ 7-306.1).

189. 220 MASS. CODE REGS. §§ 18.02, 18.04(4)–(5) (2015).

190. *See Green Communities Act of 2008, ch. 169, § 78 (codified as amended at Mass. Gen. Laws Ann. ch. 164 (West 2008)).*

191. 220 MASS. CODE REGS. § 18.02.

192. Order on Definitions of Unit and Facility, No. DPU-11-11-C at 23 (Mass. Dep’t of Pub. Utils. Aug. 24, 2012).

193. MASS. GEN. LAWS ANN. ch. 164, § 138 (West 2011).

194. 220 MASS. CODE REGS. § 18.02.

Class I Net Metering Facility means a plant or equipment that is used to produce, manufacture, or otherwise generate electricity and that is not a transmission facility and that has a design capacity of 60 kilowatts or less.

indefinitely from month to month.¹⁹⁵ Class III customers face a utility option of either a cash payment for unused credits or to roll the unused credits over to the next billing period.¹⁹⁶ Massachusetts gives their customers the option of virtual net metering or community net metering where members of the community share net metering credits from a single net metered generation facility.¹⁹⁷

The Massachusetts Department of Public Utilities (“DPU”) chose to use the term “solar power inverter” as the unit and to allow developers of solar projects of public entities to self-designate their power class “as long as the project includes the minimum number of inverters required to qualify as such a facility.”¹⁹⁸ The DPU also ruled that power distribution companies can grant exceptions of multiple interconnection points and multiple meters to facilities on the basis of optimal interconnection.¹⁹⁹ A net metering facility with a private off-taker of net metered credits cannot exceed two megawatts (“MW”); however, a net metering facility with a public off-taker of credits can have multiple 2 MW units comprising a total of up

Class II Net Metering Facility means an Agricultural Net Metering Facility, Anaerobic Digestion Net Metering Facility, Solar Net Metering Facility, or Wind Net Metering Facility with a generating capacity of more than 60 kilowatts but less than or equal to one megawatt; provided, however, that a Class II Net Metering Facility of a Municipality or Other Governmental Entity may have a generating capacity of more than 60 kilowatts but less than or equal to one megawatt per unit.

Class III Net Metering Facility means an Agricultural Net Metering Facility, Anaerobic Digestion Net Metering Facility, Solar Net Metering Facility, or Wind Net Metering Facility with a generating capacity of more than one megawatt but less than or equal to two megawatts; provided, however, that a Class III Net Metering Facility of a Municipality or Other Governmental Entity may have a generating capacity of more than one megawatt but less than or equal to two megawatts per unit.

195. MASS. GEN. LAWS ANN. ch. 164, § 139(a)(1) (West 2011).

196. *Id.* § 139(b).

197. *Id.* § 139(a).

198. Order on Definitions of Unit and Facility, No. DPU-11-11-C, at 18 (Mass. Dep’t of Pub. Utils. Aug. 24, 2012). D.P.U. Order 11-11-E reaffirmed the definitions of “unit” and “facility” adopted in Order 11-11-C. The D.P.U. allowed a narrow exception from the three-factor approach for certain net metering facilities, via a petition filed with the D.P.U. and handled on a case-by-case basis. Order on Exception to Definitions of Unit and Facility, No. DPU-11-11-E, at 17–18 (Mass. Dep’t of Pub. Utils. (July 1, 2013).

199. Order on Exception to Definitions of Unit And Facility, No. DPU-11-11-E, at 18 (Mass. Dep’t of Pub. Utils. (July 1, 2013). The D.P.U addressed whether a customer may seek net metering services for a portion of a generating facility by stating, “No customer may seek net metering services for a portion of a generating facility . . . However, nothing prevents a customer from installing a net metering facility in phases, with old and new generating equipment, assuming that the customer seeks a net metering cap allocation for all such equipment.” *Id.* at 19. To seek exceptions: If a facility seeks relief from the single parcel requirement, then it seeks an exception from the D.P.U.; if a facility seeks an exception to the single interconnection point and/or from the single meter requirement per parcel, it seeks it from the utility distribution company. *Id.*

to 10 MW for the entire facility at a single location.²⁰⁰ “Net metering projects of public entities are subject to a special rule and may exceed the maximum generating capacity limit established for facilities, so long as they do not exceed 10 MW.”²⁰¹

Massachusetts net metering credits now earn a value close to the retail power rate. Net metering host customers can transfer or sell their net metering credits to any other non-host customer of the utility in the same load zone,²⁰² a feature that is unique among all states. Since 2008, Massachusetts implemented a series of net metering cap increases²⁰³ until 7% of each utility’s overall peak electricity load is reserved for private net metering credit off-takers plus 8% is reserved for public net metering off-takers, for a total of 15% of peak load which for some Massachusetts utilities is already fully subscribed as net metered.²⁰⁴

In Massachusetts, its recent Solar Massachusetts Renewable Target (SMART) Program in 2018, provides a financial “adder” higher than “avoided cost” rates for solar projects paired with co-located energy storage projects.²⁰⁵ The SMART Program promotes energy storage with financial “adder” incentives to combine energy projects with storage.²⁰⁶ The utilities also obtain ISO-NE forward capacity market value of the participating solar projects.²⁰⁷

200. 220 CODE MASS. REGS. § 18.02.

201. DPU-11-11-C at 15 (citing MASS. GEN. LAWS ch. 164, § 139(f)).

202. See, e.g., *History of Solar in Massachusetts*, MASSSOLAR, <http://solarisworking.org/history-of-solar-in-massachusetts> (last visited Apr. 17, 2021).

203. See *What Is the Green Communities Act?*, MASS. BUS. FOR CLEAN ENERGY, <http://www.mabizforcleanenergy.com/ma-supports-clean-energy/green-communities-act> (last visited Apr. 17, 2021).

204. See *Massachusetts Net Metering*, EVERSOURCE, <https://www.eversource.com/Content/nh/about/doing-business-with-us/builders-contractors/interconnections/massachusetts-net-metering> (last visited Apr. 17, 2021).

205. 220 MASS. CODE REG. § 20. On September 26, 2018, the Massachusetts Department of Energy Resources published a Guideline on Energy Storage explaining the formula used to calculate the SMART program’s storage adder and approving the state’s utility model tariff provisions to implement the SMART program. The SMART program became available on November 26, 2018. See *Solar Massachusetts Renewable Target (SMART) Program*, MASS.GOV., <https://www.mass.gov/info-details/solar-massachusetts-renewable-target-smart-program> (last visited Apr. 17, 2021); *Building a Brighter Future for Massachusetts, SMART*, <http://masmartsolar.com/> (last visited Apr. 17, 2021). Issues were raised as to the legality of the Massachusetts SMART subsidy program which increases the total prices earned by solar projects participating in the wholesale power market, which is exclusively within the jurisdiction of FERC, and not state authority. See *Hughes v. Talen Energy Mktg., LLC*, 136 S. Ct. 1288, 1297 (2016) (holding that Maryland’s program regulating energy rates violated the Supremacy Clause).

206. On September 26, 2018, the DOER published a Guideline on Energy Storage explaining the formula used to calculate the SMART program’s storage adder and approving the state’s utility model tariff provisions to implement the SMART program. *Capacity Block, Base Compensation Rate, and Compensation Rate Adder Guideline*, MASS.GOV., <https://www.mass.gov/doc/capacity-block-base-compensation-rate-and-compensation-rate-adder-guideline-2> (last visited Apr. 17, 2021).

207. The utilities requested that they have the right to bid solar assets compensated under the SMART program into the ISO-NE forward capacity market and retain the revenue to be received from

Michigan. The net metering program only applies to rate-regulated utilities and alternative electric suppliers, including rural electric distribution cooperatives that are not regulated by membership.²⁰⁸ If a customer installs less than twenty kilowatts, its surplus credits are carried over to the next billing period at retail rate.²⁰⁹ A modified net metering facility can be up to one hundred and fifty kilowatts, and surplus credits carry over at the retail rate or the monthly average of real time pricing based on location.²¹⁰ Credits carry over indefinitely.²¹¹

Minnesota. In Minnesota, systems for net metering are limited to one megawatt.²¹² At the end of each month, customers with systems less than forty kilowatts have the option to be reimbursed or receive credit on their next bill at the retail utility energy rate for any unused credits.²¹³ For systems between forty kilowatts and 1,000 kilowatts, customers can choose to be credited at the avoided cost rate or compensated in the form of a kWh credit for any unused credit.²¹⁴ For investor-owned utilities, unused credits will be reimbursed at the end of the twelve-month period at the avoided cost rate.²¹⁵ Unused credits of customers of municipal utilities and electric cooperatives expire at the end of the year.²¹⁶ Minnesota also allows community solar ‘gardens’ similar to virtual net metering in other states.²¹⁷

successful bids, despite not previously utilizing this right on any solar project. Project developers objected, and following a series of meetings with stakeholders, including utilities, representatives of the solar and storage industries, as well as the DOER, a compromise was reached in July 2018. Under the framework, developers and/or host retail customers would retain the FCM rights over energy storage systems paired with solar net metering or SMART facilities, with the exception of “SMART projects operating under the Alternative On-Bill Credits arrangement in the SMART program rules.” K&L GATES, K&L GATES: ENERGY STORAGE HANDBOOK 33 (Buck B. Endemann ed., 4th ed. April 2019). The utilities, and for that matter no participating solar projects, ever took advantage of forward capacity market credits or payments for solar projects. This changed when Professor Ferrey took the first non-net-metered solar project into the ISO-NE FCM auction in 2013, its bid won and it was selected to provide long-term capacity to the ISO-NE wholesale system. Thereafter, these FCM payments became a potential revenue component for every new large solar project in Massachusetts.

208. MICH. COMP. LAWS § 460.1173(1) (2008).

209. *Id.* § 460.1177(4).

210. *Id.* § 460.1173(6)(d).

211. *Id.* § 460.1173(6)(d).

212. MINN. STAT. ANN. § § 216B.164 (West 1996).

213. *Id.* § 216B.164(3).

214. *Id.* § 216B.164(3)(b).

215. *Id.*

216. *Id.* § 216B.164(3)(f).

217. *Id.* § 216B.1641(b).

Minnesota adopted the nation's first state-wide "value of solar tariff" ("VOST") in 2014.²¹⁸ This required the Minnesota Department of Commerce to develop a value of solar which utilities could elect to use as an alternative to net metering.²¹⁹ The VOST was required to take into "account the value of energy and its delivery [and] generation value," and could consider the "cost or benefit of solar operation to the utility, credit for locally manufactured or assembled energy systems, and systems installed at high-value locations on the grid."²²⁰

However, there was a thumb on the scale: Legislatively, the VOST rate (for this wholesale transfer of power from the customer to the utility) was not permitted to arrive at a value which was lower than the retail rate of the utility, regardless of the application of the objective methodology.²²¹ This provision ensured that renewable energy supplied by independent parties would not be under-valued,²²² but since Minnesota adopted its new VOST law and method of determination seven years ago, no utility has chosen voluntarily to implement it in lieu of net metering.²²³

Missouri. In Missouri, each month, customers are allowed to roll over their unused credits to subsequent bills at a rate at least equivalent to the utility's avoided cost rate.²²⁴ If the customer has any unused credits at the end of the year, the credits expire with no option to roll over the credits or receive a cash payment.²²⁵

Montana. In Montana, the net metered customer can apply its unused credits to the next bill at retail rate.²²⁶ At the end of a twelve-month billing cycle, the credits expire and the customer does not have the option for a cash payment.²²⁷ Such programs create implied pressure to not over-size a net metered facility.

218. See Mark Muro & Devashree Saha, *Rooftop Solar: Net Metering is a Net Benefit*, BROOKINGS INSTITUTION (May 23, 2016), <https://www.brookings.edu/research/rooftop-solar-net-metering-is-a-net-benefit/>; Herman K. Trabish, *A Rising Tension: 'Value-of-Solar' Tariff Versus Net Metering*, GREENTECH MEDIA (Apr. 10, 2014), <https://www.greentechmedia.com/articles/read/A-Rising-Tension-Within-the-Solar-Industry-Value-of-Solar-Versus-NEM>.

219. *Value of Solar Tariff Program Overview*, N.C. CLEAN ENERGY TECH. CTR., <http://programs.dsireusa.org/system/program/detail/5666> (last updated Mar. 19, 2018).

220. *Id.*

221. *See id.*

222. See Herman K. Trabish, *NARUC Rate Design Manual Reignites Debate Over Cost Shift, Value of Solar*, UTILITY DIVE (Aug. 4, 2016), <http://www.utilitydive.com/news/naruc-rate-design-manual-reignites-debate-over-cost-shift-value-of-solar/423586/>.

223. *Value of Solar Tariff Program Overview*, N.C. CLEAN ENERGY TECH. CTR., <http://programs.dsireusa.org/system/program/detail/5666> (last updated Mar. 19, 2018).

224. MO. REV. STAT. § 386.890(5)(3) (2015).

225. *Id.* § 386.890(5)(4).

226. MONT. CODE ANN. § 69-8-603(3) (2011).

227. *Id.* § 69-8-603(4).

Nebraska. In Nebraska, at the end of the twelve-month billing period, the utility will pay the customer, at the avoided cost rate, for its unused credits.²²⁸ The maximum capacity eligible is twenty-five kilowatts that can be installed per customer.²²⁹

Nevada. As of 2015 before repeal, Nevada Senate Bill 374²³⁰ set the aggregate capacity to a flat cap for the utilities of two hundred and thirty-five megawatts.²³¹ The customer was allowed to receive credits for its excess net metered electric energy at the retail rate.²³² The credits could roll over from month to month indefinitely.²³³ There was no option for the customer to receive a cash payment for its unused credits at the end of the year or month.²³⁴

In 2015, Nevada terminated its program.²³⁵ Nevada terminated its net metering program amid protests from those with solar systems, but reinstated it on a declining value scale: Old customers were grandfathered in at the full retail rate for twenty years, but new net metering customers would earn credits at ninety-five percent of the value of prior credits, declining to seventy-five percent as more solar power was deployed over time.²³⁶

Two years after Nevada terminated its program, through legislation and state PUC order, Nevada restored its net metering program at 95% the value of prior credits, declining to 75% value of prior credits over time as more customers net metered, grandfathered eligibility at 100% value for 20 years for customers who had net metered before Nevada terminated its program and allowed surplus credit cash payment, and would not allow net metering customers to be placed in a separate rate class thus leaving them to be credited at the general retail rate.²³⁷ Nevada decided that it would not guarantee to keep its retail utilities “financially whole” from the

228. NEB. REV. STAT. § 70-2003(4) (2019).

229. *Id.* § 70-2002(7)(f), § 70-2003

230. S. 374 (Nev. 2015).

231. *Id.* § 2.95(b).

232. NEV. REV. STAT. § 704.775(3)(b) (2019).

233. *Id.* § 704.775(c).

234. *Id.*

235. *E.g.*, Julia Pyper, *Nevada Regulators Eliminate Retail Rate Net Metering for New and Existing Solar Customers*, GREENTECHSERVICES (Dec. 23, 2015), <https://www.greentechmedia.com/articles/read/nevada-regulators-eliminate-retail-rate-net-metering-for-new-and-existing-s>.

236. *Id.*

237. NEV. REV. STAT. §§ 704.773(8), 704.7732(3).

revenue loss that this could cause and would deal with utility rate structure subsequently.²³⁸

New Hampshire. New Hampshire customers can roll over their unused credits to their next bill indefinitely.²³⁹ At the end of the year, the customer may elect to be paid for its unused credits at the avoided cost rate.²⁴⁰ In 2013, New Hampshire enacted Senate Bill 98, which allows customers to form a group of customers for virtual net metering within the group.²⁴¹

New Jersey. In New Jersey, at the end of each month, the customer can roll over its credits for future bills at the retail rate.²⁴² For any unused credits at the end of the year, the utility company pays the customer at the avoided cost rate.²⁴³ In May 2018, New Jersey established a Community Solar Energy Pilot Program similar to virtual net metering programs in other states.²⁴⁴

New Mexico. The net metering program in New Mexico allows customers to have an option of a cash payment for their unused credits, or they may elect to roll them over at the end of each month.²⁴⁵ The credits are calculated at the avoided cost rate.²⁴⁶ New Mexico's system capacity limit for net metering is eighty megawatts.²⁴⁷

New York. In New York, at the end of each month, residential customers are allowed to roll over their credits.²⁴⁸ The utility pays the customer for unused credits at the avoided cost rate.²⁴⁹ In July 2015, the New York Public Utility Commission established a community net metering program,²⁵⁰ which allows at least

238. NEV. REV. STAT. § 598.9819; see also *New Energy Industry Force Recommendations*, https://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/Nevada_NEM_Motion_August.pdf (last visited Apr. 17, 2021) (lobbying for regulations to make utilities financially whole).

239. N.H. REV. STAT. ANN. § 362-A:9(V) (2013).

240. *Id.*

241. S. ill 98 (N.H. 2013) (codified at N.H. REV. STAT. ANN. § 362-A:9(XIV)). The host of the group must provide the Public Utility Commission with a list of the members.

242. N.J. STAT. ANN. § 48:3-87(e)(1) (West 2011).

243. *Id.*

244. N.J. ADMIN. CODE § 14:8-4.2.

245. N.M. ADMIN CODE § 17.9.570.14(C) (2008).

246. *Id.*

247. *Id.* § § 17.9.570(17.9.570.15).

248. N.Y. PUB. SERV. LAW § 66-j(3), 66-l(3) (McKinney 2016).

249. *Id.* § 66-j(4).

250. State Of New York Public Service Commission Cases 15-E-0082 et al., In the Matter of Proceeding on Motion of the Commission as to the Policies, Requirements and Conditions For

ten customers per group to receive energy and credits from an off-site eligible generating facility. In March 2017, New York began transitioning from traditional net metering to the development of Value of Distributed Energy Resource (“VDER”).²⁵¹ However, all projects that were interconnected prior to March 2017 will be grandfathered and continue to be compensated through traditional net metering, unless the customer opts for VDER.²⁵²

North Carolina. North Carolina allows customers to use excess net metering credits towards subsequent bills in the year.²⁵³ At the start of the summer months, if a customer has unused credits from previous months, the credits are returned to the utility company without payment to the customer.²⁵⁴ North Carolina also requires Duke Energy Carolinas and Duke Energy Progress to file plans for a community solar program, but community net metering will not be available to retail customers until those plans are approved.²⁵⁵

North Dakota. North Dakota allows utilities to pay customers for their unused credits at the end of each month at the avoided cost rate.²⁵⁶ The maximum capacity that can be installed is one hundred kilowatts per system.²⁵⁷

Ohio. In Ohio, unused credits are credited to a customer’s next bill at the unbundled generation rate, or the customer has the option to request a cash payment

Implementing a Community Net Metering Program, ORDER ESTABLISHING A COMMUNITY DISTRIBUTED GENERATION PROGRAM AND MAKING OTHER FINDINGS, CASE 15-E-0082, 1, 7, 15 (Issued July 17, 2015), <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=15-e-0082>. [hereinafter NY 2015 Order].

251. Cases 15-E-0751, In the Matter of the Value of Distributed Energy Resources, Order on Net Energy Metering Transition, Phase One of Value of Distributed Energy Resources, and Related Matters, 2017 WL 976518 (N.Y.P.S.C.), at *2 (issued March 9, 2017).

252. *Id.* at *81.

253. N.C. GEN. STAT. ANN. §§ 62-126.3(9), (15) (West 2017).

254. DUKE ENERGY CAROLINAS, LLC, RIDER NM (NC): NET METERING, https://www.duke-energy.com/_/media/pdfs/for-your-home/rates/electric-nc/ncridernm.pdf?la=en (last visited May 5, 2021); DUKE ENERGY PROGRESS, LLC, NEW METERING FOR RENEWABLE ENERGY FACILITIES, https://www.duke-energy.com/_/media/pdfs/rates/rr3-nc-rider-nm-dep.pdf?la=en (last visited May 5, 2021); NET METERING, <https://publicstaff.nc.gov/electric/net-metering#can-net-metering-offset-all-charges-on-a-customer's-electric-utility-bill> (last visited May 5, 2021).

255. 2019 WL 1534165 (N.C.U.C.); N.C. GEN. STAT. ANN. § 62-126.8.

256. N.D. ADMIN. CODE § 69-09-07-09(3) (2011).

257. *Id.*

at the end of the billing period.²⁵⁸ Ohio does not specify a system capacity limit for net metering.²⁵⁹

Oklahoma. Unlike other states, Oklahoma does not require the utility company to grant its customers net metering credits for excess energy.²⁶⁰ With an option to do so, if a utility company chooses to credit the customer, the credits would be at the avoided cost rate.²⁶¹

Oregon. In Oregon, customers can roll over their surplus net metering credits to subsequent billing periods.²⁶² If a customer has unused credits at the end of the year, the Oregon net metering program confiscates those credits for customers in the state's low income program at the avoided cost rate.²⁶³ The credit can also be awarded to the customer or determined by the commission for proper use.²⁶⁴ Oregon allows for community net metering as well as third party ownership.²⁶⁵

Pennsylvania. In Pennsylvania, unused credits are credited to the customer's next bill at full retail rate and, at the end of the year, the unused net metering credits are then paid by the utility company under a payment method called "price to compare."²⁶⁶ Residential customers have a system capacity limit of fifty kilowatts, three megawatts for non-residential customers, and five megawatts for micro-grid and emergency systems.²⁶⁷

Puerto Rico. The net metering program in Puerto Rico applies to residential and non-residential customers.²⁶⁸ The maximum capacity that can be installed is twenty-five kilowatts for residential customers and up to one megawatt for non-

258. OHIO ADMIN. CODE § 4901:1-10-28(B)(9) (2011).

259. *See generally id.* § 4901:1-10-28.

260. OKLA. ADMIN. CODE § 165:40-9-3(b) (2012).

261. *Id.* § 165:40-9-3(b).

262. OR. REV. STAT. ANN. § 757.300(3)(c) (West 2011).

263. *Id.* § 757.300(3)(d).

264. *Id.*

265. *Oregon Net Metering*, NC CLEAN ENERGY TECHNOLOGY CENTER, <https://programs.dsireusa.org/system/program/detail/39> (last visited Mar. 10 2020).

266. 73 PA. STAT. ANN. §1648.2 (West 2011); PA. ADMIN. CODE §§ 75.14, 75.13(d) (describing that credits shall include generation, transmission, and distribution charges); *see generally* <https://www.solarrunitedneighbors.org/pennsylvania/learn-the-issues-in-pennsylvania/net-metering-in-pennsylvania/> (noting that price-to-compare includes generation and transmission).

267. PA. ADMIN. CODE §§ 75.13.

268. P.R. LAWS ANN. § 1012.

residential customers.²⁶⁹ Surplus credits can be carried over from month to month for a residential customer limited to three hundred kilowatt-hours and to ten megawatt-hours for non-residential customers.²⁷⁰ At the end of the twelve-month billing period, a customer with unused surplus credits was compensated for seventy-five percent of the credits at ten cents per kilowatt-hour and the remaining twenty-five percent of the accumulated credits will be granted back to the utility.²⁷¹

Rhode Island. Rhode Island allows net metering for systems up to ten megawatts, and the system must be sized to produce no more than an average of three years of annual consumption of the energy at the account.²⁷² Customers are allowed to apply credits for their excess net metered electric energy generated at a cost slightly lower than the full retail rate.²⁷³ If the customer does not want to apply its credits towards its upcoming utility bills, the customer has the option of a cash payment at the same rate were they to roll over their credits.²⁷⁴ The state removed an aggregate utility net metering limit of three percent of peak load for all utilities except Block Island Power Company and Pascoag Utility District.²⁷⁵ Rhode Island allows for community net metering similar to other states, and also allows third party ownership of net metered systems.²⁷⁶ Rhode Islands' community net metering services are available to "cities, towns, schools, farms, and non-profit affordable housing," and to aggregation of credits where a customer(s) is part of a neighborhood provided services by the same utility.²⁷⁷

U.S. Virgin Islands. The United States Virgin Islands allow net metering for systems up to ten kilowatts.²⁷⁸ Unused credits are carried over from month to month

269. *Id.*

270. *Id.* § 1015(e)-(f).

271. *Id.* § 1015(e).

272. R.I. GEN. LAWS. ANN. § 39-26.4-3(a)(1) (West 2011).

273. *Id.* §§ 39-26.4-3(a)(3)-(5)

274. *Id.* § 39-26.4-3(a)(2)(ii).

275. H.R. 7727, 2014 Gen. Assemb., Jan. Sess. (R.I. 2014) (codified at R.I. Gen. Laws. Ann. § 39-26.4-3(a)(1)(i)).

276. R.I. GEN. LAWS. ANN. § 39-26.4-2(1).

277 *Id.* § 39-26.4-2(14). See generally Ferrey, *Virtual "Nets" and Law*, *supra* note 35, at 294 (citing S. 485, Gen. Assemb. 2011, Reg. Sess. (R.I. 2011) (listing the eligible participants in this particular renewable generation program)). See also *id.* ("[O]ne school in a district can install renewable energy and apply the credits to all the schools in the district or any other buildings owned by the town or city."). Rhode Island's program is similar to Massachusetts seeing as both states offer the neighborhood participants the ability to aggregate credits between like-participants, but Rhode Island has expanded the class of market participants eligible for these programs. *Id.* Both states allow for a renewable energy generator to be installed "at one site and apply credits to up to ten other sites." *Id.*

278. V.I. CODE ANN. tit. 12, § 113(d) (2014).

at the retail rate.²⁷⁹ The remaining credits at the end of the twelve-month billing period are forfeited to the utility company.²⁸⁰ The customer has no option of a cash payment or to roll over unused credits.²⁸¹

South Carolina. Residential customers in South Carolina are allowed to have net metering systems up to twenty kilowatts, and non-residential customers are capped at one thousand kilowatts.²⁸² Customers are allowed to roll over their unused credits for excess energy generated.²⁸³ At the end of the billing season, utilities must compensate the customers at the avoided cost rate.²⁸⁴

Utah. Utah allows customers to receive credit for excess generated energy at the retail rate.²⁸⁵ Unused credits at the end of the twelve-month billing period are surrendered to the utility company with no payment to the customer.²⁸⁶

Vermont. Vermont allows their customers to be credited on their next bill for excess energy generated at the blended residential rate.²⁸⁷ There is an option for the customer to be credited for net metering through a “time of use” metering arrangement.²⁸⁸ At the end of the twelve-month billing period, the customer must relinquish all unused credits to the utility company with no payment.²⁸⁹ Vermont allows “group net metering” similar to virtual net metering or community net metering in other states.²⁹⁰

Virginia. Net metering in Virginia allows their customers to be credited for excess net metered electric energy at the retail rate for credits applied to subsequent utility bills.²⁹¹ Customers have two options at the end of the twelve month billing period: (1) rollover any unused credits; or (2) receive a cash payout for the unused

279. *Id.* § 1146(b)(3).

280. *Id.*

281. *Id.*

282. S.C. CODE ANN. § 58-40-10(C)(2) (2014).

283. *Id.* §§ 58-40-10(C)(1), 58-41-30.

284. *Id.* § 58-41-30.

285. UTAH. CODE ANN. § 54-15-104(3) (West 2011).

286. *Id.* §§ 54-15-104(4), 54-15-102(8).

287. VT. STAT. ANN., tit. 30 § 8010(c)(2)(F) (West 2011).

288. *Id.*

289. *Id.*

290. VT. ADMIN CODE § 18-1-17.5.130.

291. VA. CODE. ANN. § 56-594(B) (West 2012).

credits at the avoided cost rate.²⁹² Virginia also allows for community net metering, but does so a little differently than some other states allowing community net metering.²⁹³ Vermont's community net metering program is not run by a utility or third-party administrator but, rather, the participants in the program organize, stipulate, and allocate the generation credits amongst their accounts.²⁹⁴

Washington. The State of Washington's net metering program applies to customers that install a maximum of one hundred kilowatts of eligible generation.²⁹⁵ A customer who generated excess energy is credited at the retail rate toward on future bills that year.²⁹⁶ At the end of the twelve-month billing cycle, the unused credits are surrendered to the utility without an option of cash payment.²⁹⁷

Washington, D.C. In Washington D.C., net metered credits last an indefinite period of time.²⁹⁸ To determine the type of credit a customer receives, it is based on the size of the customer's self-generator unit.²⁹⁹ Credit is mandated at the full retail rate for a generation of one hundred kilowatts or less.³⁰⁰ If the net metered generator exceeds one hundred kilowatts, the credit is based on the generation rate.³⁰¹ Washington, D.C. allows for virtual net metering for community renewable energy facilities.³⁰²

West Virginia. West Virginia net metered credits unused by the end of the annual billing period, will apply to the next annual billing period indefinitely at retail rate.³⁰³

292. *Id.* § 56-594.01(E).

293. *Id.* § 56-594.3 (describing shared solar programs)

294. *Id.* § 56-594.01(E).

295. WASH. REV. CODE ANN. § 80.60.010(13)(A) (West 2012).

296. *Id.* § 80.60.030(3)(b).

297. *Id.* § 80.60.030(5).

298. D.C. CODE. § 34-1518(b)(5)(K) (2021).

299. *Id.* § 1501(12A).

300. *Id.* § 34-1501(15)(A).

301. D.C. MUN. REGS. tit. 15, § 903(903.5).

302. D.C. CODE. § 34-1518(b)(5).

303. W. VA. CODE R. § 150-33-6 (West 2020).

Wisconsin. In Wisconsin, net metering credits can be applied to subsequent utility bills.³⁰⁴ If the credits add up to over twenty-five dollars, the utility company must send the customer a check payable for that amount.³⁰⁵

Wyoming. In Wyoming, at the end of the twelve-month billing period, the customer can receive a cash payment for excess credits at the avoided cost rate.³⁰⁶

States Without Net Metering. Approximately 20% of the states do not have a statewide net metering program in place now. In Alabama, certain utility companies like Alabama Power Company offer customers net metering.³⁰⁷ After reviewing the Alternative and Renewable Energy Act of 2008, the Alabama Public Service Commission voted that the standards set by PURPA with regard to net metering was precluded by §37-4-140 of the Code of Alabama.³⁰⁸ In Idaho, there are three investor-owned utilities that have developed a net metering tariff that was approved by the Idaho Public Utilities Commission.³⁰⁹ In 2006, South Dakota voted against a statewide program for net metering.³¹⁰ The Public Utilities Commission has the right under PURPA to not consider net metering if the state legislature previously voted on the subject.³¹¹ Tennessee does not offer statewide net metering.³¹² Texas has no statewide net metering policy, but four investor-owned utilities offer net metering.³¹³ Of the 39 states with net metering programs, there are four states that participate in

304. Application of Wis. Pub. Serv. Corp. for Authority to Adjust Electric and Natural Gas Rates, 2013 WL 6710788 (Wis. P.S.C. Dec. 18, 2013).

305. *Wisconsin Program Overview*, DSIRE, <https://programs.dsireusa.org/system/program/detail/235> (last visited Apr. 14, 2021).

306. WYO. STAT. ANN. § 37-16-103(a) (West 2021).

307. *E.g.*, In re Consideration of 1251 and 1254 of Energy Policy Act of 2005, Ala. P.S.C. Docket No. 30066, 2007 WL 3273480 (Ala. P.S.C. Oct. 11, 2007).

308. In re Consideration of 1251 and 1254 of Energy Policy Act of 2005, Ala. P.S.C. Docket No. 30066, 2008 WL 6040422 (Ala. P.S.C. Nov. 4, 2008) (rejecting net metering due to the fact that “net metering tended to provide a subsidy to the generator that would be paid by other customers”); *see generally* *Solar Energy*, ALA. POWER, <https://www.alabamapower.com/smart-energy/sustainability/renewables/solar-energy.html> (last visited Apr. 19, 2021).

309. News Release, Commission Issues Order Regarding Idaho Power Schedule 84 Net Metering Customers (Idaho Pub. Utils. Comm’n Dec. 4, 2020), <https://puc.idaho.gov/Fileroom/PublicFiles/Press/20201204Idaho%20Power%20Dec.%204%20Net%20Metering%20Press%20Release.pdf>.

310. S.D. Pub. Util. Comm’n. Docket No. EL06-018 (2008).

311. *Id.* at 1 (citing PURPA, § 112(d)(3), 16 U.S.C. § 2622(d)(3)).

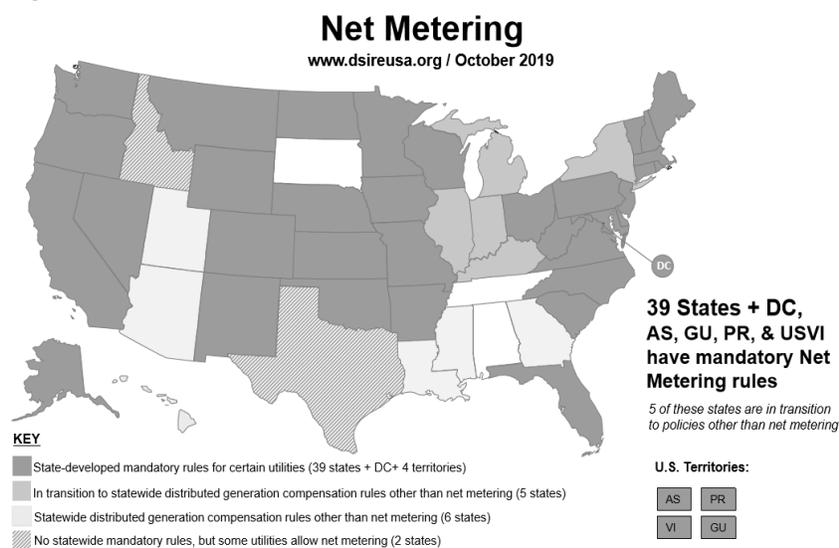
312. UNIVERSITY OF TENNESSEE INSTITUTE OF AGRICULTURE, UNDERSTANDING ENERGY: NET METERING ELECTRICAL ENERGY GENERATORS (2014) <https://extension.tennessee.edu/publications/Documents/SP757-C.pdf>.

313. *Solar Buyback Programs and Net Metering Incentives in Texas*, QUICK ELECTRICITY, <https://quickelectricity.com/2018-solar-panel-incentives-texas-net-metering-buyback-programs/> (last visited Apr. 26, 2021).

a wholesale RTO/ISO that are truncating net metering in transition to other systems.³¹⁴

As shown on Figure 3, there are thirty-four states and five U.S. territories with mandatory net metering rules.³¹⁵ In addition, there are five states³¹⁶ in transition from their state net metering programs to statewide distributed generation compensation rules other than net metering, as well as six states³¹⁷ with statewide distributed generation compensation rules other than net metering. Therefore, 39 states have some current form of net metering.

Figure 3³¹⁸



314. Those four net metering states in transition to something other than net metering are New York, Michigan, Indiana, and Illinois.

315. Charelle Eid et al., *The economic effect of electricity net-metering with solar PV: Consequences for network cost recovery, cross subsidies and policy objectives*, ENERGY POLICY 75, 244-254 (2014); Angela Picciarello et al., *Electricity distribution tariffs and distributed generation: Quantifying cross-subsidies from consumers to prosumers*, UTILITIES POLICY 37, 23-33 (2015). The states with mandatory net metering for certain utilities are: Arkansas, Alaska, California, Colorado, Connecticut, Delaware, Florida, Iowa, Kansas, Maine, Maryland, Massachusetts, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming. *Id.* Additionally, the District of Columbia, the U.S. Virgin Islands, American Samoa, Guam, and Puerto Rico have mandatory net metering. *Id.*

316. *Net Metering*, DSIRE, https://s3.amazonaws.com/ncsolarcen-prod/wp-content/uploads/2019/10/DSIRE_Net_Metering_Oct2019.pdf (last visited Apr. 17, 2021). The states currently transitioning to policies other than net metering are: Illinois, Indiana, Kentucky, Michigan, and New York. *Id.*

317. *Id.* The states with statewide distributed generation compensation rules other than net metering are: Arizona Georgia, Hawaii, Louisiana, Mississippi, and Utah. *Id.*

318. *Id.*

Of the states in transition to statewide generation compensation rules other than net metering, Illinois will be replacing retail net metering with a localized value-of-solar rate as soon as distributed solar capacity reaches 5% of a utility's total peak demand.³¹⁹ Indiana will be phasing out net metering by 2022, and the program replacing it will lower the retail rate compensation for residents who install devices to use solar or wind power.³²⁰ Kentucky's bill, which went into effect January 1, 2020, increased the maximum net metering facility size to 45 Kw, and also required the Public Service Commission to set crediting structures specific for each utility, which are based on the dollar value of the credit, as opposed to the previous Kwh netting.³²¹ Such utilities are now authorized to set up rates to incorporate all costs incurred to serve customers.³²²

B. *The Vulnerability of These Classes of Programs*

The net metering programs described in detail above fall into three different categories in terms of how they operate: surrender of excess net metering credits to the utility, sell excess credits from the generator to the utility at the avoided cost rate, or sell excess credits to the utility at another rate typically higher than avoided cost. The chart below organizes these categories by state:

Surrender to the Utility	Alaska, American Samoa, Kentucky, North Carolina, Montana, U.S. Virgin Islands, Utah, Vermont, Washington
Sell at Avoided Cost	Arizona, Arkansas, Connecticut, Delaware, Florida, Georgia, Iowa, Louisiana, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Oklahoma, Oregon, South Carolina, Virginia, Wyoming
Sell at Another Rate	California, Colorado, Guam, Illinois, Indiana, Kansas, Maryland, Massachusetts, Michigan, Ohio, Pennsylvania, Puerto Rico, Rhode Island, Washington, D.C., West Virginia, Wisconsin

319. *Illinois Net Metering*, NC CLEAN ENERGY TECHNOLOGY CENTER, <https://programs.dsireusa.org/system/program/detail/2700> (last visited May 6 2020).

320. *Indiana Net Metering*, NC CLEAN ENERGY TECHNOLOGY CENTER, <https://programs.dsireusa.org/system/program/detail/342> (last visited May 6 2020).

321. *Kentucky Net Metering*, NC CLEAN ENERGY TECHNOLOGY CENTER, <https://programs.dsireusa.org/system/program/detail/1081> (last visited May 6 2020).

322. *Id.*

A decade ago, a dozen of the then 43 net metering states, at the end of one year, would confiscate from the renewable energy generator all unused credits with no compensation at the end of one-year: Arkansas,³²³ Hawaii,³²⁴ Illinois,³²⁵ Kansas,³²⁶ Maine,³²⁷ Missouri,³²⁸ Montana,³²⁹ North Carolina,³³⁰ Oregon,³³¹ Utah,³³² Vermont,³³³ and Washington.³³⁴ Now, forfeiture of excess net metering credits after one year still occurs in 9 of the 39 states and territories that still have net metering programs; however, those states are different than a decade ago, with some no longer doing this, others having dropped state net metering entirely, and other states commencing this practice, such as American Samoa,³³⁶ Montana,³³⁷ North Carolina,³³⁸ Oregon,³³⁹ Pennsylvania,³⁴⁰ U.S. Virgin Islands,³⁴¹ Utah,³⁴² Vermont,³⁴³ and Washington.³⁴⁴ Oklahoma does not require the utility company to grant its customers net metering credits for excess energy.³⁴⁵ Georgia and Hawaii terminated their net metering programs.

323. ARK. CODE ANN. § 23-18-604 (2012).

324. HI Pub. Util. Comm'n. Order, Docket 2006-0084, *available at* <http://www.dsireusa.org/documents/Incentives/HI04R3.pdf>.

325. 220 ILL. COMP. STAT. § 5/16-107.5 (2012).

326. KAN. STAT. ANN. § 66-1264.

327. ME. REV. STAT. tit. 35-A § 3209-A.

328. MISS. CODE ANN. § 386.890 (2011).

329. MONT. CODE ANN. § 69-8-603 (2011).

330. N.C. Util. Comm'n, Docket No. E-100, Sub 83 (2009).

331. OR. REV. STAT. ANN. §757.300(3)(c)-(d). (West 2011).

332. UTAH CODE ANN. § 54-15-104(1), (3)(a)(ii). (West 2011).

333. VT. STAT. ANN. 30, § 219(e)(3)(B)-(C)(West 2011).

334. WASH. REV. CODE ANN. § 80.60 (2012).

335. *Id.* §219(e)(3)(C)

336. *American Samoa—Net Metering*, NC CLEAN ENERGY TECHNOLOGY CENTER, <http://programs.dsireusa.org/system/program/detail/3218> (last visited Feb. 20, 2020).

337. MONT. CODE ANN. §69-8-603 (2011).

338. N.C. Util. Comm'n, Docket No. E-100, Sub 83 (2009).

339. OR. REV. STAT. ANN. §757.300(3)(c) (West 2011).

340. 73. PA. STAT. ANN. §1648.2 (West 2011).

341. V.I. CODE ANN. Tit. 12 §1141-47 (2007).

342. UTAH. CODE ANN. §54-15-104(1) (West 2011).

343. VT. STAT. ANN. 30, §219(e)(3)(C) (West 2011).

344. WASH. REV. CODE ANN. §80.60 (2012).

345. OKLA. ADMIN. CODE §165:40-9-3(b) (2012).

This surrender excess credits without compensation to the utility category faces no legal issues under the *MidAmerican* and *SunEdison* decisions because no wholesale sale of electricity occurred. The sale at the avoided cost rate back to the customer is allowable under the Iowa Supreme Court's analysis in its *Windway Technologies* decision and under PURPA.³⁴⁶ Finally, the last category's legality could depend on the amount of electricity sold.

If the net-metering user/customers transfer or sell enough electricity back to the utilities that the utilities experience a net-negative transfer of electricity to customers at the end of the billing period, then under the two FERC decisions on net metering this could qualify as a wholesale transaction and thus be preempted by the Federal Power Act and the Supremacy Clause.³⁴⁷ This is especially possible for states with net metering programs as advanced as that of Massachusetts where unlimited net metering credits can be sold to any other customer of the utility at whatever price can be negotiated.³⁴⁸

Meter aggregation and community net metering allow the sharing among multiple customers of net metering credits from a single generation facility at a single site. Shared or community solar net metering shares power between multiple consumers, where none of them pays any delivery charges to move energy from remote solar projects to them as dispersed consumers of the utility. Whether this involves something approaching or similar to a wholesale transaction in power by sharing credits or not, has not reached in a case presented to FERC or the courts.

346. *See supra* Section III.A.

347. *Id.*

348. *See supra* notes 191–204 and accompanying text.

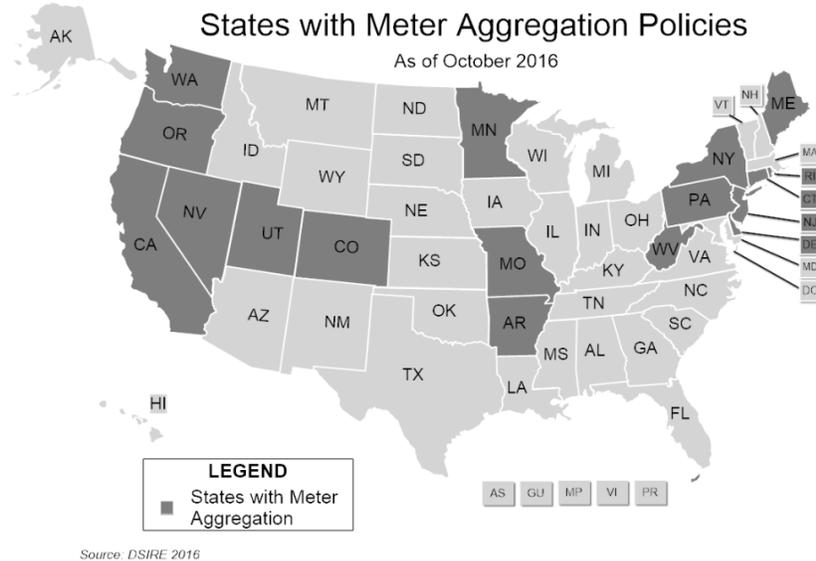
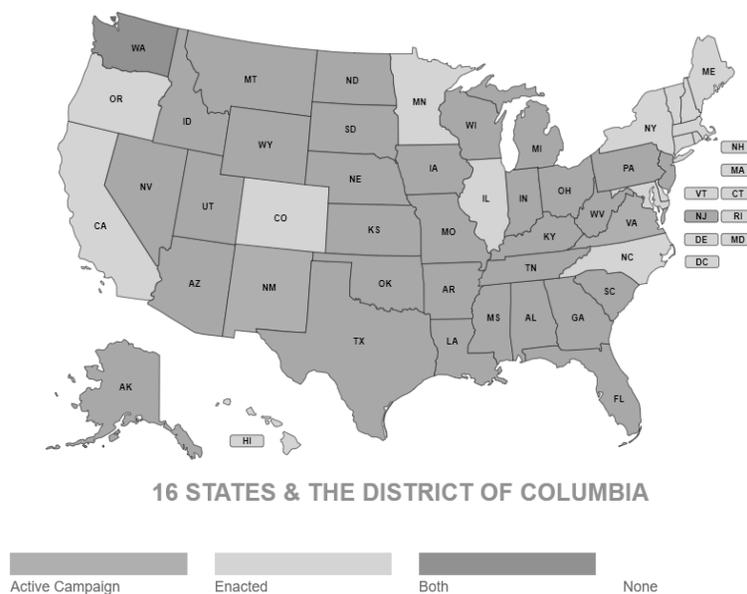
Figure 4³⁴⁹

Figure 4 demonstrates in graphic form the seventeen states that recently have had an aggregation net metering policy.³⁵⁰ Aggregation of net metering for a single customer is distinct from community net metering in which certain states allow a percentage of net metering credits earned from renewable energy net metering on one property to be shared by other customers without any eligible net metering on their respective properties.

349. *State Net Metering Policies*, NATIONAL CONFERENCE OF STATE LEGISLATURES, <https://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx> (last visited Apr.17, 2021).

350. *See id.* Currently, the seventeen states utilizing aggregate net metering are: Arkansas, California, Colorado, Connecticut, Delaware, Maine, Maryland, Minnesota, Nevada, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Utah, Washington, and West Virginia. *Id.*

Figure 5. States with Community Solar Net Metering Laws³⁵¹

As demonstrated by Figure 5, sixteen states have adopted and now utilize community solar net metering regulations.³⁵² These states use shared renewable energy generation systems through programs which provide access to renewable energy systems for customers living far from the actual physical renewable energy facility, or in places such as multi-family dwellings or condominiums which don't have the net metered facility on their specific rented or owned real property or not associated primarily with their electric utility account.³⁵³ Total net metered credits earned are allocated at the request of the net metered customer or 'host' to other designated retail utility accounts. Most shared renewable energy projects employ

351. *Community Energy Projects*, SHARED RENEWABLES, <http://www.sharedrenewables.org/community-energy-projects> (last visited Apr. 17, 2021).

352. *See id.* These states are: California, Colorado, Connecticut, Delaware, Hawaii, Illinois, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New York, North Carolina, Oregon, Rhode Island, and Vermont. The District of Columbia has also adopted community solar net metering. About the Massachusetts virtual net metering program which allows sale and transfer of net metering credits, see *Net Metering Guide*, MASS.GOV <https://www.mass.gov/guides/net-metering-guide> (last visited Apr. 17, 2021).

353. *See Shared Renewable Energy*, NATIONAL CONFERENCE OF STATE LEGISLATURES, <https://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx> (last visited Apr. 17, 2021).

solar energy; while at least ten states also allow by regulation wind, biomass, or geothermal renewable energy projects to be community net metering projects.³⁵⁴

There is a large list of approximately one-third of the net metering states and territories in the third category in the table above which provide cash compensation to permanently transfer title to unused wholesale net metering credits and power at a rate other than at the federally allowed avoided cost rate prescribed under the Public Utility Regulatory Policies Act amendments to the Federal Power Act. This third category of the list includes the state with the largest population, California, and the rates in excess of avoided cost and the net sale to the grid raises unresolved questions about these programs' legality should they be challenged as wholesale transactions with the utility. FERC actions or orders could categorize these programs as akin to wholesale transactions transferring title to the excess power sent to the grid and imperil their state-sanctioned existence, which would eliminate a major policy tool various states are using to encourage distributed renewable power and combat climate change. Such federal preemption of wholesale transactions in turn would significantly hamper the ability of U.S. states to incentivize utility companies to change the power grid in a way that make it more 'green' and distributed in the future.

V. CONSTITUTIONAL REGULATION: TIME AND GEOGRAPHY

As the Kyoto Protocol to address climate change ended its first compliance period in 2012, net metering began to be adopted in many countries around the world. In the U.S., the importance of state renewable energy net metering incentives was highlighted in July 2020 when the federal government substantially diminished federal incentives for small renewable energy projects:³⁵⁵

- Making less certain the date and time that a renewable energy project can obtain a legally enforceable commitment obligating a utility to purchase its power output
- Permitting utilities to opt-out of their obligations to purchase power from small renewable power projects larger than 5 MW
- Making it easier and less expensive to challenge a small renewable power project's federally established right
- Reducing the potential level of 'avoided cost' rates that small renewable energy projects could receive, and allowing states to

354. See *supra* note 356.

355. FERC Order No. 872 (July 2020). For an analysis of the impact of this, see STEVEN FERREY, LAW OF INDEPENDENT POWER, *supra* note 10, at § 4:6,

incorporate monthly-varying prices,³⁵⁶ which variation will make it difficult to borrow money to construct renewable power generation facilities which have high up-front capital costs and low operating cost

For the 39 U.S. states, the District of Columbia, and 4 territories analyzed in this article that still net meter consumers' renewable power generation, the *MidAmerican*³⁵⁷ and *SunEdison*³⁵⁸ opinions have raised two key legal questions:

- The legality of some states' compensating wholesale surplus net metered power at a rate above the Federal Power Act's PURPA stipulated maximum full 'avoided cost' rate;³⁵⁹ and
- Where a state, such as Massachusetts,³⁶⁰ allows a renewable power generator's sale of earned net metering credits to others, whether such state is authorizing a wholesale power transaction or a wholesale transfer that is not within state authority pursuant to the Federal Power Act's exclusive federal jurisdiction over all terms of wholesale sales of power and associated elements.

The scholarship in U.S. law reviews over the last two decades assessed the legality of some U.S. states' net metering programs after these key FERC decisions.³⁶¹ Over the last decade, there has been a retraction in 75% of those states which a decade ago set rates for excess net metered power credits above the federal maximum PURPA 'avoided cost' rate and at or closer to the state retail rate.³⁶² Moreover, some additional equilibrium has been induced in state net metering practices. Where a decade ago, 28% of the 43 then-net metering states, at the end of each year

356. This is contrary to the recent ruling in *Winding Creek Solar, LLC v. Peevey*, 293 F.Supp.3d 980, 989-90 (N.D. Cal. 2017), *aff'd sub nom.* *Winding Creek Solar, LLC v. Carla Peterman*, 932 F.3d 861 (9th Cir. 2019).

357. *MidAmerican Energy Co.*, 94 FERC 61,340 (2001).

358. *Sun Edison L.L.C.*, 129 FERC 61,146, 61,620 (2009).

359. *MidAmerican*, 94 FERC, at 62,262.

360. *Sun Edison L.L.C.*, 129 FERC, at 61,618.

361. See, e.g., Steven Ferrey, *Nothing But Net: Renewable Energy and the Environment*, *MidAmerican Legal Fictions, and Supremacy Doctrine*, 14 DUKE ENV'T L. & POL'Y F. 1, 15 (2003); Steven Ferrey, *Net Zero: Distributed Generation and FERC's MidAmerican Decision*, 17 ELEC. J. 33 (Oct. 2004) (analyzing the policy implications of a FERC decision regarding net metering); Steven Ferrey, *Efficiency in the Regulatory Crucible: Navigating 21st Century 'Smart' Technology and Power*, 3 GEO. WASH. J. ENERGY & ENV'T L. 1 (2012); Steven Ferrey, *Virtual "Nets" and Law: Power Navigates the Supremacy Clause*, 24 GEO. INT'L ENV'T L. REV. 267, 270 (2013).

362. See *supra* Section IV.A (three states which had compensated net energy generation through net metering at the retail rate, Minnesota, Georgia, and Wisconsin, have ceased that practice now, reducing the amount to no more than the federally allowed avoided cost, or in Georgia's case, discontinuing net metering. This leaves only Pennsylvania).

confiscated from the renewable energy generators all unused net energy generation credits without any compensation,³⁶³ that number is now reduced by 16.7%.³⁶⁴

The Federal Power Act and the Supremacy Clause of the Constitution created fundamental questions as the legality of some state net metering programs. If there are ongoing legal challenges, the rate at which states order to compensate the transfer of surplus net metered power is the lynchpin of whether these state net metering laws survive legally under our federalist form of government and within the “bright line” created by the Federal Power Act and the Constitution’s Supremacy Clause to prohibit state jurisdiction of wholesale transactions. These net metering incentive programs for the electric power sector, which is now undergoing a formative technological transition to no-carbon renewable generation projects, is the platform on which U.S. law will or will not gain traction to address carbon control as part of a global warming mitigation strategy. With the climate ‘tipping’ point already reached,³⁶⁵ “[n]othing’s riding on this except . . . the Constitution . . . and maybe the future of this country.”³⁶⁶ Thus, within the current landscape of FERC law, these states must adapt their net-metering programs or face an ever-worsening climate crisis without a key tool.

363. *Id.* (The twelve of the forty-three net metering states so doing a decade ago were Arkansas, Hawaii, Illinois, Kansas, Maine, Missouri, Montana, North Carolina, Oregon, Utah, Vermont, and Washington).

364. *Id.* (The ten states still confiscating net energy generation credits without compensation after one year now include Illinois, Kansas, Missouri, Montana, North Carolina, Oregon, Pennsylvania, Utah, Vermont, and Washington. Hawaii terminated its net metering program).

365. See generally *New Science and Developments in Our Changing Environment*, 2009 UNEPY.B., 21, U.N. Doc. UNEP/GC.25/INF/2 (concluding that lack of effective action on climate world climate is pushing world climate to the “tipping points . . . that will alter regional and global environmental balances . . . [and are] irreversible within the time span of our current civilization”).

366. ALL THE PRESIDENT’S MEN (Wildwood Enterprises 1976).