Should the Federal Energy Regulatory Commission Intervene: With Varying State Policies on Net Energy Metering, What is the Future of Solar Distributed Generation in the United States?

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I. INTRODUCTION

The United States' Constitution establishes a "system of dual sovereignty between the States and the Federal Government,"[1] but in the case of net energy metering, state jurisdiction alone may not be ideal for the future of distributed generation. The United States has experienced a tremendous growth in distributed generation specifically in the solar energy sector, which makes up over 90% of distributed generation in the United States.[2] Distributed generation refers to small-scale power generation by the consumer rather than the utility company. The solar energy sector has boomed in the United States, with 21,300 megawatts of cumulative solar electric capacity installed in the first quarter of 2015.[3] This growth is not restricted solely to numbers on a page, but can be seen every day on the roofs of millions of homeowners who have now installed their own residential photovoltaic solar energy systems. This increase in solar energy is the result of a combination of improvements in photovoltaic solar energy system technology and manufacturing processes,[4] federal investment subsidies, and state policies that provide financial incentives to solar panel owners[5]. The technological improvements led to a dramatic decrease in the price of photovoltaic systems, with the average price per watt of a residential photovoltaic system in 2014 being 50% less than the price in 2008 and 70% less for utility-scale photovoltaic systems.[6] It is interesting to note that according to research done by Environment America, solar energy has the ability meet the United States' electricity needs "more than 100 times over."[7]

The federal government provides tax incentives for renewable energy development in the United States. The Obama administration has focused on increasing renewable energy in the United States and has pushed for legislation providing loans, grants, and tax subsidies for those

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1. Gregory v. Ashcroft, 501 U.S. 452, 457-58 (1991).

2. *Distributed Generation: An Overview of Recent Policy and Market Developments*, AM. PUB. POWER ASS'N 1, 3 (Nov. 2013), https://www.publicpower.org/files/PDFs/Distributed%20Generation-Nov2013.pdf.

3. Lindsey Hallock & Rob Sargent, *Shining Rewards: The Value of Rooftop Solar Power for Consumers and Society*, AM. RES. & POL'Y CTR. 1, 9 (2015).

4. *The Future of Solar Energy: An Interdisciplinary Study*, MIT FUTURE OF SERIES 1, 79 (2015).

5. Benjamin Hanna, *FERC Net Metering Decisions Keep States in the Dark*, 42 B.C. ENVTL. AFF. L. REV. 133 (2015).

6. *The Future of Solar Energy: An Interdisciplinary Study, supra* note 4, at 80.

7. Judee Burr et al., *The Growing Role of Solar Energy in America*, ENV'T AM.: RES. & POL. CTR. 1, 13 (November 2014).

installing photovoltaic solar systems.[8] States focus on implementing policies that provide regulatory initiatives. One of the most instrumental state policies in the growth of distributed generation is net energy metering policies. Net energy metering policies have allowed for a rapid increase in distributed generation, specifically in the solar energy sector.[9] Historically, net energy metering was advocated as a popular and successful incentive for an increase in renewable energy because it was not of "temporary nature" like other incentives such as taxes.[10] Recently this argument and method of thinking about net energy policies is being challenged as net energy metering is the center of much debate across the United States. As a result of the solar energy sector's great success, various states are limiting or eliminating their net energy metering policies and changing the future of distributed generation. The Federal Energy Regulatory Commission (FERC) is an independent federal agency that regulates the interstate transmission of natural gas, oil and electricity.[11] The FERC has been slow to act in addressing solar distributed generation, but as thousands of citizens and homeowners are affected by the drastic changes in their state's net energy metering policies it may be time for the FERC to get involved and provide guidelines for all states to follow. This Comment not only provides a detailed analysis of the growth of net energy metering in the United States, four state's net energy metering policies, changing policies, and the need for FERC guidance on net energy metering, but it also presents what the future of solar distributed generation in the United States will be without the FERC's involvement.

II. NET ENERGY METERING IN THE UNITED STATES

A. What Is Net Energy Metering?

Net energy metering has been the driving force behind an increase in renewable energy, most significantly an increase in solar energy and private investment in distributed generation in the United States. It has

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8. *The Future of Solar Energy: An Interdisciplinary Study, supra* note 4, at 114.

9. Jocelyn Durkay, *Net Metering: Policy Overview and State Legislative Updates*, NAT'L CONF. ST. LEGISLATURES (Sept. 2014), http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx.

10. James W. Stoutenborough and Mathew Beverlin, *Encouraging Pollution-Free Energy: The Diffusion of State Net Metering Policies*, 89 SOC. SCI. Q. No. 51230, 1231 (December 2008).

11. *What Is the Electric Power Grid and What Are Some Challenges It Faces?*, U.S. ENERGY INFO. ADMIN., ENERGY BRIEF (Dec. 22, 2015), http://www.eia.gov/energy_in_brief/article/power_grid.cfm.

incentivized numerous utility customers to produce energy from solar panels or micro-turbines on their own property.[12] Net energy metering is a utility billing system that allows solar panel owners to receive credit for excess electricity they create and then sell it to the electric utility company.[13] This occurs by running the electricity meter backwards or forwards, depending on whether the customer is supplying his own energy or whether the utility company is supplying the customer's energy.[14] Customers with residential photovoltaic systems are still connected to the local electric grid[15] and must purchase power from the grid when their residential photovoltaic systems do not produce enough energy to meet their needs. When customers are producing more electricity than they need, they then sell this excess to their local electric company who is required by state net energy metering policies to buy this power. In return, customers receive credit as their electricity meter runs backward.[16] In essence, net energy metering can be seen as "energy banking"[17] as the energy produced by the customer is then "commingle[d] on the grid" along with the electricity produced by the utility company and sold to another consumer.[18] Thus, customers with residential photovoltaic systems are only paying for the net amount of electricity used plus utility service charges.[19]

There are different types of net energy metering found within the United States, including conventional net energy metering, aggregated net energy metering, virtual net energy metering and community net energy metering.[20] Aggregated net energy metering allows customers who have more than one meter on their property, or neighboring

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12. Durkay, *supra* note 9.

13. 114 H.R. 3852 (2015).

14. *Net Metering*, SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/policy/distributed-solar/net-metering (last visited Jan. 18, 2016).

15. The electric grid is the system of electric distribution and transmission lines that utility companies use to deliver electricity to their customers. (*What Is the Electric Power Grid and What Are Some Challenges It Faces?*, *supra* note 11).

16. *Straight Talk about Net Metering*, EDISON ELECTRIC INST. (Sept. 2013), http://www.eei.org/issuesandpolicy/generation/NetMetering/Documents/Straight%20Talk%20About%20Net%20Metering.pdf.

17. Steven Ferrey, *Virtual Nets and Law: Power Navigates the Supremacy Clause*, 24 GEO. INT'L ENVTL. L. REV. 267, 322 [hereinafter Ferrey, *Virtual Nets and Law*].

18. Steven Ferrey, *Nothing But Net: Renewable Energy and the Environment, MidAmerican Legal Fictions, and Supremacy Doctrine*, 14 DUKE ENVTL. L. & POL'Y F.1 1, 15.

19. *Distributed Generation: An Overview of Recent Policy and Market Developments, supra* note 2, at 3-4.

20. *See The Future of Solar Energy: An Interdisciplinary Study*, *supra* note 4.

property, to implement the net energy metering system.[21] Virtual net energy metering expands upon aggregated net metering, allowing property owners to distribute their net metering credits to various accounts. In 2008 California passed legislation authorizing virtual net metering for local governments, and in 2011 they expanded their policies to include multi-tenant properties.[22] Community net energy metering, also known as community solar, allows various people to go in together for one single net metered system. California and Massachusetts are two states that have authorized community net energy metering, but these programs are not all equal.[23]

B. History of Net Energy Metering Policies in the United States

As of 2015, forty-four states and the District of Columbia had implemented their own net energy metering polices.[24] Unfortunately, even though there are over twenty countries worldwide with federally mandated net energy metering,[25] there has not been a federal policy promoting or even regulating renewable energy in the United States since The Energy Policy Act of 2005[26] and the Public Utilities Regulatory Policy Act of 1978.[27] The federal government has jurisdiction over interstate transmission and sale of wholesale electricity,[28] and states have full jurisdiction over retail energy sales and intrastate transmission and distribution.[29]

In 1978, Congress enacted the Public Utilities Regulatory Policy Act (PURPA) in the middle of an energy crisis.[30] PURPA was enacted in order to encourage energy conservation and efficiency, and to encourage a diversification of energy sources.[31] PURPA led to FERC's enactment of rules requiring utility companies to purchase power from Qualifying Facilities (QF).[32] The FERC gave states a limited jurisdiction over QFs,

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21. *Id.*
22. *Id.*
23. *Id.*
24. Hallock & Sargent, *supra* note 3.
25. *Renewables 2015 Global Status Report*, RENEWABLE ENERGY POLICY NETWORK FOR THE 21ST CENTURY, 1, 18 and Table 3 (2015), http://www.ren21.net/wp-content/uploads/2015/07/REN12-GSR2015_Onlinebook_low1.pdf.
26. Energy Policy Act of 2005, 42 U.S.C.S. § 15801 (2005).
27. Public Utilities Regulatory Policies Act, 16 U.S.C. § 2601 (92 Stat. 3117).
28. Federal Power Act, 16 U.S.C. § 824(a) (2012).
29. *Id.* at § 824(b)(1).
30. Public Utilities Regulatory Policies Act, 16 U.S.C. § 2601 (92 Stat. 3117).
31. *Id.*
32. Public Utility Regulatory Policies Act of 1978 § 210(a), 16 U.S.C. § 824a-3(a) (2012).

which are local distribution facilities that receive special rates and regulatory treatment, and over avoided costs.[33] PURPA allows QFs to sell energy to a utility and purchase services from utility companies, while relieving them from various regulatory burdens.[34]

Net energy metering policies have been carefully structured to avoid violation of federal law, and thus retain net energy metering within the state's jurisdiction. Net energy metering remains within state jurisdiction because net energy metering was found not to involve the selling of energy but rather compensation through a credit system over a billing period.[35] Scholars believe that net energy metering stands at a "middle ground between conventional sale of power and conventional utility accounting."[36] In 1999 *MidAmerican Energy Co*. challenged Iowa's net energy metering rule, but the FERC held that Iowa's net energy metering rule did not involve the sale of energy and thus found no violation of federal law.[37] The FERC stated that as long as there is no substantial net transfer of power from the residential photovoltaic system to the utility company, there has not been a sale of power that is subject to federal law.[38] This signified that federal law did not preempt state decisions regarding net energy metering, unless the customer sells the utility company more energy than it has purchased from them during the billing period. More recently in 2009, this issue was raised again in *Sun Edison, LLC.* The FERC held, in accordance with *MidAmerican Energy Co.*, that there is no sale under the Federal Power Act or the PURPA unless there is a net delivery of energy to the utility over the course of a month.[39] As a result of *MidAmerican Energy Co.* and *Sun Edison LLC*., net energy metering policies have been structured to avoid the federal and constitutional issues raised in those cases.

Since the enactment of PURPA, the energy market has continued to evolve and change, but PURPA remains one of few federal laws promoting renewable energy and requiring competition between utility companies. In 2005 the Energy Policy Act was enacted and offered incentives for investment into the private infrastructure and expanded the

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33. 18 C.F.R. § 292.306 (2013).
34. 16 U.S.C. § 824 a-3(a), 824 a-3(e) (2012).
35. Ferrey, *Virtual Nets and Law*, *supra* note 17, at 304.
36. *Id.* at 322.
37. *See* MidAmerican Energy Co. v. Iowa Util. Bd., AA 3173 (Iowa Dist. Ct. August 1999).
38. *Id.* at 18-19.
39. Sun Edison LLC, 129 FERC 61, 146 (2009).

authority of the FERC.[40] The Energy Policy Act of 2005 promoted net energy metering policies by requiring utility companies and state regulatory commissions to provide net metering services to customers if requested.[41] The 2005 Act also continued the trend of opening the market to distributed generation and instituted a 30% investment tax credit for commercial and residential solar energy systems.[42] This investment tax credit permits commercial and residential owners of solar energy systems to receive a "one-time tax credit equivalent to 30% of qualified installed costs."[43]

Not all states have implemented net energy metering policies, even though federal law requires that such services must be offered if requested by customers. The states that have implemented net energy metering policies all have different policies. Net energy metering policies vary greatly by state, specifically in regards to credits and statutory caps on net energy metering capacity. Some states credit customers at the full retail electricity rate, which are the final rates charged to customers, while other states credit customers at the wholesale electricity rate, which includes the cost of the fuel used to create electricity and the cost of buying the power in the competitive wholesale market.[44]

C. Net Energy Metering Debate in the United States

Net energy metering policies have become a topic of debate due to the fact that more customers are able to purchase residential photovoltaic systems, and questions have begun to arise regarding state's jurisdiction and financial impacts on utilities and ratepayers.[45] The debate centers around the argument that net energy metering is a subsidy, in which customers with residential photovoltaic systems, who are being credited at full retail rate, are avoiding paying costs associated with the grid, including fixed costs of the poles, wires, meters, and other

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40. 16 U.S.C. § 824(e) (2012).
41. 16 U.S.C. § 2621(d)(11) (2012).
42. *Id.*
43. Jason Coughlin et al., *A Guide to Community Solar: Utility, Private, and Nonprofit Project Development*, U.S. DEP'T ENERGY 1, 39 (Nov. 2010), www.nrel.gov/docs/fy11osti/49930.pdf.
44. *Straight Talk about Net Metering*, *supra* note 16.
45. Naïm R. Darghough et al., *Net Metering and Market Feedback Loops: Exploring the Impact of Retail Rate Design on Distributed PV Deployment*, ELECTRICITY MKTS. & POL'Y GROUP 1, 2 (July 2015), https://emp.lbl.gov/sites/all/files/lbnl-183185_0.pdf.

infrastructure.[46] There is a significant difference between retail electricity and wholesale electricity even though both are electricity. Retail electricity is a bundled rate, which means that it encompasses various costs that the utility company must pay in providing service such as costs related to the infrastructure of the grid, power plants, and electric transmission wires as well as compliance with regulatory mandates.[47] Energy generation only makes up around half of retail electricity and encompasses the wholesale costs of electricity.

Another argument states that net energy metering is simply shifting costs away from customers with residential photovoltaic systems to customers without such systems.[48] This cost-shifting argument has gained a lot of traction by utility companies because a significant portion of the utility bill is made up of costs not associated with the generation of power.[49] This backlash by the utility companies results from the fact that utility companies are not seeing a change in the costs they must pay even though customers are reducing their net purchase of electricity from the grid. Additionally, some have raised the fact that even though solar energy is growing in the United States, it is still a minor energy resource, only contributing around 0.60% to the United States energy mix in 2015.[50] Various independent studies, such as the 2013 study by Crossborder Energy for VoteSolar, have shown that these claims of cost-shifting are trivial and "unfounded".[51] The EA 2015 study found that the United States' current net energy metering is actually under-compensating customers with residential photovoltaic systems.[52] This study states that the benefits derived from the production of solar energy are not being compensated by our current policies because benefits to the environment and society, such as reduced greenhouse gas emissions, cleaner air, avoidance of investment in expensive peaking plants, and reduction in wear and tear on the existing grid are not factored in when compensating customers.

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46. *Straight Talk about Net Metering*, *supra* note 16.

47. Melanie Craxton, *Stuck in the Shade: The Regressive Nature of Net Energy Metering*, 20 SOC. POL'Y 19, 20 (June 2015).

48. Hallock & Sargent, *supra* note 3, at 14.

49. *Id.* at 9.

50. *What Is the U.S. Electricity Generation by Energy Source?*, U.S. ENERGY INFO. ADMIN. (April 1, 2016), https://www.eia.gov/tools/faqs/faq.cfm?id=427&t=3.

51. R. Thomas Beach & Patrick G. McGuire, *Evaluating the Benefits and Costs of Net Energy Metering in California*, CROSSBORDER ENERGY 1, 40 (Jan. 2013).

52. Hallock & Sargent, *supra* note 3, at 16.

It is important to note that in December 2015, Congress passed a spending package that includes multi-year extensions for solar tax credits and other renewable energy. This means that the 30% Investment Tax Credit for solar is extended for another three years and then begins to decrease until it hits 10% and will remain there. It has been stated that this extension will result in $40 billion of investment in solar installations.[53]

Regardless, as a result of the debate concerning net energy metering, states have begun to modify their net energy metering policies. Some states have changed the compensation rates and allowed utilities to compensate customers at the wholesale price for the electricity they produce, and one state even went so far as to end net energy metering for new solar customers.[54] The other issue raised in the net energy metering debate is that of state jurisdiction in regards to the changing net energy metering policies, and FERC's lack of guidelines for the states.

III. ANALYSIS OF FOUR STATE'S NET ENERGY METERING POLICIES

There is no federal net-energy metering policy in the United States providing a guideline for states to follow, rather each state has a unique policy in place. Unfortunately, as a result of an increase in solar energy issues and debate, states have begun to restrict and eliminate their net energy metering policies, changing the lives of thousands of their residents with photovoltaic systems and the future of distributed generation in the United Sates. The net energy metering policies in Nevada, California, Hawaii, and Massachusetts, when analyzed and compared, provide an excellent example of the extreme variance in state's net energy metering policies and the effects it has as a result. These four states have all been leaders in the growth of the renewable energy sector in the United States, but with little to no guidelines from the federal government in regards to solar distributed generation, these states have begun to restrict and eliminate their policies. Net energy metering provides "health benefits, eliminate[es] the use of scarce water resources, increase[s] local employment, reduc[es] gas and electric market prices

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53. Stephen Lacey, *Congress Passes Tax Credits for Solar and Wind: 'Sausage-Making at Its Most Intense,'* GREEN TECH MEDIA (Dec. 18, 2015), http://www.greentechmedia.com/articles/read/breaking-house-passes-1.1-trillion-spending-bill-with-renewable-energy-tax.

54. Application of Nevada Power Company d/b/a NV Energy for approval of a cost-of-service study and net metering tariffs. Docket No. 15-07041; *see* Before the Public Utilities Commission of the State of Hawaii, In the matter of Public Utilities Commission Instituting a Proceeding to investigate distributed energy resource policies. Docket No. (2014-0192) Order No.33248.

due to reduc[tion] demand for th[ose] commodities and [provides] energy security and reliability."[55] These changes in rates do not account for the various benefits of net energy metering and are creating an uncertainty in the future of solar distributed generation and the renewable energy sector as thousands of solar projects have stopped. Each state's policy on distributed generation, specifically net energy metering, will have a direct impact on the future of each state's solar energy industry and the future of distributed generation.

A. Nevada

Nevada is one of the United States' leaders in the solar market, leading the nation in solar jobs per capita, solar capacity per capita, cumulative solar capacity installed, and percentage of new electrical capacity from solar.[56] Nevada's leadership in the solar market is at risk due to the recent Nevada Public Utility Commission ruling which resulted in a termination of sales and installation of net energy metered residential photovoltaic systems by Sunrun, SolarCity, and Vivint Solar and the loss of thousands of jobs within the state.[57] In December 2015, the Nevada Public Utility Commission voted for a net energy metering tariff that decreases compensation from retail rate to wholesale rate and increases the fixed service charge for customers with residential photovoltaic systems.[58] Wholesale rate is the "commodity price of electricity."[59] This may seem like a trivial change, but the gap between retail and wholesale is tremendous and means that consumers with residential photovoltaic systems will be compensated as much as two times less than they were previously.[60] This tariff applies not only to new solar customers but also to all pre-existing net-metered solar customers,

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55. *Straight Talk about Net Metering*, *supra* note 16, at 20.

56. *2014 Top 10 Solar States*, SOLAR ENERGY INDUSTRIES ASS'N (2014), http://www.seia.org/sites/default/files/resources/Top%2010%20Solar%20States%202014%201pager.pdf.

57. Sean Whaley, *PUC Official Urges New Rooftop-Solar Rate Not Be Stayed*, LAS VEGAS REV.-J. (Jan. 11, 2016), http://www.reviewjournal.com/business/energy/puc-official-urges-new-rooftop-solar-rate-not-be-stayed.

58. Application of Nevada Power Company d/b/a NV Energy for approval of a cost-of-service study and net metering tariffs. Docket No. 15-07041.

59. William Pentland, *Nevada Overhauls Net Metering Rules Despite Objections From Distributed Solar Industry*, FORBES, http://www.forbes.com/sites/williampentland/2015/12/23/nevada-overhauls-net-metering-rules-despite-objections-from-distributed-solar-industry/#1bf016e51897.

60. Julia Pyper, *Nevada Regulators Eliminate Retail Rate Net Metering for New and Existing Solar Customers*, GREENTECH MEDIA (Dec. 23, 2015), http://www.greentechmedia.com/articles/read/Nevada-Regulators-Eliminate-Retail-Rate-Net-Metering-for-New-and-Existing-S.

making Nevada the first state to implement immediate changes to pre-existing net-metered solar customers.[61] Not only are consumers who create their own energy being forced to pay more to the utility companies, but they are also receiving less compensation in return for their energy production. This is not only unfair to pre-existing net-metered solar customers but makes it "uneconomical for homeowners to go solar in the future."[62]

The Nevada Public Utility Commission explained its decision by stating that compensating customers for their excess energy at the retail rate is not "just and reasonable."[63] The Nevada Public Utility Commission Chairmen Paul Thomsen has publicly stated that the choice made was to protect those residents of Nevada who do not have net energy metering from being treated unfairly.[64] The argument is that this new tariff will prevent the cost shift that occurs from solar customers to non-solar customers, which according to the Nevada Public Utility Commission costs around $16 million per year.[65] After backlash from solar companies and residents of Nevada, one electrical company announced in January 2016 that it would "allow existing net energy metering customers to remain on old rules over a transition period as long as 20 years."[66] The NV Energy president and chief executive officer stated that this decision was made in order to ensure that all of its customers are being treated fairly.[67]

Nevada solar customers have not remained silent after this ruling, instead they have protested around the Nevada Public Utility Commission headquarters. Two solar customers followed the advice of the Nevada Governor Brian Sandoval, who stated that he is a supporter of solar energy for his state and that those affected have the right of judicial review to challenge the Nevada Public Utility Commission ruling.[68] Two

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61. *Id.*

62. Julia Pyper, *Solar Customers Launch Class Action Lawsuit Against NV Energy*, GREENTECH MEDIA (Jan. 17, 2016), https://www.greentechmedia.com/articles/read/solar-customers-launch-a-class-action-suit-against-nv-energy.

63. Application of Nevada Power Company, *supra* note 54, at 93, section 191.

64. Amanda Ketchledge, *Delay for Solar Rate Hikes Denied by Nevada Public Utilities Commission*, 2 NEWS (Jan. 13, 2016), http://www.ktvn.com/story/30960792/delay-for-solar-rate-hikes-denied-by-nevada-public-utilities-commission.

65. Whaley, *supra* note 57.

66. Press Release, NV Energy, Inc., NV Energy Announces Net Metering Grandfathering Proposal, PRNEWSWIRE (Jan. 25, 2016), http://www.prnewswire.com/news-releases/nv-energy-announces-net-metering-grandfathering-proposal-300209178.html.

67. *Id.*

68. Press Release, Nevada Governor Brian Sandoval, Sandoval Issues Statement Regarding Solar Industry Critique of Solar Industry Ruling, NEV. GOV'T (Dec. 23, 2015),

solar customers filed a class action lawsuit against NV Energy.[69] The lawsuit charges that the utility company violated the Nevada Deceptive Trade Practices Act and the Nevada Unfair Trade Practices Act.[70] The suit alleges that NV Energy gave the Nevada Public Utility Commission "false or incomplete information" as the commission considered new rates.[71] This suit highlights the influence that utility companies, such as NV Energy, exert over state public utility commissions and the devastating effects it has on net energy metering consumers and the solar market.

B. California

California is a global leader in renewable energy research and development and is the United States' largest market for solar photovoltaic systems.[72] In 2014 California installed more solar than the United States did from the years 1970 to 2011.[73] California, through its innovative policies, has shown that it recognizes the changes to the investor-owned utility business model and distribution planning process.

In December 2015, the California Public Utilities Commission proposed new rules impacting their existing net energy metering policies that will apply to new customers of California's three regulated utilities.[74] The proposed rules are focused not only on preserving retail payments for residential photovoltaic systems but also on incentivizing more solar, and assuring that we use the solar energy generated more wisely.[75] This proposition has caused an uproar within the utility companies who believe that by maintaining the retail payment, the public utilities commission is hurting those customers without residential photovoltaic

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http://gov.nv.gov/News-and-Media/Press/2015/Sandoval-Issues-Statement-Regarding-Solar-Industry-Critique-of-Solar-Industry-Ruling/.

69. Herman K. Trabish, *Solar Customers File Lawsuit Against NV Energy over New Net Metering Rates*, UTILITY DIVE (Jan. 21, 2016), http://www.utilitydive.com/news/solar-customers-file-lawsuit-against-nv-energy-over-new-net-metering-rates/412360/.

70. *Id.*

71. Daniel Rothberg, *Lawsuit Filed over New Rooftop Solar Utility Rates*, LAS VEGAS SUN (Jan. 15, 2016), http://lasvegassun.com/news/2016/jan/15/lawsuit-filed-over-new-rooftop-solar-utility-rates/.

72. Lesley Hunter, *Renewable Energy in the 50 States: Western Region*, AM. COUNCIL ON RENEWABLE ENERGY 1, 6 (2015).

73. *2014 Top 10 Solar States*, SOLAR ENERGY INDUSTRIES ASS'N (2014), http://www.seia.org/sites/default/files/resources/Top%2010%20Solar%20States%202014%201pager.pdf.

74. Order Instituting Rulemaking to Develop a Successor to Existing Net Energy Metering Tariffs Pursuant to Public Utilities Code Section 2827.1, and to address Other Issues Related to Net Energy Metering. Dec. 2015.

75. *Id.*

systems.[76] Utility companies are reacting to the threat that net-energy metering creates to their business model than the threat to their customers, as they disregard the numerous non-monetary benefits from net energy metering. In response, solar industry groups note that the public utilities commission proposition implements a time of use rate and new charges for customers with net energy metering that requires them to pay a non-bypassable charge.[77]

Though solar advocates are not in favor of these charges, it is evident that the public utilities commission has proposed such charges in order to avoid the argued cost-shifting. The time of use rate is an important addition, because energy value fluctuates throughout the day, and thus compensating customers with residential photovoltaic systems equally at noon and at midnight, when the cost of power is significantly different, is not fair.

C. Hawaii

Hawaii has led the United States in net metered rooftop solar, with almost 16% of Hawaiian Electric Co. customers having net metered rooftop solar.[78] The first net energy metering policy was enacted in 2001, and then continued to expand until recently.[79] In October 2015, the Hawaii Public Utilities Commission (PUC) issued a ruling that ended Hawaiian Electric Co.'s net energy metering program for all new solar customers in the state.[80] The ruling will not affect existing net-metered customers but states that new customers will not be able to participate in the net energy metering program and must instead choose between three new tariffs, a grid supply option, a self-supply option, and a time of use option.[81] These new tariffs, which have been approved for a two-year term, will reduce the compensation for rooftop solar by nearly half of the

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76. Cassandra Sweet, *Utilities Want Solar Customers to Pay More*, WALL ST. J. (Sept. 22, 2013), http://www.wsj.com/articles/SB10001424127887324139404579012962064155606.

77. *See* Order Instituting Rulemaking to Develop a Successor to Existing Net Energy Metering Tariffs Pursuant to Public Utilities Code Section 2827.1, and to address Other Issues Related to Net Energy Metering. Dec. 2015.

78. Julia Pyper, *Hawaii Regulators Shut Down HECO's Net Metering Program*, GREENTECH MEDIA (Oct. 14, 2015), http://www.greentechmedia.com/articles/read/hawaii-regulators-shutdown-hecos-net-metering-program.

79. *Net Metering Program Overview*, DSIRE (Sep. 19, 2015), http://programs.dsireusa.org/system/program/detail/1246.

80. *See* Before the Public Utilities Commission of the State of Hawaii, In the matter of Public Utilities Commission Instituting a Proceeding to investigate distributed energy resource policies. Docket No. (2014-0192) Order No.33248.

81. *Id.*

net metered rate they received under the traditional retail rate compensation.[82]

The customer grid supply option is similar to the previously existing net energy metering policy, but rather than turning back the meter, customers are paid a reduced amount for energy exported to the grid.[83] The customer self-supply option allows customers to install residential photovoltaic systems but prohibits them from exporting excess power back to the utility grid.[84] This means that the energy created by the customer must be stored in a battery, or energy storage device, in order to allow the customer to use the energy at another time. Additionally, Hawaiian Electric will charge new customers with residential photovoltaic systems a minimum monthly bill of $25 to help offset the costs of net energy metered customers still connected to the grid.[85]

This ruling has raised various concerns as to the future of Hawaii's solar industry, but the PUC maintains that the decision was made in order to support the sustainable growth of residential photovoltaic systems and other distributed energy resources.[86] The PUC states that this ruling was made in order to ensure Hawaii's "commitment to meet a 100% renewable portfolio standard by 2045."[87] The Alliance for Solar Choice in Hawaii believes differently, stating that this decision could shrink Hawaii's solar industry by up to 90% and has chosen to sue the utilities commission.[88] In response, the solar group is seeking an injunction on the utilities commission's decision in order to prevent a stall in solar projects and development in Hawaii.[89] They argue that the "PUC exceeded its statutory authority, violated state and federal law and violated constitutional due process requirements" because PUC did not

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82. Pyper, *Hawaii Regulators Shut Down HECO's Net Metering Program, supra* note 78.

83. *Customer Grid Supply and Self Supply Programs*, HAWAIIAN ELECTRIC COMPANY INC. (2013), http://www.hawaiianelectric.com/heco/Clean-Energy/Renewables-and-Customer-Generation/Customer-Grid-Supply-and-Self-Supply-Programs#link2.

84. *Id.*

85. *Id.*

86. *PUC Reforms Energy Programs to Support Future Sustainable Growth in Hawaii Rooftop Solar Market,* ST. HAW.: PUB. UTIL. COMMISSION (Oct. 13, 2015), http://puc.hawaii.gov/news-release/puc-reforms-energy-programs-to-support-future-sustainable-growth-in-hawaii-rooftop-solar-market/.

87. Durkay, *supra* note 9, at 3.

88. *TASC Seeks an Injunction on the Decision to Eliminate Solar Net Metering in Hawaii,* ALLIANCE FOR SOLAR CHOICE (Oct. 21, 2015), http://allianceforsolarchoice.com/tasc-seeks-an-injunction-on-the-decision-to-eliminate-solar-net-metering-in-hawaii/.

89. Duane Shimogawa, *Group Files Lawsuit Seeking Injunction on Rooftop Solar Decision*, PAC. BUS. NEWS (Oct. 21, 2015), http://www.bizjournals.com/pacific/news/2015/10/21/group-files-lawsuit-seeking-injunction-on-rooftop.html.

conduct a required cost-benefit analysis but rather relied on information provided by utility companies in reaching its decision.[90] Additionally, PUC did not hold a public hearing or give any opposing parties the right to challenge the information that PUC used when making its decision.[91] Though the PUC ruling will affect net energy metering, there is still a future for the solar market in Hawaii as many have speculated that the PUC decision may lead to an explosion in battery development[92] or an increased focus on demand flexibility.[93]

D. Massachusetts

In 2014 Massachusetts was ranked fourth in the United States, in terms of megawatts, for solar electricity capacity installed in the state.[94] Massachusetts is one of the few states that has authorized virtual net metering and what is known as neighborhood net metering facilities. This allows "facilities . . . owned by a group (or [that] serve the energy needs of) of a group of ten or more residential customers in a single neighborhood and served by a single utility" to benefit from virtual net energy metering.[95] Virtual net metering is a method that allows for the distribution of the economic benefits derived from a shared solar energy system to multiple electric accounts.[96] This provides customers, who would not normally be able to benefit from net metering, a way to join and benefit from net energy metering. Additionally, Massachusetts has another way for customers to benefit from virtual net metering, which allows net energy metering systems to earmark surplus solar energy

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90. *Id.*

91. *Id.*

92. Herman Trabish, *Primer: The Now and Future Impacts of Energy Storage*, UTIL. DIVE (Oct. 20, 2015), http://www.utilitydive.com/news/primer-the-now-and-future-impacts-of-energy-storage/407099/.

93 Peter Bronski et. al., *The Economics of Demand Flexibility: How "Flexiwatts" Create Quantifiable Value for Customers and the Grid*, ROCKY MOUNTAIN INST. 1, 11 (Aug.2015), http://www.rmi.org/Knowledge-Center/Library/RMI-TheEconomicsofDemandFlexibilityFull Report.

94. Jeremy Shulkin, *Net Metering Cap Slows Solar Installation for Central Mass. Utility*, TELEGRAM (Oct. 18, 2015), http://www.telegram.com/article/20151018/NEWS/151019335.

95. *Net Metering, Distributed Generation and Interconnection in Massachusetts*, MASS. DEP'T ENERGY RESOURCES (Jan. 27, 2016), https://sites.google.com/site/massdgic/home/net-metering.

96. Coughlin et al., *supra* note 43.

every month to other customers within the utility companies service area.[97]

Massachusetts is also one of many states in the United States with a net energy metering cap for public and private net energy metering facilities. A net energy metering cap is essentially a limit placed on utility companies that determines the megawatts of solar energy that can be net metered.[98] This means that the higher the cap, the more distributed generation, particularly solar energy, utility companies can buy and thus the higher the compensation rate.[99] The current debate is centered on whether or not to raise the net metering cap, and with the governor setting goals of producing "1,600 megawatts of solar energy by 2020," there is a lot of tension.[100] In November 2015, the House and Senate were not able to agree on a bill dealing with the net energy metering cap, which is the second time the legislation failed to update its net energy metering policies in 2014.[101] Thus the Massachusetts legislature adjourned with no change to the 4% cap for private net energy metering and 5% cap for public net energy metering.[102] Massachusetts has been a leader in solar energy, but the 4% cap threatens this leadership, thousands of solar jobs, and the future of solar projects in the state.[103] Sean Gallagher, vice president of state affairs for Solar Energy Industries Association, responded to the failure to raise the cap by saying that delays in raising the cap is "bad for business, bad for the environment and bad for citizens across the Commonwealth."[104]

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97. *Virtual Net Metering,* GLOBAL CCS INST., http://hub.globalccsinstitute.com/publications/guide-community-shared-solar-utility-private-and-nonprofit-project-development/virtual-net-metering (last visited Jan. 2016).

98. David Brooks, *Net Metering Cap Increase Passes N.H. Senate Committee*, CONCORD MONITOR (Jan. 20, 2016), http://www.concordmonitor.com/home/20637343-95/net-metering-cap-increase-passes-nh-senate-committee.

99. Shulkin, *supra* note 94.

100. *Id.*

101. Christian Roselund, *Massachusetts Fails to Lift Net Metering Caps*, PV MAG. (Nov. 19, 2015), http://www.pv-magazine.com/news/details/beitrag/massachussets-fails-to-lift-net-metering-caps_100022056/#axzz3yTmoleWG.

102. *Id.*

103. Sean Gallagher, *Solar Industry Urges Massachusetts to Lift the Net Energy Metering Cap*, ALT ENERGY MAG. (Jan. 22, 2016), http://www.altenergymag.com/news/2016/01/21/solar-industry-urges-massachusetts-to-lift-the-net-energy-metering-cap/22647/.

104. *Id.*

IV. IS STATE AUTHORITY THE BEST FOR SOLAR DISTRIBUTED GENERATION?

It can be said that in the United States, through the absence of contemporary federal legislation on net energy metering, states are allowed to experiment with the rise of customer demand for distributed generation. This argument has been criticized by MIT researchers who believe that the numerous and variable subsidies and policies from the federal, state, and local government are simply creating "an extremely inefficient policy regime," which is not fully capitalizing on the value of solar electricity.[105] The decisions in *MidAmerican Energy Co.* and *Sun Edison LLC.* ensured that net energy metering remained under state authority, rather than federal authority, by not characterizing net energy metering as the sale of energy.[106] Without a set of federal guidelines, states have been changing their net energy metering policies in ways that limit the potential of solar distributed generation and its benefits to the United States. It is also interesting to note that by stating that net energy metering is not the sale of energy, the FERC has retained the view of the grid as one dominated by utility monopolies rather than the realistic view.[107] The discrepancies between state's net energy metering policies has raised the question as to whether net energy metering should be left to state jurisdiction or whether the FERC should step in and address many of the issues several states are struggling to address. The inconsistencies in state policies can be managed by having the FERC create a solid legal foundation for states to follow. In doing so the FERC must rely on accurate information and research, not solely the information provided by various utility companies who are experiencing financial downturns as a result of net energy metering. If the FERC were to determine the proper rate of compensation, based on information that presented both the costs and benefits of net energy metering and the benefits to the electric grid as a result of the decrease in wear and tear resulting from a decrease in use, then that would become the filed federal rate. Under the filed rate doctrine, which is derived from the Commerce and Supremacy Clause of the Constitution, the rate would become the legal rate and could not be challenged.[108]

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105. *The Future of Solar Energy: An Interdisciplinary Study*, *supra* note 4, at 241.

106. *See* Ferrey, *Virtual Nets and Law, supra* note 17.

107. Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Servs. by Public Utilities, 75 F.E.R.C. ¶ 61,080, at p. 4 (1996).

108. People of Cal. ex rel Lockyer v. Dynegy, 375 F.3d 831, 853 (9th Cir. 2004).

One of the biggest discrepancies among the net energy metering policies analyzed above is the compensation rate for solar distributed generation, but this could easily be regulated with involvement by the FERC. Utility companies were originally regulated monopolies, but the influx of solar distributed generation is forcing a change in the infrastructure and governance of the utility infrastructure.[109] Though the federal government's vision for the grid is no longer a "monopoly-regulated regime" but rather a grid with fair competition,[110] the electricity grid's rate structure is still based on the antiquated idea of power transmission and generation. Rate designs must ensure that utility companies are compensated to cover their costs, but at the same time, those costs must be "distributed among customers equitably, so a customer's electricity bill is representative of the value of the services provided to, and by, that customer."[111] In 2013 the U.S. Department of Energy's National Renewable Energy Laboratory and Lawrence Berkeley National Laboratory found that around $2.2 billion of benefits "in the form of low future climate change damages" were derived from reductions in greenhouse gas emissions and $5.2 billion of global health and environmental benefits from reduction in air pollution.[112] This information provides economic data as to the benefits of policies such as net energy metering and supports the idea that compensation rates must take these benefits into account alongside the costs incurred to utility companies.

MidAmerican Energy Co. and *Sun Edison LLC.* held that net energy metering was not the wholesale sale of energy, but as the landscape of net energy metering has changed with a dramatic surge in customers with residential photovoltaic systems, the FERC may need to reconsider their previous decisions. With states changing their net energy metering policies, various suits have been filed such as the lawsuit against NV Energy in Nevada and the injunction in Hawaii against the Hawaii Public Utilities Commission. Nevada and Hawaii are

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109. Elisabeth Graffy and Steven Kihm, *Does Disruptive Competition Mean a Death Spiral for Electrical Utilities?*, 35 ENERGY L.J., no.1, 1, 12 (2014).

110. *The Future of Solar Energy: An Interdisciplinary Study, supra* note 4, at 2.

111. *Net Energy Metering, Zero Net Energy and The Distributed Energy Resource Future: Adapting For The 21st Century*, ROCKY MOUNTAIN INST. 1, 43 (March 2012), http://www.rmi.org/Content/Files/RMI_PGE_NEM_ZNE_DER_Adapting_Utility_Business_Models_for_the_21st__Century.pdf.pdf.

112. Ryan Wiser et al., *A Retrospective Analysis of the Benefits and Impacts of U.S. Renewable Portfolio Standards,* ELECTRICITY MKTS. & POL'Y GROUP 1, 13 and 24 (Jan. 2016), https://emp.lbl.gov/sites/all/files/lbnl-1003961.pdf.

also two states that have hindered the installation of residential photovoltaic systems due to the decrease in compensation to their customers from the retail rate to wholesale rate. These states should be following policies such as those in California regarding compensation rates, which preserve the retail payments and incentivizes solar distributed generation.[113] Congress enacted PURPA as a way to ensure a diversification of energy sources in the United States and avoid the utility companies from discouraging distributed generation by lowering retail rates.[114] The situation we face now is the same one, utility companies are lobbying states to reduce compensation rates from retail to wholesale, and in the process, discouraging the installment of residential photovoltaic systems.

V. THE FUTURE OF SOLAR DISTRIBUTED GENERATION IN THE UNITED STATES WITHOUT FERC GUIDELINES

Without involvement from the FERC, many states will succumb to pressures from utility companies and limit the benefit from net energy metering and solar distributed generation for their residents. With such dramatic changes to net energy metering policies occurring in various states across the United States, customers with residential photovoltaic systems are trying to figure out what the future looks like in terms of their solar distributed generation. Researchers and advocates have proposed an increase in demand flexibility, a shift to utility-scale photovoltaic systems, a spread in energy storage, and, in extreme cases, grid defection.

A. A Shift Away from Residential Photovoltaic Systems

In the MIT study, the researchers stated that they believe net-metering is not the best economical solution, and they propose a system in which charges reflect the customer's contribution to the utilities'

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113. *See* Order Instituting Rulemaking to Develop a Successor to Existing Net Energy Metering Tariffs Pursuant to Public Utilities Code Section 2827.1, and to address Other Issues Related to Net Energy Metering. July 2014.

114. *Public Utility Regulatory Policy Act (PURPA)*, UNION CONCERNED SCIENTISTS, http://www.ucsusa.org/clean_energy/smart-energy-solutions/strengthen-policy/public-utility-regulatory.html#.V35mJpMrLq0 (last visited Jan. 2016); Carolyn Elefant, *Reviving PURPA's Purpose: The Limits of Existing State Avoided Cost Ratemaking Methodologies in Supporting Alternative Energy Development and a Proposed Path for Reform*, SOUTHERN ALLIANCE FOR CLEAN ENERGY (SACE), http://www.recycled-energy.com/images/uploads/Reviving-PURPA.pdf (last visited Jan. 2016).

distribution costs, rather than their consumption.[115] Unfortunately, their study realizes that there is no clear path to implementing their system, and they focus on the fact that in order to increase solar generation, policies must shift their focus from residential photovoltaic systems towards utility-scale photovoltaic systems and the implementation of national policies.[116] The researchers state that the current mix of local, state, and federal policies are "needlessly inefficient," and that national policies that reward generation of clean energy should be implemented.[117] Additionally, they suggest moving away from policies focused on residential photovoltaic systems due to the extremely high cost and less energy production compared to utility-scale photovoltaic generation.[118]

B. The Rise of Demand Flexibility

As a result of the changes in net energy metering policies, the idea of demand flexibility has gained traction as a way to help customers who have been negatively impacted by these changes in policies save money. Demand flexibility can help address the issue of increased grid costs, with one study finding that the implementation of demand flexibility can help avoid $13 billion per year in grid costs.[119] Additionally, demand flexibility will allow solar owners to use 90% of their own onsite solar generation and results in 80% of the savings that the old net energy metering arrangement offered.[120] Demand flexibility uses "communication and control technology to shift electricity use across hours of the day while delivering end-use services at the same or better quality but lower cost."[121] The demand flexibility technology required to access savings is easy and simple for customers to install, and they include smart appliances such as thermostats, electric vehicle chargers, and electric dryers. These technologies provide consumers with a flexibility in their demand, allowing them to shift the watts of demand throughout the day. The result is what is known as flexiwatts, which are simply the watts of energy demand that can be shifted across the day,

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115. *The Future of Solar Energy: An Interdisciplinary Study, supra* note 4.
116. *Id.* at 223.
117. *Id.* at 224.
118. *Id.* at 225.
119. Bronski et. al., *supra* note 93.
120. Herman K. Trabish, *The Day After: How Solar Can Thrive in the Post-Net Metering Era*, UTILITY DIVE (Nov. 3, 2015), http://www.utilitydive.com/news/the-day-after-how-solar-can-thrive-in-the-post-net-metering-era/408357/.
121. Bronski et. al., *supra* note 93, at 5.

from high price to low price times[122]. Flexiwatts result in reducing peak demand and increasing the consumption of solar photovoltaic energy produced on site.[123] Demand flexibility is not solely limited to consumers generating their own energy, as it also reduces costs for customers connected to the grid by creating real-time pricing.[124]

Demand flexibility is not a novel concept, but with the reduction in price of control technologies, a surge in innovation and development of control technologies, and the changing net energy metering policies across the United States, demand flexibility has resurfaced as a solution to the debate surrounding distributed generation for both consumers and utility companies.

C. A Future Focused on Energy Storage

Energy storage has begun to gain traction as many people are looking for behind-the-meter technologies, and energy storage is becoming more affordable. In fact, "according to a report by Navigant Research, worldwide revenue from distributed energy storage systems is expected to grow from $452 million annually in 2014 to more than $16.5 billion in 2024."[125] Solar energy installers have begun to team up with storage providers to offer smart energy storage systems to its customers. In 2015 SolarCity partnered with Tesla to incorporate Tesla's battery into its solar energy system and provide its customers with an affordable battery storage.[126] SolarCity states that the combination of solar power generation and battery storage will not only reduce the cost of expanding and maintaining the grid but will help support the grid and prevent service interruptions.[127]

D. The Decision to Defect from the Grid

Grid defection, though a possibility as a result of the changes in net energy metering policies across the United States, would not be the ideal solution to creating a stronger and cleaner electrical system. Regardless,

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122. *Id.* at 6.

123. *Id.* at 9.

124. *Id.* at 18.

125. *Revenue From Distributed Energy Storage Systems is Expected to Exceed $16.5 Billion by 2024*, NAVIGANT RES. (Jan. 12, 2015), https://www.navigantresearch.com/newsroom/revenue-from-distributed-energy-storage-systems-is-expected-to-exceed-16-5-billion-by-2024.

126. Molly Canales, *SolarCity Introduces Affordable New Energy Storage Services Across U.S.*, SOLARCITY (April 30, 2015), http://www.solarcity.com/newsroom/press/solarcity-introduces-affordable-new-energy-storage-services-across-us.

127. *Id.*

some are being driven to grid defection due to their frustration with the electricity grid and utility companies, regulatory changes, and an interest in clean energy and better economics.[128] Morgan Stanley researchers determined that grid defection will occur as the fixed charges for distributed generation customers increases.[129] Presently, total grid defection is not a very popular idea for most residents in the United States, because it would require extremely large batteries that come at high prices. As energy storage technology increases and prices decrease, many residents may be choosing to cut the cord and defect from the grid.

VI. CONCLUSION

Advocates of distributed generation are striving for the creation of a sustainable energy market in the United States, and net energy metering policies have helped the renewable energy industries, especially solar energy, thrive. Distributed generation prevents the purchase of fossil fuel energy, reduces C2O emissions, provides thousands of jobs in the solar sector, and the resulting decrease in the use of the electric grid prevents wear and tear to the electric grid. Logically, it would seem that states would want to implement net energy metering policies that work hand in hand with tax subsidies from the government and compensate their residents for the excess energy they create, but unfortunately, due to the influence of utility companies, many states have changed their net energy metering policies in a way that hurts not only their residents and the solar industry but also the environment. Without a set of legal guidelines from the FERC, states have been changing their net energy metering policies in such a way that limits the potential impact of solar distributed generation. FERC involvement is required because distributed generation has changed the way power flows in the United States by creating a two-way power flow, and thus the policies and rate structure must take this change into consideration and adequately compensate consumers.

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128. *Economics of Grid Defection*, ROCKY MOUNTAIN INST. 1, 19 (Feb. 2014), http://www.rmi.org/electricity_grid_defection.

129. Stephen Lacey, *Morgan Stanley: Fixed Charges on Solar May Cause 'Tipping Point' for Grid Defection*, GREENTECH MEDIA (Aug. 2014), http://www.greentechmedia.com/articles/read/Solar-Fixed-Charges-May-Cause-Grid-Defection.