NOTE

NEW YORK'S TIME TO SHINE: TURNING WEAKNESSES IN STATE SOLAR ENERGY POLICY INTO AN OPPORTUNITY FOR NATIONAL LEADERSHIP

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New York has shifted its policy for valuing the energy that solar panel owners place back onto the grid in an effort to promote solar development where the state needs it the most. Now, the state is at a crossroads because that change has stressed solar investments rather than incentivized them; should the state eliminate the legislation in favor of old policy or make changes to the current policy? This Note argues that New York should maintain the current policy but make small changes in order to ameliorate the weaknesses that are challenging the state's solar market. If New York eliminates the new policy, it could miss an opportunity to achieve balance between the need to increase renewables and to ensure long-term success of its utilities. New York should choose wisely because other states will look to New York as a cautionary tale or as a lesson for success.

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INTRODUCTION

New York does not necessarily invoke an image of limitless sun and expanses of solar panels, yet the state ranks fifth friendliest state to rooftop solar.[1] Although New York's sun exposure does not compare to that of Arizona or Hawaii, Governor Cuomo and the New York legislature have developed policies that effectively incentivize solar investment, and these policies include grants and tax breaks.[2] Until recently these measures have indisputably succeeded; between 2011 and 2018, investment in solar energy grew by over 1000%.[3]

But, since 2017, $800 million in local investment for solar infrastructure has disappeared in the State of New York, and some blame a shift in New York's policy that compensates owners of solar infrastructure.[4] The missing investment jeopardizes the fruition of planned solar projects, which would have delivered cheap, clean, and renewable energy to local communities.[5] New York has expressed the political will not only to expand solar, but also to lead the industry nationally.[6] But, since the shift in New York policy, solar companies have abandoned possible sites in New York to find more favorable compensation in other states.[7] These are the concerns and allegations of environmentalists and solar power advocates in New York state.

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1 Julian Spector, *The States Most Friendly to Rooftop Solar, Ranked*, GREENTECH MEDIA (Jan. 6, 2017), https://www.greentechmedia.com/articles/read/the-states-most-friendly-to-rooftop-solar-ranked#gs.2qr2wy.

2 New York has, for example, implemented a Renewable Portfolio Standard ("RPS") in which it requires utilities to acquire a certain percentage of energy generation from approved renewable sources. The state has also implemented property and sales tax exemptions for homeowners that invest in rooftop solar. *See id.*

3 Frank Andorka, *New York Solar Grows More than 10-Fold in Six Years*, PV MAGAZINE (Feb. 6, 2018), https://pv-magazine-usa.com/2018/02/06/new-york-solar-grows-more-than-10-fold-in-six-years/.

4 Ellen Abbott, *Solar Energy Advocates Want Cuomo to Reinstate Net Metering for Compensation*, WRVO PUBLIC RADIO (Aug. 29, 2018), https://www.wrvo.org/post/solar-energy-advocates-want-cuomo-reinstate-net-metering-compensation.

5 *See id.*

6 *See Governor Cuomo Announces $40 Million to Support Solar Powered Storage Projects*, NEW YORK STATE (Oct. 10, 2018), https://www.governor.ny.gov/news/governor-cuomo-announces-40-million-support-solar-powered-storage-projects-0.

7 *See* Abbott, *supra* note 4.

What could explain this change in fate? Environmentalists blame Value of Distributed Energy Resources ("VDER") for the gloomy future of solar investment in New York.[8] VDER is a policy that changes the way that New York compensates the owners of solar panels for the energy that they supply to the grid.[9] VDER replaced net metering, a traditional and simpler method of compensating solar-energy producers.[10] Opponents of VDER argue that the new scheme does not sufficiently compensate owners of solar panels for their energy contributions and removes the certainty of the return on investment, thus spooking possible investors.[11] In response, the New York legislature has begun to consider repealing VDER and replacing it with traditional net metering.[12] This Note explains why this would be a mistake.

Part I of this Article describes policies for valuing solar energy and analyzes the failures of VDER. These failures include that the policy is too complicated to allow for investment planning and that it gives utilities too much room to limit their compensation to solar infrastructure owners. Part II of this Article provides the legal framework that governs utility and electricity rate regulation. Part III discusses the benefits of a locational and demand-relief values. Part IV elaborates on the need to balance the benefits of a locational and demand-relief value with the need to ensure investors of their return on investment.

Finally, Part V of this Article suggests minor policy changes that could ameliorate VDER's weaknesses without necessitating the complete repeal of the policy, thus allowing the policy to stand as an example for other states with mature solar energy markets. The proposed policy changes include placing a floor on the amount that utilities must compensate owners of solar infrastructure and endowing a third-party non-profit with the responsibility of setting that floor through a standard methodology that applies across utilities and regions of New York.

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8 *Id.*

9 *The Value Stack*, NY-SUN, https://www.nyserda.ny.gov/All%20Programs/Programs/NY%20Sun/Contractors/Value%20of%20Distributed%20Energy%20Resources (last visited Apr. 25, 2019) [hereinafter *VDER Resources*].

10 *Id.*

11 *See* Abbott, *supra* note 4.

12 *See* Alyssa Danigelis, *New York Assembly Passes Bill to Establish New Value for Solar Energy*, ENVIRONMENTAL + ENERGY LEADER (June 20, 2018), https://www.environmentalleader.com/2018/06/new-york-assembly-solar-bill/; *New York's Stopgap Proposals Offer Improvements to VDER, Create Strong Starting Point for Further Discussions*, SEIA, (Aug. 2, 2018), https://www.seia.org/news/new-yorks-stopgap-proposals-offer-improvements-vder-create-strong-starting-point-further.

I. DESCRIPTION

A. *Background: What is Net Metering?*

The concept of compensating customers that contribute to the grid is well established.[13] Starting in 1979, Massachusetts utilities began to offset electricity bills for their customers that contributed energy to the grid.[14] Since then, many states have moved in the right direction by adopting policies that incentivize investment in distributed energy sources ("DERs"), or non-traditional and small-scale electricity generators, like wind and solar.[15] As of 2017, thirty-eight states, Washington D.C and four territories adopted net metering[16], which requires utilities to compensate owners of DERs that generate surplus energy and return it to the grid for general consumption.[17] A homeowner that installs solar will not need all the energy that the panels produce during the height of the day, so the homeowner can sell that excess electricity back to the grid.[18] However, when the panels do not produce energy (i.e. during dark hours), the grid will still provide the homeowner with electricity.[19] Instead of charging the homeowner for this electricity use, the utility subtracts the amount of electricity that the solar panels provide to the grid from the final bill.[20]

Compensating owners of DERs offers four discrete benefits to the grid. First, by offering lower electric bills and incentivizing investment in DERs, net metering reduces carbon emissions.[21] Second, by allowing owners of DERs to generate and use their own electricity, net metering eases congestion in heavily trafficked transmission areas.[22] Grid congestion occurs when distribution or transmission lines cannot deliver enough electrical load to meet demand.[23] This occurs because people tend to

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13 *See* Roberto Verzola, *Net Metering History & Logic – Part 1*, CLEANTECHNICA (Sept. 6, 2015), https://cleantechnica.com/2015/09/06/net-metering-history-logic-part-1/.

14 *Id.*

15 *State Net Metering Policies*, NAT'L CONF. ST. LEGISLATURES (Nov. 20, 2017), http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx.

16 *Id.*

17 Mark Muro & Devashree Saha, *Rooftop Solar: Net Metering is a Net Benefit*, BROOKINGS INST. (May 23, 2016), https://www.brookings.edu/research/rooftop-solar-net-metering-is-a-net-benefit/.

18 *See* Verzola, *supra* note 13.

19 *See id.*

20 *Id.*

21 *Id.*

22 *See* David Roberts, *If You Thought Solar Was Going to Hurt Utilities, Get a Load of Solar + Storage*, VOX (Feb. 5, 2016), https://www.vox.com/2016/2/5/10919082/solar-storage-economics.

23 Phill Feltham, *Power Grid Congestion*, ELECTRICITY TODAY T&D MAG. ONLINE, https://www.electricity-today.com/overhead-td/power-grid-congestion (last visited Apr. 28, 2019).

come home in the late afternoon and turn on electrical appliances, which results in greater demand on the electrical grid.[24] Hot summer days also increase demand because people rely on air conditioning.[25] These times are referred to as periods of "peak demand," and they stress the grid the most because transmission lines have limited capacity to deliver electricity from generators to end users, like homeowners.[26] These two benefits (i.e. reducing carbon emissions and easing congestion) reinforce one another. DERs will ease peak demand by satisfying net-metered customers' need for electricity where those customers would otherwise turn to the grid to meet their electricity needs.[27] Thus, by easing peak demand, DERs reduce reliance on dirty fossil fuels like coal, which in turn reduces carbon emissions.[28] Finally, by easing congestion, renewables will decrease the need for fossil fuel generators to meet demand.[29]

While net metering has benefited the electrical grid, ratepayers,[30] and the climate, mitigating climate change requires innovative approaches that build on net metering to increase the share of renewables in our electricity mix, maximize the usefulness of DERs, and compensate those homeowners who ease grid congestion.[31] Solar Energy Industries Association and others have proposed that policies incorporate locational and demand relief values to DER compensation because utilities can benefit from DERs in certain locations and at certain times more than at others.[32] The first reason for this is that utilities might expect population growth and energy demand in specific areas, so DERs can help the utility meet that demand where it is growing the fastest.[33] Second, utilities might need to retire aging infrastructure, and, instead of having to fi-

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24 *Demand for Electricity Changes Through the Day*, U.S. ENERGY INFO. ADMIN. (Apr. 6, 2011), https://www.eia.gov/todayinenergy/detail.php?id=830.

25 *Homes Show Greatest Seasonal Variation in Electricity Use*, U.S. ENERGY INFO. ADMIN. (Mar. 4, 2013), https://www.eia.gov/todayinenergy/detail.php?id=10211.

26 *Electricity Explained: How Electricity is Delivered to Consumers*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/index.php?page=electricity_delivery (last updated Oct. 11, 2019).

27 *See* Feltham, *supra* note 23.

28 *See id*; *see also* Jeff St. John, *How Energy Storage Can Cut Peaker-Plant Carbon for the Clean Power Plan*, GREENTECH MEDIA (Sept. 24, 2015), https://www.greentechmedia.com/articles/read/how-energy-storage-can-cut-peaker-plant-carbon-for-the-clean-power-plan.

29 *See* St. John, *supra* note 28.

30 Utilities provide the service of delivering electricity. Ratepayers are the entities that receive that service and compensate the utility. These entities pay at a rate that the federal government sets. *See* Seth Kaplan, *Why 'Ratepayer' is a Dirty Word*, GREENTECH MEDIA (May 22, 2014), https://www.greentechmedia.com/articles/read/theres-no-such-thing-as-a-ratepayer/.

31 *See* Muro & Saha, *supra* note 17

32 Dave Gahl et al., *Getting More Granular: How Value of Location and Time May Change Compensation for Distributed Energy Resources*, SOLAR ENERGY INDUS. ASS'N 1, 2–4 (2018), https://www.seia.org/sites/default/files/2018-01/SEIA-GridMod-Series-4_2018-Jan-Final_0.pdf [hereinafter SEIA Whitepaper].

33 *Id.*

nance and construct replacement infrastructure, the utility can rely on DERs to fill an expected void.[34] Third, utilities might expect demand to surge more in some locations at certain times of the year.[35] Southern states, for example, use more electricity in the hot summer months.[36] Finally, DERs limit the need to mitigate congestion on transmission lines. If DERs generate more electricity than the homeowner requires, then the electricity will go back on the grid and travel a short distance to the next user.[37] So, DER generation meets that demand and eases the burden of transmission lines to bring energy from further away.[38] In sum, the goal of incorporating locational and demand relief values is to incentivize investment in places where the utility would most benefit.

B. New York's Net-Metering Policy

The New York State Public Service Commission ("PSC") has pioneered an ambitious DER policy called Reforming the Energy Vision ("REV"), which involves moving beyond simple net metering.[39]As part of REV, New York has reimagined the scheme for compensating renewable energy generators.[40] In particular, New York has adopted Value of Distributed Energy Resources ("VDER"), which incorporates a "value stack," meant to encourage investment in DERs where it would best meet growing energy demands.[41] The value stack is comprised of four categories of values that DERs can provide the grid. First, the environmental value reflects the reduced cost of carbon per kWh[42] of energy that DERs generate.[43] The idea behind the environmental value is that DERs mitigate externalities associated with traditional forms of energy generation, which includes the emission of greenhouse gases, particulate matter, and

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34 Herman K. Trabish, *How Utilities Can Mitigate Grid Impacts of High Solar Penetrations*, UTILITY DIVE (Oct. 16, 2014), https://www.utilitydive.com/news/how-utilities-can-mitigate-grid-impacts-of-high-solar-penetrations/320407/.

35 *See, e.g.,* Dennis Pillion, *Alabama Residents Pay 2nd Most for Electricity, Study Says*, AL.COM (Feb. 27, 2018), https://www.al.com/news/2018/02/alabama_residents_pay_2nd_most.html.

36 *See id.*

37 *See* Jackson Salovaara, *Just and Reasonable Rooftop Solar: A Proposal for Net Metering Reform*, 7 ARIZ. J. ENVTL. L. & POL'Y 57, 61–64 (2017).

38 *Id.* at 91.

39 *See Reforming the Energy Vision*, NEW YORK STATE, https://rev.ny.gov/about/ (last visited Apr. 28, 2019) (indicating that in response to Hurricane Sandy, Governor Cuomo tasked the New York Public Service Commission with implementing policies over the course of multiple years in order to achieve various climate and clean energy goals, and that the Value of Distributed Energy Resources, the topic of this Article, is just one of the policies that fall under REV).

40 *See VDER Resources*, *supra* note 9.

41 *Id.*

42 A kilowatt hour is a unit of energy.

43 *In the Matter of the Value of Distributed Energy Resources,* N.Y. PUB. SERV. COMM'N, Case No. 15–E–0751 at 4 (Apr. 18, 2019).

other pollutants.[44] Second, a capacity value reflects the amount of load[45] that an intermittent energy source can serve without an increase in the loss-of-load probability (or the probability that demand or energy will outstrip supply).[46] Third, there is a demand reduction value ("DRV"), which reflects that amount of energy demand that the grid did not have to meet because owners of DERs consumed what they produced.[47] Finally, the value stack includes a locational system relief value ("LSRV") in order to incentivize investment in DERs in places where New York utilities could make best use of DER infrastructure and avoid forecasted distribution system investments.[48]

In response to alleged failures of VDER, the New York legislature has begun to backtrack, initiating legislation that would place a moratorium on VDER and return to net metering. On June 19, 2018, the New York State Assembly passed a bill to keep net metering in effect for community solar[49] until December 31, 2021.[50] The same bill awaits approval in the New York Senate, where it has undergone consideration by the Rules Committee.[51] Popular, and well-founded, fears have stoked a legislative response.[52] Through its simplicity and clarity, net metering addresses the concerns about VDER's unpredictability.[53] However, New York, along with the rest of the United States, will lose out on the potential additional benefits available through VDER if it backtracks. With other states awaiting the outcome of REV's experiment, New York's handling of VDER's weaknesses will either serve as a cautionary tale or a success that other states model.

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44 Elizabeth B. Stein & Ferit Ucar, *Compensating Distributed Energy Resources for Environmental Attributes*, ENVTL. DEF. FUND BLOGS (Mar. 6, 2018), http://blogs.edf.org/energyexchange/2018/03/06/compensating-distributed-energy-resources-for-environmental-attributes/.

45 Load is the total consumer use at a given point in time. *See How the Electricity Grid Works*, UNION OF CONCERNED SCIENTISTS (Feb. 17, 2015), https://www.ucsusa.org/clean-energy/how-electricity-grid-works.

46 Michael Coddington et al., GRID MODERNIZATION LABORATORY CONSORTIUM U.S. DEP'T OF ENERGY, DISTRIBUTED ENERGY RESOURCES 77 (2018).

47 *VDER Resources*, *supra* note 9.

48 *See* Jeff St. John, *Why Solar Advocates Are Crying Foul Over New York's Latest REV Order*, GREENTECH MEDIA (Sept. 19, 2017), https://www.greentechmedia.com/articles/read/why-solar-advocates-are-crying-foul-over-new-yorks-latest-rev-order.

49 Large solar farms allow customers to subscribe and to purchase energy produced on the farm. This system is called community solar.

50 A-10474, Assemb. Reg. Sess. 2017–2018 (N.Y. 2018).

51 S-8237, S. Reg. Sess. 2017–2018 (N.Y. 2018).

52 Some environmentalists and solar advocates have attempted to garner support and bring attention to the weaknesses of VDER and its potential to dismantle progress in the solar industry by referring to it as "Darth VDER." *See* NY Energy Democracy Alliance, *Darth VDER Visits Albany*, FACEBOOK (June 12, 2018), https://www.facebook.com/EnergyDemocracyNY/videos/1539513136178339/.

53 Abbott, *supra* note 4.

C. *Weaknesses of New York's VDER*

Despite ostensibly being an improvement over traditional DER approaches, New York REV has failed to increase investment in solar. According to the Energy Program Manager at the Central New York Regional Planning and Development Board, Chris Carrick, New York's solar industry has lost $800 million in local investment since the New York Public Service Commission first implemented VDER.[54] The impediment to solar investment that VDER has posed is twofold. First, the value stack is more complex than the traditional valuation scheme, which is volumetric, meaning that the same rate applies for a kWh (kilowatt-hour) of energy consumed as a kWh that a generator places back onto the grid.[55]

Second, in its current iteration, VDER allows utilities to limit the value of DRV, LSRV, and environmental benefits such that DERs receive low compensation for the value that they contribute.[56] Utilities are wary of traditional net metering because the simplicity allows certainty for potential investors, thus increasing incentives to invest in DERs (i.e. energy that the utilities neither provide nor generate revenue from).[57] Currently, utilities can weaponize VDER by undervaluing LSRV and DRV, limiting the rate at which the utilities must compensate owners of DERs, and thus, disincentivizing investment in DERs.[58] Essentially, VDER's current iteration has perverted the incentives of New York's utilities, motivating them to act in a way that undermines the original goals of the policy.[59] These drawbacks limit the predictability of solar investment because a complex value calculation makes it difficult to determine the period over which investors will recuperate their investment, and utility control over the value of DERs undermines investor confidence that values will stay fair and constant.[60]

Although New York's current policy suffers many weaknesses, LSRV and DRV can provide additional benefits to New York.[61] Rather than scrapping VDER and regressing back to net metering, New York should revamp its implementation of VDER to address the above weak-

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54 *Id.*

55 Ryan Hledik & Jim Lazar, *Distribution System Pricing with Distributed Energy Resources*, FUTURE ELECTRIC UTILITY REGULATION, May 2016, at 16.

56 *See* Solar Energy Industries Association, Comment Letter on CASE 15-E-0751 Regarding VDER Phase 1 Implementation Plans of the Joint Utilities at 39 (July 24, 2017) [hereinafter SEIA Comments].

57 *See id.* at 42–43.

58 *See id.* at 42–43.

59 *See id. See also* N.Y. PUB. SERV. COMM'N, *supra* note 43, at 2 (asserting that the purpose of VDER is to "take appropriate, reasonable and expeditious initial steps toward more accurate valuation and compensation of DER.").

60 SEIA Comments, *supra* note 56, at 43–44.

61 SEIA Comments, *supra* note 56, at 47.

nesses. The remainder of this Note will discuss the regulation of electricity rates, the benefits of LSRV and DRV, as well as ways to address VDER's weaknesses.

II. LEGAL FRAMEWORK OF ENERGY MARKETS

Utilities play an important role in the development of energy policy. Utilities provide electricity to their customers, which has become an essential service in our society.[62] As such, ensuring the economic prosperity and survival of utilities is in the public interest. Yet, as for-profit companies, utilities are still more motivated by increasing revenue than for delivering low cost electricity to their customers. As such, the government must balance the financial survival of utilities with the public interest. Therefore, any energy-policy debate must illuminate the history and role of utilities in shaping the legal background.

Energy markets are unique because the government has historically treated utilities that provide electricity as both natural monopolies and public companies.[63] Traditionally, utilities function as monopolies because the high capital costs of transmission lines that carry electricity make it difficult for new entrants to participate.[64] Additionally, generating electricity, sending it to transmission lines, decreasing voltage at substations, and sending electricity out again on lower voltage distribution lines for entities that will use the electricity has high transaction costs.[65] Therefore, it made sense to centralize these processes under one entity to limit transactional costs.[66] However, for the purposes of regulation, the government would treat utilities as public entities because they provide an essential service to society.[67]

The government regulates the rates that utilities can charge their customers to protect the public from having to pay exorbitant rates for electricity.[68] Since the utility has a monopoly on service in a given area, and people will always need electricity, the utility would otherwise be

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62 JOEL B. EISEN ET AL., ENERGY, ECONOMICS AND THE ENVIRONMENT 38–39 (Robert C. Clark et al. eds., 4th ed., 2015).

63 *Id.*

64 *See* Samuel Insull, Speech at the 1898 National Electric Light Association Convention (June 7, 1898), https://www.masterresource.org/edison-electric-institute/the-insull-speech-of-1898/.

65 *See id.* ("I cannot bring myself to the belief that the citizens of this country are in fact opposed to large aggregations of capital in corporate form, as such aggregations are absolutely necessary to the operation of all great undertakings by private enterprise.").

66 *Id.*

67 *See* EISEN ET AL., *supra* note 62. *See also* Munn v. Illinois, 94 U.S. 113, 126 (1876) (Although Munn v. Illinois did not deal with utility regulation specifically, it stood for the proposition that "[p]roperty does become clothed with a public interest when used in a manner to make it of public consequence, and affect the community at large.").

68 *See* EISEN ET AL., *supra* note 62, at 455–57.

able to raise prices to increase profits.[69] The government fights against that motivation by setting rates at the cost that utilities bear in providing service plus a reasonable return, which is called the cost of service.[70] This scheme for compensating utilities and treating them as public monopolies continued until the 1970s.[71]

The Public Utilities Regulatory Policies Act ("PURPA") of 1978 was signed into law during the Oil Embargo—a period of rising fuel prices and increasing awareness of environmental issues.[72] In enacting PURPA, Congress responded to ratepayers' desire for lower cost options.[73] Traditionally, utilities operated as vertically-integrated monopolies, meaning that the utility controlled all aspects of electricity supply: generation, transmission, and distribution.[74] However, PURPA authorized FERC to force utilities to sell generating assets and to purchase electricity from qualifying facilities ("QFs"), thus introducing competition into the energy generation sector.[75] QFs include generators that produce fewer than 80 MWs of electricity (which includes solar and wind and precludes coal, oil, and natural gas producers).[76] FERC only has jurisdiction over wholesale markets, meaning that the agency's regulatory authority is limited to sales between generators and intermediaries.[77] It cannot regulate retail sales to ratepayers, where electricity moves from intermediaries to end-users.[78] States have jurisdiction over retail markets.[79]

PURPA ensures that QFs compete on an equal footing with traditional generators by setting the cost that utilities buy electricity from QFs at the utility's avoided cost.[80] Avoided cost is defined as "the incremental cost to the electric utility of the electric energy . . . which, but for the purchase from such the qualifying facility or qualifying facilities such utility would generate itself or purchase from another source."[81]

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69 *Id.*

70 *Id.*

71 *Id.* at 630.

72 *Id.*

73 *Id.*

74 *Id.* at 67–70.

75 *Id.* at 631.

76 *What is a Qualifying Facility?*, FERC, https://www.ferc.gov/industries/electric/gen-info/qual-fac/what-is.asp (last updated Dec. 29, 2017).

77 *Frequently Asked Questions*, FERC, https://www.ferc.gov/industries/electric/gen-info/mbr/faqs.asp (last updated Dec. 11, 2018).

78 16 U.S.C. § 824(a) (2018).

79 *Id.*

80 EISEN ET AL., *supra* note 62, at 631.

81 18 C.F.R. § 292.101(b)(6) (2007).

III. THE IMPORTANCE OF LSRV AND DRV

Even though PURPA applies to wholesale generation under FERC's jurisdiction, states should still apply avoided cost principles to their energy markets. Right now, most states set rates that utilities pay to net-metered customers volumetrically.[82] This means that the ratio of cost for consumption per unit of electricity to benefit received per unit of energy placed back onto the grid is one-to-one.[83] However, this rate regime does not account for the fact that the price of electricity varies at different times and in different places.[84] The costs of building infrastructure for energy generation bear more heavily on utilities in places with greater expected demand growth and need for infrastructure upgrades.[85] For this reason, avoided cost increases where utilities and the grid require grid expansion and upgrades.[86] Therefore, by setting rates for distributed generators at avoided cost, states can incentivize the development of distributed generation where and when it most benefits the grid.

Simple net metering is most helpful during the beginning stages of DER expansion at the state level, rather than after the solar-energy industry has matured.[87] First, net metering creates a market for DER by incentivizing investment.[88]Second, and relatedly, net metering provides simplicity and certainty.[89] Because compensation is volumetric, or one-for-one, customers more easily understand net metering transactions than they would transactions under VDER with the value stack.[90] Further, because credits to their bills are fixed to rates for electricity, owners of DERs can predict when they will recuperate the cost of their investment.[91] However, in mature solar markets, it makes sense to shift away from net metering in order to take advantage of additional benefits (i.e. locational value and grid congestion relief).[92]

While net metering has supported the development of markets for renewables, more sophisticated valuation schemes can provide greater benefit to states with mature renewables markets.[93] States with the great-

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82 Hledik & Lazar, *supra* note 55, at 21.

83 *Id.*

84 *See* U.S. ENERGY INFO. ADMIN., *supra* note 24.

85 SEIA Whitepaper, *supra* note 32, at 3.

86 *Id.*

87 *Id.* at 2–4.

88 *Id.*

89 *Id.* at 8.

90 *Id.*

91 *See* SEIA Comments, *supra* note 56, at 12.

92 *See* SEIA Whitepaper, *supra* note 32. There is a strong argument that New York is a mature market. *See* Spector, *supra* note 1.

93 SEIA Whitepaper, *supra* note 32, at 4. New York's solar market is mature; the state has some of the highest penetration of solar in the nation. *See* John Farrell, *The State(s) of Distributed Solar – Where are the Biggest Gains?*, RENEWABLE ENERGY WORLD (May 31,

est penetration of DERs should design investment incentives such that they maximize the benefits of future growth in renewable energy generation. LSRV and DRV can increase where utilities most expect demand growth, or high value locations, thus increasing compensation for DERs in those places.[94] Additionally, this will incentivize utilities to develop maps illustrating high demand growth areas and to plan for this growth in a smart way.[95]

Although utilities traditionally view DERs as a threat, through smart planning, utilities can use the growth in DERs to their advantage.[96] Most utility executives expect DERs to reduce their companies' revenues by eroding their rate base.[97] Rate base determines utility compensation, and the rate base is based on the assets that the utility owns and employs in generating and delivering energy.[98] Utilities are therefore concerned that, if they rely more on customer-owned DERs infrastructure, their rate base will decline, in turn, decreasing revenue.[99] Further, utilities may have to continue to provide transmission and distribution services to DER customers because, in times of high energy demand, DER customers will rely on the grid to deliver additional energy that their own installations cannot provide.[100] However, sophisticated rate schemes and smart planning can obviate the need for some large infrastructure investments and avoid costs for both customers and utilities.[101] Rather than reducing revenue, smart planning to incorporate DERs will allow utilities to satisfy customer demand while deferring capital cost investments in places of high congestion and energy demand.[102] Yet, despite the benefits, LSRV and DRV cannot alone resolve the VDER's uncertainty.

2018), https://www.renewableenergyworld.com/2018/05/31/the-states-of-distributed-solar-2017-update/#gref.; Jeff St. John, *5 States Leading the Distribution Energy Revolution*, GREENTECH MEDIA (Sept. 19, 2014), https://www.greentechmedia.com/articles/read/5-states-leading-the-distributed-energy-revolution.

94 SEIA Whitepaper, *supra* note 32, at 8.

95 *Id* at 5.

96 Jeff St. John, *Utility Execs See Distributed Energy as the Biggest Stress on Grid Reliability, Revenues*, GREENTECH MEDIA (June 6, 2017), https://www.greentechmedia.com/articles/read/utility-execs-see-distributed-energy-as-biggest-stress-on-grid-reliability#gs.475fmm.

97 *Id.*

98 JIM LAZAR, ELECTRICITY REGULATION IN THE U.S.: A GUIDE 51 (2d ed. 2016), http://www.raponline.org/knowledge-center/electricity-regulation-in-the-us-a-guide-2.

99 *See* St. John, *supra* note 96.

100 *See* Frederick Hewett, *Power To The People: What's Really Happening With Net Metering*, WBUR (Aug. 1, 2017), https://www.wbur.org/cognoscenti/2017/08/01/power-to-the-people-whats-really-happening-with-net-metering.

101 *See, e.g.*, Jeff St. John, *Can Distributed Resources Replace $1 Billion in Substation Upgrades? New York Will Soon Find Out*, GREENTECH MEDIA (Dec. 22, 2014), https://www.greentechmedia.com/articles/read/con-eds-200m-distributed-energy-plan-gets-the-green-light.

102 *See* SMART ELECTRIC POWER ALLIANCE & BLACK & VEATCH, PLANNING THE DISTRIBUTED ENERGY FUTURE: EMERGING ELECTRIC UTILITY DISTRIBUTION PLANNING PRACTICES FOR DISTRIBUTED ENERGY RESOURCES 25 (2016).

IV. THE NEED FOR CERTAINTY

Certainty is crucial to propelling solar energy in New York and elsewhere in the United States. In the context of the solar industry, government intervention can help to provide that certainty.[103] Solar, unlike traditional sources of energy like coal or natural gas, is capital intensive, but the cost of operation once installed decreases significantly.[104] The sticker shock on renewable energy infrastructure engenders trepidation among possible investors.[105] Therefore, as with most capital intensive projects, solar investment requires a greater degree of certainty of return on investment; investors want assurance that they will make back the shocking initial cost of their investment.[106] Historically, policies that most effectively increase the proliferation of DERs like solar, share the ability to balance a degree of certainty for investors with flexibility to shift with the market. The undeniable success of feed-in tariffs ("FITs") in Germany and the rapid growth of the wind energy industry in California demonstrate how certainty incentivizes investment.[107]

A. *Feed-In Tariffs: A Lesson on Certainty from Germany*

Although the United States has not itself implemented a feed-in tariff policy, the implications of Germany's model—and the importance of providing certain revenues to renewables—resonate nonetheless. In 1991 Germany implemented a FIT to incentivize investment in renewable energies like solar and wind.[108] This FIT would allow owners of DERs to enter into long-term contracts with their utilities that would require the utility to purchase energy from DERs at a predetermined rate that typically falls above retail rates for electricity.[109] In other words, homeowners considering an investment in rooftop solar or big solar companies planning to cite large solar arrays would have a guaranteed rate of return, and this provides the essential lesson for policy-makers in the United States.[110]

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103 *See, e.g.* GRETCHEN BAKKE, THE GRID: THE FRAYING WIRES BETWEEN AMERICANS AND OUR ENERGY FUTURE 104 (2016). *See also* Christoph Böhringer et al., *The Impact of the German Feed-in Tariff Scheme on Innovation: Evidence Based on Patent Filings in Renewable Energy Technologies*, 67 ENERGY ECON. 545 (2017).

104 *See Barriers to Renewable Energy Technology*, UNION OF CONCERNED SCIENTISTS, https://www.ucsusa.org/clean-energy/renewable-energy/barriers-to-renewable-energy#.XEuEyC2ZNAY (last updated Dec. 20, 2017).

105 *Id.*

106 *Id.*

107 *See e.g.* BAKKE, *supra* note 103; Böhringer et al., *supra* note 103.

108 Böhringer et al., *supra* note 103, at 545.

109 *Feed-In Tariff: A Policy Tool Encouraging Deployment of Renewable Electricity Technologies*, U.S. ENERGY INFO. ADMIN. (May 30, 2013), https://www.eia.gov/todayinenergy/detail.php?id=11471.

110 *Id.*

Although the United States faces significant constitutional hurdles to implementing its own FITs,[111] domestic policy-makers should not ignore the success that Germany experienced as a result of its energy policy. Since 2007, Germany has gone from producing less than 2% of its electricity through solar installations to producing 7.2% of its electricity through solar installations.[112] In contrast, the United States generated only 1.6% of its electricity from solar as of 2018.[113]

There is a strong relationship between the certainty that comes with FITs and the policy's success. The Solar Energy Industries Association ("SEIA") finds a causal link between the certainty that FITs guarantee and the success that Germany has experienced.[114] An SEIA report finds that "[t]here is significant evidence that FIT based systems, which provide the revenue certainty needed to attract low-cost financing for renewable energy, allow for lower cost renewable energy procurement than most of the alternatives . . . "[115] Therefore, in order to experience the same success that Germany has, state policies in the United States need not implement FITs but should ensure that whatever scheme they adopt also ensures a degree of certainty to investors.

Yet, the SEIA report provided a significant caveat to its thesis on certainty that New York and other states in the United States should heed.[116] Certainty that locks in for long periods of time rates that do not reflect the true value of solar could jeopardize the continued success of utilities, which would undermine the system of compensation for DER generation.[117] The report went on to conclude that "since . . . solar PV development can be extremely dynamic, a system of FITs to support solar PV development must be able to adjust quickly . . . Subsequent reforms to Germany's renewable energy law have largely rectified this, with future FIT levels being revised often . . . ."[118] Therefore, the report

111 PURPA establishes that utilities will pay avoided cost for energy from QFs. California attempted to implement a FIT, but it required utilities to pay *more* than avoided cost to QFs in order to incentivize development. However, PURPA only allows utilities to pay avoided cost for energy from QFS, no more and no less. Because FITs lock in a price for DER energy, this could require utilities to pay more than avoided cost, which would thus violate PURPA. *See* Winding Creek Solar LLC v. Peevey, 293 F. Supp. 3d 1, 6 (N.D. Cal. 2015).

112 Dr. Harry Wirth, *Recent Facts About Photovoltaics in Germany*, FRAUNHOFER ISE 1, 5 (2018), https://www.ise.fraunhofer.de/en/publications/studies/recent-facts-about-pv-in-germany.html (last updated Oct. 25, 2018).

113 *Frequently Asked Questions: What is U.S. Electricity Generation by Energy Source?*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/tools/faqs/faq.php?id=427&t=3 (last updated Mar. 1, 2019).

114 *See* JURGEN WEISS, SOLAR ENERGY SUPPORT IN GERMANY: A CLOSER LOOK 41 (2014).

115 *Id.*

116 *See id.*

117 *See id.*

118 *Id.* at 42.

attributes the success of Germany's program not entirely to certainty, but to a degree of certainty that is tempered for the sake of flexibility to respond to market shifts.[119] A successful policy in New York state will balance certainty to attract investment with enough flexibility to respond to market changes and maintain the ability of utilities to compensate owners of DERs while continuing to provide electricity.

B. Wind Energy in California: Yet Another Lesson on Certainty

Like Germany's FITs, California's incentives for wind investment succeeded as a result of contracts that offered a degree of certainty without locking in unreasonable prices for more extended periods of time. After the implementation of PURPA, California decided to order its utilities to enter into a series of standard offer contracts with QFs.[120] Interim Standard Offer #4 ("ISO4") served as the most significant of these contracts because it offered the most enticing return on investment.[121] ISO4 was a 30-year contract that offered the first ten years of energy prices fixed[122] above the avoided cost mandated by PURPA.[123] The purpose behind ISO4 "was to provide non-utility developers with the long-term price certainty necessary to obtain financing for capital-intensive projects."[124] In short, ISO4 provided a similar degree of certainty for wind investors that FITs in Germany did.

The success of California's ISO4 is undeniable. As a result of its policies, California launched the wind energy industry in the United States and "gave California the short-lived title of having the most installed wind capacity in the world."[125] In just four years, wind capacity increased from 10MW to 1039MW in California.[126] Some criticize ISO4, asserting that the program was overly generous in its pricing, thus jeopardizing the health of the utilities that had to pay more than a reasonable price from the wind generation.[127] Yet, the guaranteed and generous revenue allowed for wind energy to expand exponentially in California, because it attracted entrepreneurs, which in turn increased research and development that would allow wind companies to produce more efficient

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[119] *See id.*

[120] Randall Swisher & Kevin Porter, *Renewable Policy Lessons from the US: The Need for Consistent and Stable Policies*, *in* RENEWABLE ENERGY POLICY AND POLITICS: A HANDBOOK FOR DECISION-MAKING 185, 186 (Karl Mallon ed. 2006).

[121] BAKKE, *supra* note 103, at 103.

[122] Swisher & Porter, *supra* note 120, at 186.

[123] BAKKE, *supra* note 103, at 103.

[124] Swisher & Porter, *supra* note 120, at 186.

[125] *Id.*

[126] *Id.*

[127] Swisher & Porter, *supra* note 120, at 187; Winding Creek Solar LLC v. Peevey, 293 F. Supp. 3d 1, 6 (N.D. Cal. 2015).

turbines.[128] These breakthroughs in efficiency allowed for wind prices to plunge between 1980 and 1996, following the implementation of California's ISO4.[129]As such, we can credit California with much of wind energy's success in the United States.[130]

California's ISO4 mirrored Germany's FITs in its tempered certainty, and New York should take note as it refines its own solar energy policies. Although ISO4 guaranteed a rate for wind energy above avoided cost for ten years, with the end of the ten-year period, utilities would pay less than this amount for the following twenty years.[131] Entrepreneurs would be able to recover high initial capital costs of producing wind energy as a result of ISO4.[132] At the same time, however, California's utilities would be able to respond to fluctuations in the value of wind energy after this ten-year period. In conclusion, California's ISO4 reinforces the lesson of Germany's FIT program; a successful renewable energy policy will both provide enough certainty to attract investment while providing enough flexibility to respond to market fluctuations.

V. POLICY RECOMMENDATIONS

A. *Marginal Cost of Service Floor*

Implementing a floor for the marginal cost of service ("MCOS")[133] would strike the appropriate balance between ensuring certainty and allowing for the flexibility necessary to avoid utility-endangering inefficiency.[134] LSRV and DRV are based on MCOS, so that value can ultimately affect the price that DER owners receive for their energy.[135] Legislation governing carbon markets, like the U.S. Regional Greenhouse Gas Initiative ("RGGI") and the Waxman-Markey Bill, have implemented price floors in order to ensure a degree of certainty for investors in low emission technologies.[136] The New York legislature

128 BAKKE, *supra* note 103, at 104. *See* Robinson Meyer, *How Solar and Wind Got So Cheap, So Fast*, ATLANTIC (Dec. 2, 2015), https://www.theatlantic.com/technology/archive/2015/12/how-solar-and-wind-got-so-cheap-so-fast/418257/.

129 Meyer, *supra* note 128.

130 Swisher & Porter, *supra* note 120, at 186.

131 BAKKE, *supra* note 103, at 103.

132 *Id.* at 104.

133 Marginal cost of service "measure the additional costs of providing the next unit of service, whether that is the next unit of energy or the additional burden that adding a kilowatt of demand places on the electrical system, at a specific location, time, and quality." Metin Celebi & Philip Q. Hanser, *Marginal Cost Analysis in Evolving Power Markets: The Foundation of Innovative Pricing, Energy Efficiency Programs, and Net Metering Rates*, BRATTLE GRP. 2 (2010), https://brattlefiles.blob.core.windows.net/files/6671_energy_newsletter_2010_no_2_-_marginal_costs.pdf.

134 *See id.*

135 *See id.*

136 Peter John Wood & Frank Jotzo, *Price Floors for Emissions Trading*, 39 ENERGY POL'Y 1746, 1746 (2011).

should use this simple solution to address concerns that VDER has undermined certainty in the solar market.

The simple price-floor solution would also address utility and PSC concerns about other solutions that lock in an inflexible MCOS. As in the context of carbon markets and net metering, floors allow prices to deviate above that price that legislation sets.[137] CEP had previously suggested that PSC should use previous MCOS studies to establish an MCOS, but PSC expressed concern that this would "inappropriately lock in inaccurate numbers."[138] This concern arises from the fact that an artificial calculation would set the price for net-metered solar rather than the market, which introduces potential inefficiency; should the actual value of solar fall below that value, utilities would be stuck paying more for solar than it is worth, and the policy would be a windfall for net-metered customers.[139] However, a price floor would derive from considerations of historic trends and market fluctuations for the value of solar. The floor would thus provide greater flexibility that the original CEP proposal but also more certainty than the existing legislation.

B. *A Method for Setting the MCOS Floor*

A third-party non-profit should establish a standardized methodology for calculating MCOS. First, a standard *methodology* would provide for a degree of certainty without locking in a standard *price* for solar across New York utilities. PSC should not expect uniformity of MCOS across utilities because LSRV is intended to reflect, more or less, the true value of solar based on location.[140] Utilities each occupy their own territory, and the MCOS for the purposes of LSRV will differ across different regions of the state.[141] Locking in a standard MCOS for all utilities would not result in compensation to net-metered customers that reflected the true value of solar from region to region, but a standard methodology would not suffer the same weakness.[142]

Second, a third-party non-profit will provide an unbiased and realistic method for calculating MCOS. FERC has established a similar system of third-party non-profit organizations, called independent service

137 *See id.*

138 *See* N.Y. PUB. SERV. COMM'N, *supra* note 43, at 12.

139 *See id.* ("For that reason, adjusting it as some commenters suggest would result in compensation in excess of the actual avoided costs resulting from the DER and would therefore cause unreasonable impacts on non-participating ratepayers.").

140 *See id.* at 14.

141 *NYS Electric Utility Service Territories*, N.Y. STATE, https://data.ny.gov/Energy-Environment/NYS-Electric-Utility-Service-Territories/q5m9-rahr (last visited Apr. 29, 2019).

142 *See* N.Y. PUB. SERV. COMM'N, *supra* note 43, at 12, 14 (stating that locking in the MCOS would lock-in incorrect calculations for MCOS and that LSRV is tied to locational value, thus making the case for a standard methodology over a standard value).

providers ("ISOs"), to balance electricity generation with demand.[143] In its order establishing ISOs, FERC mandated that ISOs act independently from any control by market participants.[144] This mandate reflects a concern that ISOs should act independently in order to prevent interested parties from commandeering the process and managing generation in a way that benefited utilities at the expense of customers.[145]

Similarly, a non-profit that develops a methodology for establishing an MCOS floor for the purpose of VDER should operate independently of market participants in order to ensure unbiased outcomes that do not benefit the utilities at the expense of their customers. The failures of VDER thus far proves this to be true; investors worry that utilities will narrow LSRV and DRV in order to limit their liability for DER production.[146] Although they provide an essential public service, utilities still concern themselves with the bottom line and profit maximization.[147] Continuing to let utilities determine LSRV and DRV is tantamount to letting foxes guard the henhouse; utilities have too much self-interest to ensure unbiased decision making.[148]

The best candidate for setting the methodology for establishing the MCOS floor is New York's Independent System Operator ("NYISO"). NYISO monitors electricity demand and ensures that generation meets that demand.[149] NYISO would naturally fill the role of establishing the methodology for three reasons. First, NYISO is well-established and enjoys a great degree of legitimacy.[150] NYISO is one of seven ISOs/RTOs, meaning that its functions and activities are mirrored and recognized by FERC.[151] Second, NYISO already performs similar functions. Establishing an MCOS floor would require an understanding of energy demand and where grid congestion in order to calculate where the grid would most benefit from improvements; NYISO calculates demand and understands grid transmission in order to fill its role of ensuring the generation

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143 *Regional Transmission Organizations (RTO)/Independent System Operators (ISO)*, FERC, https://www.ferc.gov/industries/electric/indus-act/rto.asp [hereinafter *RTOs/ISOs*] (last updated Oct. 18, 2018).

144 Regional Transmission Organizations, 89 FERC ¶ 61,285, at 152 (Dec. 20, 1999) (codified at 18 C.F.R. § 35).

145 *See id.* at 153–54. ("In the NOPR, the Commission reiterated its earlier statement that 'the principle of independence is the bedrock upon which the ISO must be built' and that this standard should apply to all RTOs . . . Virtually all commenters agree with this principle.").

146 *See* SEIA Comments, *supra* note 56.

147 *See id.*

148 *See id.*

149 *See What We Do*, N.Y. ISO, https://www.nyiso.com/what-we-do (last visited Apr. 30, 2019).

150 *Id.*

151 *See RTOs/ISOs*, *supra* note 143.

meets demand.[152] Third, and finally, NYISO is by nature a third-party non-profit that does not have profit-driven motives.[153]

The MCOS floor should reflect possible market fluctuations but, above all, establish a baseline price that will ensure certainty and profitability of solar. On the one hand, the independent non-profits should not set a price-floor so high as to be out-of-line with trends in the value of solar for the concerns that such an inaccurate value would undermine the viability of utilities and provide a windfall to net-metered customers. Yet, the price floor should not fall below a point at which investors would be willing to participate. VDER and REV arose out of the context of climate change and a desire to derive New York's electricity from more sustainable sources; as such, a price floor should encourage, not discourage, investment in solar energy.[154] Homeowners and solar companies that consider building solar infrastructure in New York should be guaranteed baseline profits by factoring in a price floor; in other words, should the value of solar fall and all else fails, VDER should ensure that investors will earn some baseline profit by providing solar energy to the grid.

CONCLUSION

VDER represents a necessary next step toward recognizing the value of location and demand reduction in the evolution of the solar market in New York state, but the policy requires revamping. VDER, unlike traditional net metering, will encourage the development of solar in places where the grid could most benefit from relief or where solar will generate the most electricity. For this reason, the proper solution is not to repeal the young New York legislation that eliminated net metering. Rather, the New York legislature should tweak the existing policy in order to ensure greater certainty for investors interested in solar energy. To do so, the PSC should establish a third-party non-profit to design a standardized methodology for setting floors for MCOS across New York utilities. A price floor will avoid an immovable price that could lock in inefficiencies while assuring investors of the certainty of their profits.

A perfectly free market has not yet ensured long-term profitability to investors interested in building solar infrastructure, so the PSC should provide necessary, but modest, intervention. Though maturing quickly, solar energy still faces high capital costs that traditional sources of energy do not. As such, New York should continue to nudge solar toward success by creating a market in which solar will certainly result in long-

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152 *See* N.Y. ISO, *supra* note 149.

153 *Id.*

154 *See Reforming the Energy Vision*, N.Y. STATE, https://rev.ny.gov/about/ (last visited Apr. 28, 2019).

term profits. VDER, with an LSRV, nods to solar's increasingly competitive presence in the energy industry and setting LSRV to an MCOS with a price floor ensures the certainty needed to maintain the viability and competitiveness of solar.

Although these prescriptions apply specifically to New York's VDER policy, the success of the state's policy could ripple across the country. Both Illinois and California have implemented programs to unlock the added benefits of solar energy and to keep utilities involved as customers begin to generate their own electricity.[155] Other states are experimenting with alternatives to net metering, so New York's success could turn heads in this regard.[156] In short, as state solar markets continue to mature and face tension with utilities, state public utility commissions will look for ways to improve their policies. The best policies will balance the need for more renewables with the health of the utilities.

155 *See* Mike O'Boyle, *Three Ways Electric Utilities Can Avoid a Death Spiral*, FORBES (Sept. 25, 2017), https://www.forbes.com/sites/energyinnovation/2017/09/25/three-ways-electric-utilities-can-avoid-a-death-spiral/#2b70f399758d.

156 *See* Coley Girouard, *The Top 10 Utility Regulation Trends of 2018*, GREENTECH MEDIA (Jan. 18, 2019), https://www.greentechmedia.com/articles/read/top-10-utility-regulation-trends-of-2018#gs.1u5u8z.