A New "Sunshine State"? Evaluating Minnesota's Value of Solar Tariff Methodology

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Florida may be the "Sunshine State," but Minnesota could soon usurp the title.[1] The Minnesota Public Utilities Commission recently approved the nation's first statewide formula for calculating the value of customer-generated solar power,[2] joining worldwide efforts to grow renewable generation. Across the United States and throughout Europe, lawmakers are pursuing creative approaches to reduce carbon emissions and decrease dependence on fossil fuels.[3] For example, in March 2015, a French law mandated all new commercial buildings be equipped with rooftop solar.[4] Even if the United States is reluctant to follow this particular French trend, France's attention-grabbing model should not outshine existing efforts within the United States.

The United States is actively engaged in discussion and debate surrounding rooftop solar or distributed solar generation ("DSG"). The historic Paris Agreement[5] and President Obama's remarks during his final State of the Union address[6] provide two recent examples. Like the European Union, several other initiatives in the United States support the expansion of solar generation.[7] The U.S. government provides financial incentives via investment tax credits for solar at the federal level,[8] while other policies are concurrently directed at the state level.[9] These laws come in a variety of forms, though their impact is not always as visible as France's rooftop mandate. Instead, Minnesota's value of solar tariff ("VOST") methodology works behind the scenes to achieve a similar goal.

The VOST methodology reconfigures customer compensation schemes for DSG and is poised to revolutionize how customers who generate solar power are compensated. The new Minnesota law purports to reach a middle ground

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1. Minn. Stat. § 216B.164 subdiv. 10 (2015); *see, e.g.*, Diane Munns, *Minnesota Advances First Statewide Plan to Fairly Value Rooftop Solar*, Envtl. Def. Fund (Mar. 24, 2014), http://blogs.edf.org/energyexchange/2014/03/14/minnesota-advances-first-statewide-plan-to-fairly-value-rooftop-solar.
2. In May 2013, the Minnesota State legislature enacted legislation requiring that Minnesota's Department of Commerce develop a methodology. A methodology was subsequently submitted to the Minnesota Public Utilities Commission on January 31, 2014. The state's public utility commission later approved the methodology on March 12, 2014, after a series of stakeholder meetings. Dan Haugen, *Minnesota Becomes First State to Set "Value of Solar" Tariff* (Mar. 12, 2014), http://www.midwestenergynews.com/2014/03/12/minnesota-becomes-first-state-to-set-value-of-solar-tariff/. Then, on April 1, 2014, it issued a formal order. *Order Approving Distributed Solar Value Methodology*, Minn. Pub. Util. Commission, Docket E-999/M-14-65 (Apr. 1, 2014), https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=eDocketsResult&docketYear=14&docketNumber=65.
3. *See generally* European Comm'n, COM(2015) 293, Report From the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions, Renewable Energy Progress Report (2015), http://eur-lex.europa.eu/resource.html?uri=cellar:4f8722ce-1347-11e5-8817-01aa75ed71a1.0001.02/DOC_1&format=PDF; *Energy Union and Climate*, Eur. Commission, http://ec.europa.eu/priorities/energy-union-and-climate_en (last visited Sept. 9, 2015); *Renewable Energy*, Eur. Commission, ec.europa.eu/energy/en/topics/renewable-energy (last updated Jan. 29, 2016) (noting the National Action Plans of E.U. countries).
4. *See, e.g.*, *Biodiversité (N.2064), Amendement N.987*, Assemblée Nationale Française (Mar. 12, 2015), http://www.assemblee-nationale.fr/14/amendements/2064/AN/987.asp; Lara Charmeil, *En France, les Toits des Zones Commerciales Seront Verts Ou Ne Seront Pas*, We Demain (Mar. 26, 2015), http://www.wedemain.fr/En-France-les-toits-des-zones-commerciales-seront-verts-ou-ne-seront-pas_a944.html. Although France is the first country to adopt such a model, some U.S. cities have made similar mandates or ordinances. *E.g.*, Matt Hickman, *By Law, All New Roofs in France Must Be Topped With Plants (or Solar Panels)*, Mother Nature Network (Mar. 25, 2015, 6:00 PM), http://www.mnn.com/earth-matters/energy/blogs/by-law-all-new-roofs-in-france-must-be-topped-with-plants-or-solar-pane-0.
5. *E.g.*, Paris Agreement, Dec. 12, 2015, https://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf (acknowledging need for the deployment of more renewable energy).
6. *E.g.*, Barack Obama, State of the Union Address (Jan. 13, 2016) ("On rooftops from Arizona to New York, solar is saving Americans tens of millions of dollars a year on their energy bills, and employs more Americans than coal . . . .").
7. *See* Phillip Brown, Cong. Research Serv., R43176, European Union Wind and Solar Electricity Polices: Overview and Consideration 34 (2013).
8. The Emergency Economic Stabilization Act of 2008, Pub. L. No. 110-343, §§ 103–105, 122 Stat. 3765, 3770–73 (codified as amended at 26 U.S.C. § 48 (2012)) (extending commercial and residential solar investment tax credit until 2015); *see generally Residential Renewable Energy Tax Credit*, U.S. Dep't Energy, http://energy.gov/savings/residential-renewable-energy-tax-credit (last visited Mar. 22, 2016).
9. *See generally* Mark Detsky, Note, *The Global Light: An Analysis of International and Local Developments in the Solar Electric Industry and Their Lessons for United States Energy Policy*, 14 Colo. J. Int'l Envtl. L. & Pol'y 301, 315 (2003); *State Solar Policy*, Solar Energy Industries Ass'n, http://www.seia.org/policy/state-solar-policy (last visited Mar. 22, 2016).

between environmentalists and utilities. Essentially, VOST recognizes the benefit of adding carbon-free solar generation to the grid by placing a per kilowatt-hour ("kWh") value on DSG. Minnesota remains the only state to have formally enacted this type of customer compensation scheme, though several public utility commissions ("PUCs"), including those located in Arizona,[10] California,[11] Georgia,[12] Florida,[13] Michigan,[14] Maine,[15] and South Carolina,[16] are exploring comparable approaches. Minnesota's VOST methodology is a catalyst for change and a promising model for other states to consider.[17] Although it offers a fresh approach to recognizing the value of solar and encouraging development of DSG, VOST also demonstrates how challenging and complex innovation can be.[18]

This Note explores this tension and offers a critique of Minnesota's VOST methodology. Part I provides an overview of the solar energy landscape in the United States. Part II discusses current compensation schemes for customer-generators and how DSG fits with traditional regulatory frameworks. Part III introduces VOST in more detail, while Part IV analyzes this methodology's strengths and weaknesses. Finally, Part V proposes improvements to VOST and suggests how similar methodologies might be adopted in other states. Although VOST's goal is admirable, it currently falls short of achieving its aim. At least until it is improved, utilities in both Minnesota and other states should continue compensating customer-generators through existing programs, preferably at the avoided-cost rate.

I. Solar Energy Overview

Solar power is an attractive renewable energy source that plays an important role in America's energy portfolio.[19] The following Sections introduce solar power's environmental benefits, recent technological improvements, and the concept of distributed generation ("DG").

A. Environmental Benefits of Solar

Total anthropogenic greenhouse gas ("GHG") emissions continue to increase despite existing mitigation policies,[20] and fossil fuels contribute a large percentage of GHG emissions worldwide.[21] GHG emissions are linked to the warming atmosphere and ocean, diminished snow and ice, as well as rising sea level.[22] According to the Intergovernmental Panel on Climate Change, the energy supply sector may produce nearly double, if not triple, the amount of carbon dioxide emissions by 2050.[23] Mitigating this trajectory while simultaneously meeting the increasing demand for electricity requires a diverse portfolio of energy resources; renewable energy technologies play an integral role.[24] In fact, in 2012, renewables made up approximately one-half of all added electricity-generating capacity worldwide.[25] Like other renewables, solar technology may help to decrease dependence on fossil fuels and reduce air emissions.[26]

Solar also possesses qualities that make it uniquely attractive. Although no energy source is perfect, solar uses less water than other renewables.[27] Many environmental benefits are inherent to solar, but technically it is not entirely "carbon free."[28] The carbon footprint of solar acknowledges extracting raw materials, manufacturing, transportation, construction, operating and maintenance, as well as dismantling and disposal produce some GHG emissions.[29]

10. *See generally Value & Cost of Distributed Generation (Including Net Metering)*, Ariz. Corp. Commission (June 20, 2014), www.azcc.gov/Divisions/Utilities/Electric/Value&Cost_default.asp.
11. *See generally Decision Adopting Successor to Net Energy Metering Tariff*, Cal. Pub. Util. Commission (Jan. 28, 2016), http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M158/K181/158181678.pdf.
12. *See Direct Testimony of Karl R. Rábago*, Ga. Pub. Serv. Commission, Docket No. 36498, at 7 (May 10, 2013), http://www.psc.state.ga.us/factsv2/Document.aspx?documentNumber=147816.
13. *See Testimony of Karl R. Rábago*, Fla. Pub. Serv. Commission, Docket Nos. 130199-EI, 130200-EI, 130201-EI, 130202-EI, 130203-EM, at 4 (July 23, 2014), http://www.floridapsc.com/library/filings/14/04296-14/04296-14.pdf.
14. *See MPSC Staff Solar Working Group*, Mich. Pub. Serv. Commission, http://www.michigan.gov/mpsc/0,4639,7-159-16393_55246_55249-321593--,00.html (last visited Mar. 22, 2016).
15. *See generally* Me. Pub. Utils. Comm'n, Maine Distributed Solar Valuation Study 51 (2015) (finding the value of distributed solar systems for Central Maine Power is $0.337 per kWh).
16. *See generally Order on Net Metering and Approving Settlement Agreement*, S.C. Pub. Serv. Commission, Docket No. 2014-246-E, Order No. 2015-194, at 7 (2015), https://dms.psc.sc.gov/Attachments/Order/29CF4369-155D-141F-23B1536C046AEBC5.
17. *But see* Richard Martin, *Battles Over Net Metering Cloud the Future of RoofTop Solar*, MIT Tech. Rev. (Jan. 5, 2016), https://www.technologyreview.com/s/545146/battles-over-net-metering-cloud-the-future-of-rooftop-solar/ (reporting on recent PUC decisions to cut compensation for customer-generators).
18. *See generally* Clean Power Research, Minnesota Value of Solar: Methodology 1 (2014) (disclaiming VOST as an incentive for solar and pitching it instead as an impartial approach to valuing DSG).
19. *See, e.g.*, Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Generating Units, 80 Fed. Reg. 64,661, 64,667, 64,694–95 (Oct. 23, 2015) (to be codified at 40 C.F.R. pt. 60) (describing modern electric system trends and including within one of the three "build blocks" the substitution of renewables for fossil fuel-fired generating units).
20. *See, e.g.*, Intergovernmental Panel on Climate Change, Working Group III, Fifth Assessment Report: Mitigation of Climate Change—Summary for Policymakers 6 (2014) [hereinafter Working Group III].
21. *E.g.*, *Global Greenhouse Gas Emissions Data*, U.S. Envtl. Protection Agency, http://www3.epa.gov/climatechange/ghgemissions/global.html (last updated Feb. 23, 2016) (citing Intergovernmental Panel on Climate Change, Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2014)).
22. *E.g.*, Intergovernmental Panel on Climate Change, Working Group I, Fifth Assessment Report, Climate Change 2013: The Physical Science Basis—Summary for PolicyMakers 4 (2013) [hereinafter Working Group I].
23. Working Group III, *supra* note 20, at 20.
24. *See id.* at 20–21.
25. *See id.* at 20.
26. *See, e.g.*, Rocky Mountain Inst., A Review of Solar PV Benefit and Cost Studies 59 (2d ed. 2013).
27. *See* Nat'l Renewable Energy Lab., Renewable Electricity Features Study—Volume 2: Renewable Electricity Generation and Storage Technologies 10-46 (2012) [hereinafter Nat'l Renewable Energy Lab., Vol. 2].
28. *See id.* at 10-47 (citing Drury et al., *The Solar Photovoltaics Wedge: Pathways for Growth and Potential Carbon Mitigation*, *in* U.S., Envtl. Research Letters (2009)).
29. *Id.*

Nevertheless, when combined, these emission contributions amount to less than the lifetime carbon reductions of solar.[30] Even by conservative estimates, the comparative life cycle GHG emissions for solar are significantly lower than those of traditional energy sources.[31] Notwithstanding inherent shortcomings of lifetime GHG studies,[32] the growth potential for solar is undeniable.[33]

To take advantage of its growth potential and environmental benefits, solar energy can be harnessed by various technologies.[34] Currently, there are three primary technologies: (1) photovoltaics ("PV"), (2) concentrated solar power ("CSP"), and (3) solar heating and cooling.[35] Of these, PV "is winning."[36]

B. *Survey of PV in the United States*

Solar PV relies on solar photovoltaic cells to directly convert light into electricity at the atomic level.[37] As technology advances, the investment costs for PV will continue to decrease.[38] In the United States, the percentage of electricity generated from solar is increasing.[39] Total solar electric capacity in the United States is approximately 16 gigawatts ("GW").[40]

Solar is no longer prohibitively expensive. PV is closer than ever to achieving grid parity[41] and development of large-scale projects and DSG is ongoing.[42] Although solar remains two to five times more expensive than coal or gas,[43] projections anticipate future decreases in capital costs[44] for not only utility-scale projects, but also "rooftop solar" or distributed PV.[45] For the foreseeable future, however, the cost of residential rooftop solar will be greater than the cost of utility-scale projects.[46] This is largely because rooftop solar requires higher installation and supply chain costs.[47] Thus, there is a demonstrated need for policies and laws that promote residential solar PV.

At least part of the surge in rooftop solar is attributable to PV's ability to be distributed across the grid.[48] According to the Solar Energy Industries Association, 792 megawatts ("MW") of solar PV were installed in 2013,[49] totaling more than 3400 MW nationwide.[50] Not unlike the French vision introduced above,[51] U.S. homes, commercial buildings, and even schools, are embracing solar PV.[52] There are at least 578,000 individual solar installations throughout the United States.[53] Residential solar specifically comprises a large number of these new installations.[54] In fact, new rooftop solar is installed as often as every two minutes.[55] Should development maintain this pace, it is not farfetched to imagine a future where all households are equipped with solar PV panels.[56] Studies reinforce this vision, estimating that rooftop solar has a technical potential of 700 GW.[57]

Although the potential for solar may be greatest in the Southwestern United States, solar can yield energy in virtually all states, with the exception of Alaska and some parts of the Pacific Northwest.[58] Some states are associated with sunny weather, but the output of PV systems located in those states can resemble output of PV systems in snowy or cold-

30. *Id.*; *see also* Rocky Mountain Inst., *supra* note 26, at 17.
31. *Compare* Nat'l Renewable Energy Lab., Renewable Electricity Features Study—Volume 1: Exploration of High-Penetration Renewable Electricity Futures C-4 tbl. C-1 (2012), *with id.* at C-6 tbl. C-2.
32. *Id.* at C-9 to C-11 (explaining lifetime GHG studies are neither infallible nor absolutely certain).
33. *See* Nat'l Renewable Energy Lab., Vol. 2, *supra* note 27, at 10-32 fig. 10-17.
34. *See Issues & Policies: Solar Technology*, Solar Energy Industries Ass'n, http://www.seia.org/policy/solar-technology (last visited Mar. 22, 2016).
35. *See id.*
36. CSP harnesses solar energy by heating water, producing vapor, and turning a turbine; whereas, solar PV relies on the solar photovoltaic cells. *E.g.*, Romeu Gaspar, *How Solar PV Is Winning Over CSP*, Renewable Energy World (Mar. 12, 2013), http://www.renewableenergyworld.com/rea/blog/post/2013/03/how-solar-pv-is-winning-over-csp (declaring PV as the solar technology of choice).
37. *See generally* Gil Knier, *How do Photovoltaics Work?*, U.S. Nat'l Aeronautics & Space Admin. (2012), http://science.nasa.gov/science-news/science-at-nasa/2002/solarcells ("Photovoltaics is the direct conversion of light into electricity at the atomic level. . . . A number of solar cells electrically connected to each other and mounted in a support structure or frame is called a photovoltaic module. . . . Multiple modules can be wired together to form an array.").
38. *See, e.g.*, Int'l Energy Agency, Technology Roadmap: Solar Photovoltaic Energy 8 (2010), https://www.iea.org/publications/freepublications/publication/technology-roadmap-solar-photovoltaic-energy.html.
39. Nat'l Renewable Energy Lab., Vol. 2, *supra* note 27, at 10-1.
40. The Solar Found., Brighter Future: A Study on Solar in U.S. Schools 6 (2014), http://www.seia.org/sites/default/files/resources/9gFf68wlE7SOLAR-SCHOOLS-REPORT-FINAL.pdf.
41. *See, e.g.*, Int'l Energy Agency, *supra* note 38, at 6.
42. Am. Pub. Power Ass'n, Distributed Generation: An Overview of Recent Policy and Market Developments 5–6 (2013); U.S. Dep't of Energy, The Potential Benefits of Distributed Generation and Rate-Related Issues That May Impede Their Expansion 1–7 (2007) [hereinafter U.S. Dep't of Energy, Potential Benefits of Distributed Generation]; U.S. Dep't of Energy, 2014: The Year of Concentrating Solar Power 3 (2014), http://energy.gov/sites/prod/files/2014/10/f18/CSP-report-final-web.pdf (recognizing progress of Mojave Desert's Ivanpah project).
43. David Grinlinton & LeRoy Paddock, *The Role of Feed-In Tariffs in Supporting the Expansion of Solar Energy Production*, 41 U. Tol. L. Rev. 943, 945–46 (2010); Diane Cardwell, *Solar and Wind Energy Start to Win on Price vs. Conventional Fuels*, N.Y. Times, Nov. 23, 2014, http://www.nytimes.com/2014/11/24/business/energy-environment/solar-and-wind-energy-start-to-win-on-price-vs-conventional-fuels.html?_r=0.
44. Nat'l Renewable Energy Lab., Vol. 2, *supra* note 27, at 10-20 fig. 10-12.
45. *See id.* at 10-22 tbl. 10-3, 10-23 tbl. 10-4.
46. *Compare id.* at 10-12 tbl. 10-3, *with id.* at 10-23 tbl. 10-4.
47. *Id.*
48. *See, e.g.*, Samuel Farkas, *Third-Party PPAS: Unleashing America's Solar Potential*, 28 J. Land Use 91, 92 (2012).
49. Michael Saunders, *Distributed Solar Energy in Nevada*, Nev. Law., July 2014, at 17.
50. Nat'l Renewable Energy Lab., Vol. 2, *supra* note 27, at 10-1 (AC capacity); *see generally Electricity Primer—The Basics of Power and Competitive Markets*, Elec. Power Supply Ass'n, https://www.epsa.org/industry/primer/?fa=wholesaleMarket (last visited Mar. 22, 2016) ("A single megawatt . . . the most common unit of electricity used in discussions . . . is generally enough power to light 750 to [1000] homes.").
51. Hickman, *supra* note 4.
52. *See* Solar Energy Indus. Ass'n & Vote Solar, Solar Means Business 2013: Top U.S. Commercial Solar Users (2013); *see also* The Solar Found., *supra* note 40.
53. Solar Energy Indus. Ass'n, U.S. Solar Market Insight: Executive Summary 3 (2014).
54. *Id. But see* Joel Eisen, *Residential Energy: By Whom?*, 31 Utah Envtl. L. Rev. 339, 339 (2011) (suggesting the amount of residential solar could be drastically increased).
55. *Solar Industry Data*, Solar Energy Industries Ass'n, www.seia.org/research-resources/solar-industry-data (last visited Mar. 22, 2016).
56. *See generally* Eisen, *supra* note 54, at 340 (advocating that adding solar panels to households should become "as routine as a car purchase").
57. Nat'l Renewable Energy Lab., Vol. 2, *supra* note 27, at 10-32.
58. *Id.* at 10-3.

weather states.[59] For example, a PV system in Los Angeles might produce the same amount of power as a similar system located in Boston.[60] Ironically, Germany has the most PV installations worldwide, but its systems average less output than identical installations in the United States.[61]

C. Distributed Generation

Rooftop solar, or DSG, is an increasingly popular generation option. It is important to recognize that "rooftop solar" can be a misnomer because DSG is not always situated on a rooftop. PV installations can be rooftop or ground-mounted.[62] Also, DSG refers specifically to solar energy, but DG is capable of harnessing energy from wind and other renewables as well.[63] Generally, DG is a small-power generating facility that produces anywhere from 1 kW to 5 MW of electricity,[64] and the Energy Policy Act of 2005 ("EPAct 2005")[65] defines distributed generation as "an electric power generation facility designed to serve retail electricity customers at or near the facility site."[66]

Potential benefits of DG include eliminating cost, complexities, interdependencies and inefficiencies associated with generation, transmission and distribution.[67] Experts predict that by 2020, DG will contribute as much as twenty percent of the country's power supply.[68] Many believe, however, that DG is "disruptive" to the utility-scale energy marketplace despite its innovative approach and increasing popularity.[69]

DG is still progressive in that it shifts generation, which has typically occurred at a centralized location (i.e., a power plant) away from utilities to individual households.[70] Households that were once merely electricity customers can now be equipped with solar panels. Before, electricity only flowed from the utility to the customer. Technology now enables customers to produce energy from their own PV systems.[71] Generating electricity may allow a customer to satisfy his or her household's demand. Or, if a customer generates electricity that exceeds household demand, customers might even supply generation to the electricity grid.[72] Generation is no longer a one-way street.

DSG is less radical when the flow of resources remains consistent with the traditional electricity framework, wherein a utility sells electricity to its customers. DSG produces more debate, however, when customers generate a surplus of electricity. In particular, controversy surrounds how customer-generators should be compensated.[73] Customer-generators have the potential to produce electricity to the grid, but they remain markedly different from traditional investor-owned utilities ("IOUs").[74] These dynamics are confusing since it is not always obvious how customer-generators should be billed, or if they should be compensated.[75] Thus, DG tests current industry norms and traditional frameworks for generating and delivering energy because it transforms the contractual relationship between a utility and its customers.[76]

As customers choose to install PV, but remain connected to the electrical grid, regulatory frameworks and existing laws must consider the evolving dynamic between customer-generators and utilities.[77] Net energy metering ("NEM" or "net metering") and feed-in tariffs ("FITs") have emerged as popular mechanisms for addressing these scenarios.[78] Although Minnesota does not have a FIT program,[79] it was the first state to adopt a NEM program in 1983.[80]

II. Integrating DSG Into Traditional Frameworks

Solar advocates seek innovative ways to incentivize and promote DSG.[81] One way regulators can facilitate competition between solar and other resources is through legislation, like

59. *See id.*
60. *Id.*
61. *Id.*
62. *E.g*, *Distributed Solar*, Solar Energy Industries Ass'n, http://www.seia.org/policy/distributed-solar (last visited Mar. 22, 2016).
63. *See generally Distributed Wind*, U.S. Dep't Energy, http://energy.gov/eere/wind/distributed-wind (last visited Mar. 22, 2016).
64. *E.g.*, Gina S. Warren, *Vanishing Power Lines and Emerging Distributed Generation,* 4 Wake Forest J.L. & Pol'y 347, 357 (2014).
65. Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594.
66. Warren, *supra* note 64, at 357 n.62 (citing 42 U.S.C. § 16197(g)(3) (2006)).
67. *See, e.g.*, Paul Denholm et al., Nat'l Renewable Energy Lab., NREL/TP-6A20-62447, Methods for Analyzing the Benefits and Costs of Distributed Photovoltaic Generation to the U.S. Electric Utility System 20, 34, 37 (2014); Garrick B. Pursley & Hannah J. Wiseman, *Local Energy*, 60 Emory L.J. 877, 897–900 (2010).
68. Warren, *supra* 64, at 369 (citing Resnick Inst. Report, Grid 2020: Towards a Policy of Renewable and Distributed Energy Resources (2012)).
69. *See, e.g.*, PwC, 14th PwC Global Power & Utilities Survey 2, 22–24 (2015) (using a "Power & Utility Market Disruption Index" to show where and to what extent distributed generation will be disruptive); David Raskin, *Getting Distributed Generation Right: A Response to "Does Disruptive Competition Mean a Death Spiral for Electric Utilities?,"* 35 Energy L.J. 263, 264, 266–67 (2014) (challenging other authors' views on the extent to which DG is "disruptive").
70. *See* U.S. Dep't of Energy, Potential Benefits of Distributed Generation, *supra* note 42, at 2 (explaining that historically, distributed generation played a small role in utility-scale generation, but "modern" DSG may have a broader "range of opportunities and applications"). *But see also* Kristin Bluvas, Note, *Distributed Generation: A Step Forward in United States Energy Policy*, 70 Alb. L. Rev. 1589, 1591 (2007) (clarifying that centralized generation became the new norm during the early twentieth century).
71. *See generally* Elisabeth Graffy & Steven Kihm, *Does Disruptive Competition Mean a Death Spiral for Electric Utilities?*, 35 Energy L.J. 1, 30–31 (2014); Jon Wellinghoff & Steven Weissman, *The Right to Self-Generate as a Grid-Connected Customer*, 36 Energy L.J 305 (2015).
72. *Id.*
73. *E.g.*, Erin Carson & Eric Davis, EnerKnol Inc., Solar Energy Compensation Arguments Intensify as Utilities Aim to Recover Fixed Costs (2014).
74. *See, e.g.*, Pursley & Wiseman, *supra* note 67, at 900.
75. *See* Carson & Davis, *supra* note 73.
76. *E.g.*, Warren, *supra* note 64, at 362.
77. Not only technology, but also policy development, social and cultural preferences, as well as scientific investigations are facilitating this evolving dynamic. *See* Graffy & Kihm, *supra* note 71, at 3.
78. *See, e.g.*, Mathias Aarre Maehlum, *What's the Difference Between Net Metering and Feed-In Tariffs?*, Energy Informative, http://energyinformative.org/net-metering-feed-in-tariffs-difference (last updated Mar. 15, 2014).
79. *See Feed-In Tariffs and Similar Programs*, U.S. Energy Info. Admin., http://www.eia.gov/electricity/policies/provider_programs.cfm (last updated June 4, 2013).
80. Solar Elec. Power Ass'n, Ratemaking, Solar Value and Solar Net Energy Metering—A Primer 1 (n.d.), https://www.solarelectricpower.org/media/51299/sepa-nem-report-0713-print.pdf.
81. *E.g.*, Anthony Allen, Comment, *The Legal Impediments to Distributed Generation*, 23 Energy L.J. 505 (2002).

laws that give preferential rates to DSG.[82] A brief overview of the traditional regulatory framework and current compensation schemes is necessary to understand why Minnesota's VOST methodology is unique.

A. *The Regulatory Compact*

Electricity is subject to a bifurcated regulatory framework under the Federal Power Act.[83] The Federal Energy Regulatory Commission ("FERC" or "the Commission") regulates interstate activity, electric transmission, and wholesale rates from sales of electricity for re-sale.[84] Conversely, states have jurisdiction over local distribution, retail rates from sales of electric energy to end users, and intrastate utility activity.[85] As Justice Kagan recently summarized, "That statutory division generates a steady flow of jurisdictional disputes because—in point of fact if not of law—the wholesale and retail markets in electricity are inextricably linked."[86]

Historically, utilities and regulators have entered into a "regulatory compact," whereby utilities are willingly regulated by state PUCs in exchange for receiving exclusive control of a certain service territory.[87] Under this arrangement, utilities operate a government-controlled monopoly, without any threat of competition from new entrants.[88] This traditional arrangement between utilities and regulators is significant because it influences how electricity rates are determined. Cost-of-service ratemaking formulas strive for rates that allow a utility and its shareholders to earn a reasonable return on their investments but prevent customers from paying electricity rates that are too high.[89]

Critics of cost-of-service ratemaking suggest that restructuring traditional energy markets could achieve better prices for customers and eliminate incentives to overbuild or encourage electricity consumption.[90] The calls for change have coincided with the expansion of DG. Although states enjoy jurisdiction over retail electricity rates,[91] the Public Utility Regulatory Policies Act ("PURPA")[92] and the EPAct 2005 provide statutory guidance regarding compensation schemes for DSG.

1. Applicable Federal Statutes: PURPA, EPAct 2005

PURPA is often viewed as the single most effective legislative measure to promote renewable energy development.[93] In 1978, confronted by soaring oil prices and pressure to reduce the country's reliance on foreign oil, Congress passed PURPA, seeking to encourage energy efficiency and the development of renewable energy sources.[94] PURPA is credited with expanding competition within electricity markets and for bringing over 12,000 MW of renewable generation online.[95] Before PURPA, state regulators generally designed electricity rates to maximize consumption.[96] PURPA then encouraged state regulators to design rates in more efficient ways.[97] It promotes independent power production, cogeneration, and small power generation.[98] Notably, PURPA permits certain qualifying facilities ("QFs") to generate electricity at rates that compete with electricity generation from traditional IOUs.[99]

Specifically, PURPA's section 210 requires utilities to purchase electricity from QFs.[100] Where FERC jurisdiction applies, the rate at which these "sales for re-sales" are purchased is set at the "avoided-cost."[101] If the QF produces *x* amount of electricity, the utility does not need to produce *x*. The QF is then compensated at an amount equal to what it would have otherwise cost the utility to produce *x* amount of electricity. Not surprisingly, there has been substantial debate over what the boundaries of avoided-cost should be.[102] For instance, in an important decision, FERC left open the possibility that the avoided-cost rate could account for environmental costs.[103]

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82. *See*, *e.g.*, L. Bird et al., Nat'l Renewable Energy Lab., Regulatory Considerations Associated With the Expanded Adoption of Distributed Solar 47 (2013); Pursley & Wiseman, *supra* note 67, at 909–15.
83. Federal Power Act, Public L. No. 74-33, §§ 201, 205–206, 49 Stat. 847, 851–52 (1935) (codified as amended at 16 U.S.C. §§ 824, 824d, 824e (2012)).
84. *E.g.*, Lawrence R. Greenfield, *An Overview of the Federal Energy Regulatory Commission and Federal Regulation of Public Utilities in the United States*, Fed. Energy Reg. Commission 9 (Dec. 2010), http://www.ferc.gov/about/ferc-does/ferc101.pdf.
85. *E.g*, *id.* at 12.
86. FERC v. Elec. Power Supply Ass'n, 136 S. Ct. 760, 766 (2016).
87. Joseph P. Tomain, *Traditionally-Structured Electric Utilities in a Distributed Generation World*, 38 Nova L. Rev. 473, 482–83 (2014) (quoting Samuel Insull, "the regulatory compact is 'a grand bargain in which local electric companies would receive exclusive franchise service territories . . . coupled with the conditions of public control, requiring all charges for services fixed by public bodies to be based on cost plus a reasonable profit'").
88. *Id.* at 482.
89. *Id.* at 482–83.
90. Elise Caplan & Stephen Brobeck, *Have Restructured Wholesale Electricity Markets Benefitted Consumers?*, ElectricityPolicy.com 3 (Dec. 12, 2012), http://www.electricitypolicy.com/Articles/have-restructured-wholesale-electricity-markets-benefitted-consumers.
91. 16 U.S.C. §§ 824, 824d, 824e (2012).
92. Public Utility Regulatory Policies Act of 1978, Pub. L. 95-617, 92 Stat. 3117 (codified as amended in scattered sections of 15, 16, 42, and 43 U.S.C.). Sections 201 and 210 of PURPA are codified at sections 796(17)–796(22) and 824a-3 of title 16 of the U.S. Code, respectively.
93. Warren, *supra* note 64, at 370.
94. 16 U.S.C. § 2601(1); *see, e.g.*, Greg Dotson & Ben Bovarnick, Ctr. For Am. Progress, A Forward-Looking Agenda for the Nation's Public Utility Commissions 9–10 (2015).
95. Warren, *supra* note 64, at 370.
96. Tomain, *supra* note 87, at 486.
97. *Id.*
98. *Id.*
99. *Id.*
100. 16 U.S.C. § 824a-3 (2012); *see also* Tomain, *supra* note 87, at 486–87.
101. 18 C.F.R. § 292.101(b)(6) (2015) (defining avoided cost as "the incremental costs to an electric utility of electric energy or capacity or both which, but for the purchase from the qualifying facility or qualifying facilities, such utility would generate itself or purchase from another source").
102. *See id.* § 292.304(d); *see e.g.*, Clean Coalition, Local CLEAN Program Guide: Module 3: Evaluating Avoided Costs (2012); *see* Tomain, *supra* note 87, at 496–504.
103. *E.g.*, Richard D. Cudahy, *PURPA: The Intersection of Competition and Regulatory Policy*, 16 Energy L.J. 419, 431 (1995) (quoting *S. Cal. Edison Co.*, 70 FERC ¶ 61,215, 62,080 (1995) ("Our decision today does not, for example, preclude the possibility that, in setting an avoided cost rate, a state may account for environmental costs of all fuel sources included in an all source determination of avoided cost. Also, under state authority, a state may choose to require a utility to construct generation capacity of a preferred technology or to purchase power from the supplier of a particular type of resource.")); *see also* Donna M. Attanasio, *PURPA's Public Power Impact (And What to Do About It)*, 5 Geo. Wash. J. Energy & Envtl. L., no. 3, Summer 2014, at 1, 10 ("Under certain circumstances, a utility may offer different avoided cost rates to reflect

At the same time, FERC currently disclaims jurisdiction over net metering.[104] Consequently, most states compensate customer-generators at the retail rate, unless the customer-generator produces more energy than it consumes, in which case, FERC jurisdiction is triggered. Some maintain, however, that FERC jurisdiction, and therefore the avoided-cost rate, should always apply—whether or not a customer-generator produces surplus energy—because all exchanges between customer-generators and utilities are technically "sales for resales."[105] Calls for FERC to claim jurisdiction remain unanswered; net metering is presently classified as a ratemaking practice for state PUCs and not for the Commission.[106]

Provided a QF is smaller than 20 MW, it is exempt from federal regulation.[107] In other words, PURPA sets customer compensation at the avoided-cost rate for larger QFs, whereas smaller production facilities remain outside of FERC's jurisdiction. Unlike FERC's ratemaking authority, the states are not bound by the "avoided cost rate." The EPAct 2005 further encourages states to adopt net metering policies[108] and to compensate customer-generators.[109]

2. Setting Rates: "Avoided-Cost" or "Retail"?

The main objective in ratemaking procedures is fairness.[110] PUCs strive for rates that are just and reasonable for both utilities and the utilities' customers.[111] This is true across the board, including when regulators set rates specifically for DSG customer-generators.[112] As the Solar Electric Power Association explains, "[R]egulators [prioritize] the need for adequate and equitable (fairly apportioned, non-discriminatory) revenue collection from both non-solar and solar customers."[113] Historically, setting rates included three sets of objectives: (1) the revenue requirement, (2) the revenue collection, and (3) other practical concerns.[114] Regarding revenue collection, ensuring that rates "reflect the present and future private and social costs and benefits of providing services (i.e., internalities and externalities)" is a key concern.[115] Overall, PUCs vary their approach.[116] PUCs may already consider external costs, such as those costs associated with energy security, water conservation, or economic development benefits,[117] without being required by state law.[118]

Net metering programs nationwide illustrate discrepancy among rates. The flexibility states have in setting rates extends to net excess generation ("NEG") from rooftop solar.[119] Forty-four states and the District of Columbia have net metering programs,[120] but all programs are not created equally. By the measure of some solar advocates, states without net metering programs (e.g., Alabama, Georgia, and Oklahoma) deserve failing grades, while programs in more progressive states (e.g., California and Massachusetts) earn "A" marks.[121] For example, in California, a high-scoring state, net metering provides customer-generators a bill credit equivalent to the rate a utility makes on its generation, what is referred to as the "retail rate."[122] By comparison, in Oklahoma, a low-scoring state,[123] a customer-generator would only be compensated at the utility's avoided-cost rate.[124] The avoided-cost rate is typically less than the retail rate.[125] Reaching an appropriate rate to value NEG from customers is often viewed as the best way of incentivizing DSG.[126]

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the respective values of the different resources that are avoided.") (citing *Cal. Pub. Utils. Comm'n*, 133 FERC ¶ 61,059, at P 31 (2012) ("[FERC] may take into account actual procurement requirements, and resulting costs, imposed on utilities [by the state.]")).

104. *See generally* Linda L. Walsh, *Can FERC's Policy Disclaiming Jurisdiction Over Net Meter Sales of Distributed Generation Survive Analysis Under the Subdelegation Doctrine?*, 28 Electricity J. 11 (2015).

105. *See, e.g.*, David B. Raskin, *The Regulatory Challenge of Distributed Generation*, 4 Harv. Bus. L. Rev. Online 38, 43 (2013), http://www.hblr.org/wp-content/uploads/2013/12/Raskin_The-Regulatory-Challenge-Of-Distributed-Generation.pdf; Walsh, *supra* note 104, at 11–14 (suggesting state net metering parties and FERC's national goals under PURPA are incongruous).

106. *See* Raskin, *supra* note 105, at 42. The EPAct 2005 amends section 111(d) of PURPA to state that "each electric utility shall make available upon request net metering service to any electric consumer that the electricity serves." Energy Policy Act of 2005, Pub. L. No. 109-58, sec. 1251, § 111(d), 119 Stat. 594, 962–63 (codified as amended at 16 U.S.C. § 2621(d)(11) (2012)). "Net metering" is broadly defined as a "service to an electric consumer under which electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the electric consumer during the applicable billing period." 16 U.S.C. § 2621(d)(11).

107. 18 C.F.R. § 292.601(c)(1) (2015); Walsh, *supra* note 104, at 18 n.44

108. *E.g.*, Benjamin Hanna, Note, *FERC Net Metering Decisions Keep States in the Dark*, 42 B.C. Envtl. Aff. L. Rev. 133, 142 (citing 16 U.S.C. § 2621(d)(11)).

109. *See, e.g.*, *Public Power Utilities: Net Metering Programs*, Am. Pub. Power Ass'n (Apr. 2014), http://www.publicpower.org/files/PDFs/Public_Power_Net_Metering_Programs.pdf (detailing and comparing state-by-state rate schemes for net metering as such schemes relate to small QFs and non-qualifying generating entities).

110. *E.g.*, Solar Elec. Power Ass'n, *supra* note 80, at 5.

111. 16 U.S.C. § 824d(a) ("All rates and charges made, demanded, or received by any public utility for or in connection with the transmission or sale of electric energy subject to the jurisdiction of the Commission, and all rules and regulations affecting or pertaining to such rates or charges shall be *just and reasonable*, and any such rate or charge that is not just and reasonable is hereby declared to be unlawful.") (emphasis added); *e.g.*, Solar Elec. Power Ass'n, *supra* note 80, at 5.

112. *See* Solar Elec. Power Ass'n, *supra* note 80, at 6.

113. *Id.*

114. *Id.*

115. *Id.* at 6, A-6 to A-7 n.15.

116. *See id.* at 14.

117. *Id.*

118. *See id.* at 14, 19, 28.

119. Shannon Baker-Branstetter, *Distributed Renewable Generation: The Trifecta of Energy Solutions to Curb Carbon Emissions, Reduce Pollutants, and Empower Ratepayers*, 22 Vill. Envtl. L.J. 1, 14 (2011).

120. *Id.* at 13; *see, e.g.*, *Net Metering: Policy Overview and State Legislative Updates*, Nat'l Conf. State Legislatures, http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx (last updated Dec. 18, 2014).

121. Interestingly, Minnesota received an "A," for net metering but only a "C" for its interconnection. *See Best Practices in State Net Metering Policies and Interconnection Procedures*, Freeing Grid 2015, http://freeingthegrid.org/#state-grades (last visited Feb. 16, 2016).

122. *See id.* (click on "California" and then select "Net Metering" tab).

123. *See id.* (click on "Oklahoma" and then select either "Net Metering" or "Interconnection" tabs).

124. Utilities are not required to purchase electricity from customers under Oklahoma's net metering program. *See generally Net Metering*, U.S. Dep't Energy, http://energy.gov/savings/net-metering-18 (last visited Mar. 22, 2016) (discussing Oklahoma's approach). This undoubtedly contributed to Oklahoma's low score.

125. *See, e.g.*, Carl Linvill et al., *Designing Distributed Generation Tariffs Well*, Reg. Assistance Project 32 (2013), http://www.raponline.org/search (search "Distributed Generation"; narrow search to 2013).

126. *See, e.g.*, Denholm et al., *supra* note 67, at 1.

It is against this landscape that Minnesota has emerged as a leader, moving to recognize via electricity rates the value of adding DSG generation to its electric system and society.

III. Minnesota's Value of Solar Tariff Methodology

In 2013, Minnesota became the first state to enact a "value of solar" ("VOS") statute, frequently referred to as the "VOST methodology" or simply "VOST."[127] Although VOST has previously been implemented on a smaller scale in Austin, Texas,[128] the statewide adoption of a VOST methodology popularized this relatively unknown concept. Under Minnesota's new law, electric utility companies may apply to the Minnesota PUC for a VOST rate that compensates customers producing solar PV through a bill credit mechanism.[129] The VOST rate provides monetary recognition to the customer-generator for the value they are providing;[130] this value is two-fold. First, a customer-generator is interconnected to the grid and excess electricity produced by the customer-generator's DSG will be sent to the grid.[131] This allows the utility to produce less electricity to satisfy overall customer demand. Second, the VOST rate recognizes DSG as beneficial to not only customer-generators, but also society as a whole.[132] The idea is that because DSG is a renewable energy source, VOST helps translate solar energy's more intangible environmental benefits into a quantifiable amount.[133] Unlike existing approaches that typically net a customer-generator's electricity use and compensate the customer at either the retail or avoided cost rates, VOST offers a bill credit based on an innovative algorithm.[134] The approach relies on complex economics to assign a dollar-value to solar electricity and takes a long-term perspective that considers the lifetime benefits and costs of DSG.[135] VOST purports to be a middle ground between the retail and avoided-cost rate, recognizes the inherent benefits of solar power, and simultaneously allows utilities to recover some costs.[136] As such, VOST is a viable alternative to current customer compensation schemes. Although Minnesota's VOST methodology was theoretically attractive to all, including the state's largest utility,[137] the enacted version is considerably different than the version that was first introduced.[138]

Momentum to develop the VOST methodology accelerated in late 2012, when the Solar Works for Minnesota coalition proposed a policy package of solar energy initiatives.[139] Through a series of informed stakeholder meetings, experts compiled information and explanations about the various costs and benefits of generation from DSG.[140] Desire for a new customer compensation scheme also stemmed from critics who felt customers were being overpaid under the existing NEM program. Representatives from local utilities emphasized that paying customers the same rate as utilities, or the retail rate, did not make sense because utilities provide grid connection, upkeep, and must respond with enough electricity to meet customer-generator demand, should their electricity consumption exceed generation from their rooftop solar.[141] In 2013, Clean Power Research developed and submitted the initial VOST to the Minnesota Department of Commerce.[142] In its draft form, VOST was actually a FIT with three key elements: (1) a simple, standardized contract, (2) a long-term fixed price based on solar production, and (3) a price paid for solar that was commensurate with the cost of producing solar energy.[143] Additionally, VOST gave customer-generators the ability to select the VOST rate.[144] Empowering customer-generators with this choice championed the notion that customers are in the best position to pick what scheme makes most sense for their generation.[145] Currently, it is up to utilities whether or not to pursue the VOST methodology.[146]

127. VOS and VOST are sometimes used interchangeable. This Note elects to use "VOST" to refer specifically to Minnesota's legislation, and distinguishes "VOS" which often evokes more general concepts pertaining to how solar could theoretically be valued, though not necessarily through Minnesota's VOST methodology. Alternatively, Minnesota's VOST is sometimes abbreviated as "VOS tariff," again; this Note prefers the "VOST" abbreviation. The VOST methodology is the formula enacted by the statute. One would arrive at the actual "VOST rate" by plugging case-specific numbers into the methodology.

128. *Value-of-Solar Tariffs*, Nat'l Renewable Energy Laboratory, http://www.nrel.gov/tech_deployment/state_local_governments/basics_value-of-solar_tariffs.html (last updated Oct. 7, 2015); *see* Clean Power Research, The Value of Distributed Photovoltaics to Austin Energy and the City of Austin (2006); *see generally* Karl R. Rábago, *The Value of Solar Tariff: Net Metering 2.0*, ICER Chron. (2013), http://digitalcommons.pace.edu/cgi/viewcontent.cgi?article=1950&context=lawfaculty.

129. *See* John Farrell, Inst. for Local Self-Reliance, Minnesota's Value of Solar: Can a Northern State's New Solar Policy Defuse Distributed Generation Battles? (2014), http://ilsr.org/wp-content/uploads/2014/04/MN-Value-of-Solar-from-ILSR.pdf.

130. *Id.*

131. Am. Pub. Power Ass'n, Distributed Generation: An Overview of Recent Policy and Market Developments 3 (2013).

132. Minn. Stat. § 216B.164 subdiv. 10(a) (2015) ("A public utility may apply for commission approval for an alternative tariff that compensates customers through a bill mechanism for the value to the utility, its customers, and society for operating distributed solar photovoltaic resources . . . .").

133. *See generally* Owen R. Zinaman & Naim R. Darghouth, Nat'l Renewable Energy Lab., A Valuation-Based Framework for Considering Distribtued Generation Photovoltaic Tariff Design (2015).

134. Karl R. Rábago, *The "Value of Solar" Rate: Designing an Improved Residential Solar Tariff*, Solar Industry (2013), http://rabagoenergy.com/files/ra0301bago-value-of-solar-sim-feb-2013.pdf.

135. *See generally* Clean Power Research, *supra* note 18.

136. *See id.*; *see also Comments by Xcel Energy*, Minn. Pub. Util. Commission, Docket No. E-999/M-14-65, at 1 (Feb. 13, 2014).

137. Xcel Energy proposed an approach similar to VOST in 2012. *See Filing of the Minnesota Department of Commerce, Division of Energy Resources*, Minn. Pub. Util. Commission, Docket No. E-999/M-14-65, at 4 (Jan. 31, 2014).

138. Farrell, *supra* note 129, at 9.

139. *Id.* at 8.

140. *See id.* at 11.

141. *See, e.g.*, *Comments on Solar Value Methodology by Minnesota Power*, Minn. Pub. Util. Commission, Docket No. E999/M-14-65, at 2–3 (Feb. 13, 2013 [sic]); *Comments on Solar Value Methodology by Xcel Energy*, Minn. Pub. Util. Commission, Docket No. E999/M-14-65, at 1–2 (Feb. 13, 2014).

142. Farrell, *supra* note 129, at 11.

143. *Id.* at 9.

144. *Id.*

145. *Id.* at 7.

146. Minn. Stat. § 216B.164 subdiv. 10(a) (2015) ("A public utility *may* [but is not required to] apply for commission approval for an alternative tariff . . . .") (emphasis added).

A. Calculating VOST

Appreciating VOST's innovation and controversy necessarily begins with how the VOST rate is derived. VOST places a per kWh value on DSG and aims to pay customers supplying solar power to the grid a sum for solar power's intrinsic value to both the grid and society.[147] All customers are billed for their total electricity use. When customer-generators are billed, however, they also receive a bill credit for electricity they generate.[148] This credit is calculated by multiplying the monthly solar production by the VOST rate.[149] Minnesota's preliminary VOST rate is $0.145 per kWh.[150] So, if a customer produced 500 kWh of solar electricity over the course of a month, that customer would receive a $72.50 bill credit, resulting in a lower electricity bill.[151]

Minnesota's Department of Commerce, at the direction of the PUC, considered several incremental values to calculate the current VOST rate.[152] As codified, the Minnesota statute mandates the VOST rate consider these components.[153] The VOST rate "must, at a minimum, account for the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value."[154] The VOST rate may, though it need not, also incorporate additional values into the methodology.[155] These components could account for any known and measurable costs or benefits, such as a credit for DSG systems that are locally manufactured or assembled.[156] The VOST rate must be reevaluated annually,[157] as electricity rates often are.

B. Accounting for Environmental Value

That the rate must account for environmental value is VOST's most significant feature. By expressly incorporating an environmental value into its calculations, Minnesota's statute recognizes there is a social cost of carbon.[158] The social cost of carbon is a figure used by federal agencies that estimates potential economic and climate change damages from carbon dioxide emissions.[159] Damages factored into this estimate may include human health or property damages from increased flood risk.[160] In practice, the VOST rate makes a utility pay for the environmental harm resulting from its fossil fuel electricity generation.[161] Utilities paying at the VOST rate internalize some of the negative externalities produced by their power plants.[162]

Specifically, the "Avoided Environmental Cost" is VOST's groundbreaking component. It is based on both federal and state estimates.[163] To determine this fractional amount, the Minnesota Department of Commerce calculated the sum of environmental externality costs associated with carbon dioxide, particulate matter, and nitrogen dioxide.[164] Table 1 illustrates these externality costs.[165] Each is based on preexisting values calculated by the PUC.[166] Cost associated with carbon dioxide emissions is notably the largest environmental externality.[167] According to these projections, the externality costs of carbon dioxide, particulate matter, and nitrogen oxide will steadily increase.[168] These externalities are air pollutants resulting from fossil fuel combustion. As environmental externality costs increase, so too does VOST's Avoided Environmental Cost.[169]

147. Farrell, *supra* note 129, at 6.
148. Clean Power Research, *supra* note 18, at 3.
149. *See* Farrell, *supra* note 129, at 14.
150. *Id.* at 13 (explaining the value of solar rate would only become formal if a utility were to opt for the VOST alternative).
151. *See id.*
152. The following components were included and collectively aim to accurately quantify the true value of distributed solar generation: avoided fuel costs, avoided plant operating and maintenance costs, avoided generation capacity costs (savings from capital costs associated with providing enough generation in order to meet peak load), avoided reserve capacity cost (savings in capital costs required to provide enough generation to ensure electricity reliability), avoided transmission capacity cost, avoided distribution capacity cost, avoided environmental cost (savings from reduced negative externalities and associated compliance costs), voltage control (savings from costs association with certain regulation of distribution), and integration cost (cost of regulating system frequency and variability with increased solar). Components that were considered but not included: credit for local manufacturing and assembly (the local tax revenue for adding solar jobs), market price reduction (reduced cost of wholesale power resulting from reduction in electricity demand), disaster recovery (cost of restoring local economy following a natural disaster). Minn. Stat. § 216B.164 subdiv. 10(f) (2015); Clean Power Research, *supra* note 18, at 4–5 (summarizing what components were included as well as those that were not included) (Table 2 notes components not included in the VOST methodology, i.e., credits for local manufacturing or assembly, market price reduction, and disaster recovery).
153. Minn. Stat. § 216B.164 subdiv. 10(f).
154. *Id.*
155. *Id.*
156. *Id.*
157. *Id.* subdiv. 10(h).
158. *E.g.*, Farrell, *supra* note 129, at 12.
159. *The Social Cost of Carbon*, U.S. Envtl. Protection Agency, http://www.epa.gov/climatechange/EPAactivities/economics/scc.html (last updated July 21, 2014); *see also* Jason Robert Hull, *Hey Now, Let's Be Social: The Social Cost of Carbon and the Case for Its Inclusion in the Government's Procurement of Electricity*, 7 Geo. Wash. J. Energy & Envtl. L. 18 (2016).
160. *The Social Cost of Carbon*, *supra* note 159.
161. Farrell, *supra* note 129, at 12.
162. *See id.*
163. Clean Power Research, *supra* note 18, at 39; *see also Notice of Updated Environmental Externality Values*, Minn. Pub. Util. Commission, Docket Nos. E-999/CI-93-583, E-999/CI-00-1636 (June 5, 2013), https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7B36C90B6B-6E10-4EE9-B96E-DB4C946DE365%7D&documentTitle=20136-87887-01 (explaining how the PUC used the U.S. Department of Commerce's 2012 Gross Domestic Product Price Deflator index to configure environmental externality values). The values were for sulfur dioxide, particulate matter, carbon monoxide, nitrogen oxide, lead, and carbon dioxide. *Notice of Updated Environmental Externality Values*, *supra*.
164. Clean Power Research, *supra* note 18, at 10, 39–40. Table 4 represents costs per "MMBTU." A British Thermal Unit ("BTU") is the amount of heat energy it take to raise the temperature of one pound of water by 1 degree Fahrenheit. "MMBTU" refers to the U.S. dollars per million BTU.
165. *Infra* Table 1.
166. Minn. Stat. § 216B.2422 subdiv. 3 (2015) (requiring the PUC to "quantify and establish a range of environmental costs associated with each method of electricity generation"); *see generally Order Reopening Investigation and Convening Stakeholder Group to Provide Recommendations for Contested Case Proceeding*, Minn. Pub. Util. Comm'n, Docket No. E-999/CI-00-1636 (Feb. 10, 2014), https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={6FBF743A-1F1E-4C7D-A731-0519B62941A4}&documentTitle=20142-96292-01.
167. *See infra* Table 1.
168. *See infra* Table 1.
169. *See infra* Table 1.

Table 1. Fixed Environmental Externality Costs by Year

Year	Analysis Year	Carbon dioxide (CO_2) Cost ($/MMBtu)	Particulate Matter (PM_{10}) Cost ($/MMBtu)	Carbon monoxide (CO) Cost ($/MMBtu)	Nitrogen Oxide (NO_x) Cost ($/MMBtu)	Lead (Pb) Cost ($/MMBtu)	Total Cost ($/MMBtu)
2014	0	2.140	0.027	0.000	0.044	0.000	2.210
2015	1	2.255	0.028	0.000	0.045	0.000	2.327
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
2036	22	5.877	0.047	0.000	0.076	0.000	5.999
2037	23	6.131	0.048	0.000	0.078	0.000	6.257
2038	24	6.395	0.049	0.000	0.080	0.000	6.524

Clean Power Research, Minnesota Value of Solar: Methodology 10, tbl. 4 (2014).

C. Other Key Provisions

While VOST's most significant feature is that it expressly includes the environmental value of solar within the customer compensation rate, the statute also includes important provisions regarding how to implement VOST.[170] Key provisions specify which customers are eligible, who obtains renewable energy credits ("RECs"), when the rate begins, and for how long the rate extends.[171] First, VOST applies to customer-generators, but with several important caveats. The law only applies to customers with generation capacity of 20 kW or smaller.[172] Second, customers producing solar PV electricity are not compensated for output that exceeds 120% of the customer's electricity consumption.[173] Should a customer producing solar exceed the 120% threshold, the customer will not receive compensation for that generation. Third, the statute institutes a three-year embargo, which effectively requires a utility to continue paying customer-generators the retail rate.[174] Also, any RECs earned by the solar generation are credited to the utility.[175] Finally, in order to take advantage of the VOST rate, the utility must lock in that rate for at least twenty-five years. It is possible, however, that the utility and customer-generator may negotiate for a shorter term.[176] Together these provisions create a new framework and join Minnesota's concurrent initiatives for incentivizing DSG.

D. Ongoing Solar Initiatives in Minnesota

Minnesota is actively pursuing several legislative initiatives to encourage the development of DG, and particularly DSG.[177] Minnesota set an aggressive goal of achieving ten percent solar generation by 2030.[178] A crucial part of this goal will be met by requiring IOUs to make solar constitute 1.5% of their electricity sales by 2020.[179] Minnesota is certainly not alone in this endeavor, though it was the first and remains the only state to adopt a VOST methodology. In tandem with community solar gardens,[180] and improved incentive programs for solar PV manufacturing within Minnesota, VOST strives to bring Minnesota closer to its solar generation goal.[181]

IV. Evaluating VOST

The VOST methodology is a bold step in the direction of progress: it attempts to address the realities within Minnesota and nationwide, it recognizes the inherent environmental benefits of solar, and it implements a customer compensation scheme superior to Minnesota's current NEM program. Although it sets ambitious goals and offers a creative and innovative approach, joining worldwide efforts to decrease GHG emissions and dependence on fossil fuels, it ultimately falls short. VOST adds complexity and fails to deliver transparency. Most significantly, the VOST methodology exceeds the retail rate.[182] Although theoretically attractive, in reality, VOST does not distinguish itself from existing net metering programs or FITs across the country. Despite passing this law, practices in Minnesota have not changed.[183] Without success in Minnesota, this method will struggle to remain credible in other states.

In its draft form, VOST identified establishing a *simple* contract as one of its key elements.[184] Instead of clarifying existing confusion and streamlining electricity ratemaking, the VOST methodology adds a layer of complexity. On one hand, requiring rates to account for environmental

170. *See* Minn. Stat. § 216B.164 subdiv. 10 (2015).
171. *Id.*
172. *See* Farrell, *supra* note 129, at 10.
173. Minn. Stat. § 216B.164 subdiv. 4c(a)(1)–(2); *see also* Farrell, *supra* note 129, at 10.
174. Minn. Stat. § 216B.164 subdiv. 10(j).
175. *Id.* § 216B.164 subdiv. 10(i).
176. *Id.* § 216B.164 subdiv. 10(k).
177. *See* Farrell, *supra* note 129, at 8.
178. *Legislative Accomplishments*, Minn. Solar Energy Industries Ass'n, http://www.mnseia.org/2013-legislative-accomplishments (last visited Mar. 28 2015).
179. *Id.*; *see also* Farrell, *supra* note 129, at 8.
180. *See generally Petition of Northern States Power Company*, Minn. Pub. Util. Commission, Docket No. E-002/M-13-867 (Sept. 30, 2013) (requesting approval of the Company's proposed solar gardens program); *Frequently Asked Questions*, Solar Gardens Community Power, http://www.solargardens.org/frequently-asked-questions (last visited Apr. 8, 2015) (defining a community solar garden as "a solar electric array with multiple subscribers connected to the utility grid" where "[t]he subscribers may purchase a portion of the power produced by the array and receive a credit on their electric bill . . . including residences, businesses, local governments, non-profits, and faith-based organizations" provided they are within the utility's service area). *But see* Frank Jossi, *Minnesota Regulators Side With Utility in Value-of-Solar Case*, Midwest Energy News (Aug. 7, 2014), http://www.midwestenergynews.com/2014/08/07/minnesota-regulators-side-with-utility-in-value-of-solar-case (announcing Minnesota Public Utilities Commission's decision not to use the VOST methodology to calculate how to pay community solar garden developers).
181. *See Legislative Accomplishments*, *supra* note 178.
182. *See* John Farrell, *We Have "Value for Solar," but Should We Use It?*, Inst. Loc. Self-Reliance (Oct. 21, 2014), http://ilsr.org/value-of-solar-use-it.
183. *See id.*
184. Farrell, *supra* note 129, at 9.

value seems it would be straightforward; assigning a dollar figure for environmental value is a foolproof way of ensuring the inherent environmental benefits of solar are computed into electricity rates. Expressly requiring the PUC and utilities to consider the environmental value might even streamline ratemaking procedures. Unfortunately, the environmental value becomes yet another obligation for regulators to oversee. Although a straightforward concept—that solar energy is good because it produces less negative environmental externalities than fossil fuels—the VOST methodology is quite complex to implement. The economic estimations and valuations seem to distract from the bigger picture. VOST introduces additional dispute to the ratemaking process, which already requires tremendous debate over increasing or decreasing rates by a mere fraction of a cent. The overarching change VOST seeks to facilitate might be impractical through meticulous ratemaking battles before a PUC.

In part, developing VOST was an attractive idea because it intended to create a standardized contract for utilities and customers generating DSG. Standardization would provide increased transparency for both solar advocates and utilities.[185] Utilities could know exactly how the PUC would evaluate the VOST components each time it filed a ratemaking case. VOST would also demystify how environmental values are considered during the ratemaking process because each component of the VOST rate would become publicly available.[186] Even though the Minnesota PUC already oversees ratemaking cases, which include opportunity for public comment, determining an economic rate by using the methodology could have the appearance of being less arbitrary.[187] Ratemaking procedures typically rely heavily on estimation by the utility itself, whereas a private company and non-profit organization led the development of Minnesota's VOST methodology.[188] Those inclined to be skeptical of the traditional ratemaking process presumably found this added participation more comforting. However, for every concern the VOST methodology eliminates, additional concerns are created. Ratemaking processes deliberately rely on industry knowledge and expertise to derive electricity rates. Both utilities and environmentalists participated during developmental phases of VOST, but individual utilities appear to have emerged with less influence under the VOST methodology than they might otherwise enjoy. Following a rigid methodology may miss opportunities to engage industry expertise. Furthermore, while developing a standardized contract is an attractive proposition, utilities are more familiar with Minnesota's existing net metering program and routine ratemaking procedures. Thus, VOST introduces rather than eliminates regulatory certainty. Utilities may be reluctant to opt for the path unknown, especially when there is no guarantee it will be financially attractive.

The greatest shortcoming of Minnesota's VOST methodology ironically stems from one of its most appealing characteristics. VOST purports to offer a rate between the utility's avoided-cost and retail rates.[189] Unfortunately, reports indicate that the VOST rate exceeds present retail rates for residential-end users. The average retail price of electricity for residential end-users in Minnesota is $0.1177 per kWh.[190] Determining the actual VOST rate is not possible until a utility opts to pursue the methodology and plugs their specific numbers into the formula.[191] However, the current retail rate is less than preliminary estimations for the VOST rate. Preliminary estimations suggested the VOST would be $0.145 per kWh.[192] The example VOST rate included in the official methodology report by the Minnesota Department of Commerce also exceeds the current retail rate.[193] VOST only makes logical sense if utilities adopt it as an alternative. As of 2014, no utilities had actually pursued this option.[194] An unwillingness to pursue the alternative entirely undercuts VOST's potential to replace Minnesota's current net metering program. Furthermore, even if VOST were hypothetically able to achieve its purported middle ground, this would not solve VOST's flaws. The U.S. Energy Information Administration asserts that FITs and similar programs must set rates well above the retail rate to encourage households to use renewables.[195] This suggests all rates below the VOST methodology will fall short of promoting DSG.

Another shortcoming is VOST's failure to distinguish itself from Minnesota's existing net metering program. Minnesota is not a FIT state, but observers have also suggested VOST is really just a FIT by another name.[196] Proponents pitched VOST as an alternative to net metering.[197] Indeed it is codified as an "[a]lternative tariff" under section 216B.164, Minnesota's governing statute on cogeneration and small power production.[198] There are nevertheless many similarities. Emerging criticism of VOST describes it as "old wine in new bottles,"[199] or merely "net metering 2.0."[200] In fact,

185. *See* Clean Power Research, *supra* note 18, at 6.

186. *See id.* at 4–5; *see also* Mike Taylor et al., Nat'l Renewable Energy Lab., Value of Solar: Program Design and Implementation Considerations 16 (2015) (listing transparency as a key characteristic of VOST).

187. *See Petition to Establish the Value of Solar Energy*, Ga. Pub. Serv. Commission, Docket No. 36498 (July 9, 2014).

188. Farrell, *supra* note 129, at 17 (suggesting development of the methodology would not have been possible without experts from the Clean Power Research and Rocky Mountain Institute).

189. *See id.*

190. *See* U.S. Energy Info. Admin., Electric Power Monthly With Data for December 2015 tbl. 5.6.A (2016).

191. Farrell, *supra* note 129, at 13.

192. *Id.* at 14.

193. *See* Clean Power Research, *supra* note 18, at 43.

194. Namely, Xcel Energy, Minnesota's largest power producer, has yet to elect the alternative. *See* Farrell, *supra* note 182. According to the National Renewable Energy Laboratory, although Xcel filed an updated VOS rate on May 1, 2014, the rate has yet to be implemented. Taylor et al., *supra* note 186.

195. *See Feed-In Tariff: A Policy Tool Encouraging Deployment of Renewable Electricity Technologies*, U.S. Energy Info. Admin. (May 30, 2013), http://www.eia.gov/todayinenergy/detail.cfm?id=11471.

196. *E.g.*, Yann Brandt, *Does VOST=FiT, What Is a Value of Solar Tariff (VOST)?*, SolarWakeUp.com, http://www.solarwakeup.com/2014/02/25/does-vostfit-what-is-a-value-of-solar-tariff-vost (last visited Aug. 28, 2015).

197. *See id.*

198. Minn. Stat. § 216B.164 subdiv. 10 (2015).

199. Toby D. Couture, *The Value of Solar: Old Wine in New Bottles*, Renewable Energy World (May 12, 2014), http://www.renewableenergyworld.com/rea/news/article/2014/05/the-value-of-solar-old-wine-in-new-bottles (recalling Portugal's value-based approach that pays a rate to renewable energy producers based on a detailed value-based calculation).

200. *Cf.* Karl R. Rábago, *The Value of Solar Tariff: Net Metering 2.0*, Pace L. Fac. Publications (2013), http://digitalcommons.pace.edu/cgi/viewcontent.cgi?a

the VOST is so similar to net metering that it is susceptible to much of the criticism surrounding Minnesota's existing NEM program (i.e., customer-generators compensated at the retail rate are overpaid). Like net metering, VOST may encounter legal challenges in the future.[201] VOST's outlook is optimistic, but its shortcomings are only just beginning to be exposed.

VOST, like net metering, favors DSG over non-distributed sources. However, DSG is not necessarily more beneficial than electricity from larger-scale solar. VOST values DSG but does not assign a value to non-distributed solar. Utility-scale solar projects remain more cost effective than residential rooftop solar and achieve the same environmental benefits as their residential counter parts.[202] Like residential solar, utility-scale projects reduce dependence on fossil fuels. However, utility-scale projects are less disruptive than DG because they fit seamlessly with traditional regulatory frameworks.[203] Regardless of a system's size, there are environmental benefits associated with solar PV. It is therefore unreasonable for electrical rates to credit or compensate residential customer-generators for VOS without recognizing the equivalent value of utility-scale solar. According to some practitioners and industry experts, DG is actually less valuable than non-distributed renewables because the energy output from non-distributed renewables is less variable, more dependable, and thus more reliable.[204]

VOST also remains susceptible to fairness arguments regarding lower-income customers. Net metering programs are sometimes criticized for having a disproportionate impact on lower-income customers.[205] Because installing solar PV panels remains expensive, lower-income households are unable to invest in available technology. Third-party financing arrangements may make installing solar panels more affordable, but direct ownership is a luxury. There is concern that as DG continues to gain popularity, the result will create a decreased demand for electricity generated by utilities. Consequently, electricity prices may increase.[206] Households unable to install their own solar PV systems remain vulnerable to price increases but ineligible to receive a bill credit under VOST.

Like the rate itself, several of the statute's key provisions also fall short. Minnesota's statute provides, "A public utility *may* apply for commission approval for an alternative tariff that compensates customers through a bill credit mechanism for the value of the utility, its customers, and society for operating distributed solar photovoltaic resources . . . ."[207] As written, VOST permits an alternative to net metering that is voluntary. Utilities in Minnesota, however, have been reluctant to opt for this alternative.[208] Again, this is presumably because the VOST rate exceeds the retail rate. Despite incentives for participation, including the ability to claim RECs for customer-generation,[209] utilities are not persuaded. Utilities are unable to apply the VOST rate until three years after the PUC approves its VOST tariff.[210] Assuming the VOST rate were lower than the retail rate, a utility must continue paying customer-generators the retail rate for three years, which delays the utility from realizing economic benefits associated with the methodology.

There is nevertheless potential for VOST to overcome its shortcomings. VOST is important because it is a creative and innovative approach to regulating DSG. Incentives for solar typically focus on subsidizing expansion or providing production tax credits,[211] but these incentives have not done enough. VOST recognizes that compensation schemes have already begun to receive significant attention and that improvement is possible. The increased presence of DSG on the grid only reiterates the need for more discussion about the future of America's energy portfolio.

All is not lost for VOST. For utilities, VOST remains theoretically preferable to the retail rate. Where the VOST rate is lower than the retail rate, a utility need not compensate customer-generators as much. Indeed, the VOST was well received by industry when pitched as a middle ground approach.[212] VOST also remains theoretically attractive to solar advocates.[213] It is a viable alternative to compensating customers at the utility's avoided-cost rate, and it would expressly account for the environmental benefits of solar, whereas an avoided-cost rate will not necessarily do so.

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rticle=1950&context=lawfaculty.

201. *See generally* Raskin, *supra* note 105, at 42; Walsh, *supra* note 104, at 11.

202. *See* Becky Beetz, *US: Utility-Scale Solar More Cost Effective Than Residential Rooftop*, PV Mag.: News (July 14, 2015), http://www.pv-magazine.com/news/details/beitrag/us--utility-scale-solar-more-cost-effective-than-residential-rooftop-_100020200/#axzz3qHdeoRkI (claiming utility-scale solar projects can save fifty percent more carbon emissions than residential rooftop solar).

203. *See generally* Nat'l Regulatory Research Inst., Report No. 15-01, Utility Involvement in Distributed Generation: Regulatory Considerations White Paper (2015) (examining the problems associated with the present regulatory framework as it relates to growth in the DG market); David Wagman, *Distributed Solar Challenges Utilities, Markets, and Regulation*, Power Mag. (Dec. 1, 2012), http://www.powermag.com/distributed-solar-challenges-utilities-markets-and-regulation/?printmode=1 (discussing alternatives to the traditional regulatory framework of DG and the problems faced by the traditional framework).

204. *See, e.g.*, Raskin, *supra* note 105, at 45–50.

205. *See id.* at 46.

206. Germany deployed its *Energiewende* campaign to expand renewable generation. Consequently, Germany's electric rates are, on average, around \$0.36 per kWh, and without a change in this policy may approach nearly \$0.50 per kWh in the next decade. By comparison, rates in the United States remain much lower, and hover around \$0.125 per kWh. *See id.* at 39, 46.

207. Minn. Stat. § 216B.164 subdiv. 10 (2015) (emphasis added).

208. *See* Farrell, *supra* note 182.

209. Minn. Stat. § 216B.164 subdiv. 10(i).

210. *Id.* § 216B.164 subdiv. 10(j).

211. *See* Raskin, *supra* note 105, at 40.

212. *See, e.g.*, *Comments by Xcel Energy*, *supra* note 136 (discussing distributed solar "done right").

213. *See, e.g.*, *Comments of the Minnesota Solar Energy Industries Association*, Minn. Pub. Util. Commission, Docket No. E-999/M-14-65 (Feb. 13, 2014), https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={0E275CAC-E5E2-4696-9E29-9D2FCE9F1BAD}&documentTitle=20142-96432-01. *But see Initial Comments of the Alliance for Solar Choice*, Minn. Pub. Util. Commission, Docket No. E-999/M-14-65, at 2–3 (Feb. 13, 2014), https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={1515165D-4487-41BC-9673-4ECCBE6DE1C6}&documentTitle=20142-96425-01 (suggesting VOST underestimates the value of DSG).

V. Recommendations

This Note proposes that Minnesota's VOST methodology is seriously flawed, but maintains that improving the VOST methodology is possible. Revising language and conditions within the statute will bring the methodology closer to its goals. Further, this Note suggests that other states considering development and implementation of their own respective methodologies should also heed these recommendations, but recognizes that ongoing initiatives in other states may render a VOST methodology unnecessary.

A. Make VOST Mandatory

Minnesota's VOST methodology must be amended to require that utilities actually adopt this alternative. Nearly two years have lapsed since the Minnesota Department of Commerce submitted the final methodology.[214] If VOST remains a voluntary alternative, its widespread adoption in Minnesota seems unlikely. Minnesota should instead replace its current net metering program with an improved VOST methodology. Amending VOST to make the voluntary alternative mandatory could, however, encounter resistance by utilities. Because utilities are a tremendous source of expertise within the electricity industry, their input and cooperation plays a crucial role in establishing a feasible and reasonable approach. Losing industry support would jeopardize VOST's potential. Establishing a more desirable methodology, even if mandatory, may be more effective than providing an optional alternative to net metering that is not economical. In other words, assuring VOST is financially attractive would soften the blow of making VOST mandatory.

B. Assure VOST Is Financially Attractive

Despite strong environmental motivations for supporting VOST, economics remain the crucial factor. VOST makes logical sense only if utilities actually adopt it as an alternative. Should it remain voluntary, utilities would be more apt to select the alternative if VOST clearly saved them money over the long term. An electric utility has little incentive to adopt a scheme under which it must compensate customers for more than it already does. For a utility to pursue the option, the benefits must exceed the costs. Failure to establish a rate between the avoided-cost and retail rates of electricity is a difficult hurdle for VOST to overcome. An improved methodology should still emphasize the environmental value of solar, but acknowledge a lower avoided generation capacity cost and lower avoided fuel cost. For example, the Minnesota Department of Commerce relied on an estimated avoided environmental cost of $0.029 per kWh in its calculation.[215] For avoided fuel cost and avoided generation capacity cost, the example provided the economic value was $0.061 and $0.048, respectively.[216] This Note does not suggest values should be deliberately skewed to derive a rate that is more favorable to utilities. Instead, this Note suggests there is latitude to reevaluate each component under different assumptions.

C. Eliminate the Embargo

The provisions regarding RECs should remain the same, but the current three-year restriction on charging below the retail rate should be eliminated. The relevant provision forces electric utilities to continue compensating customers at the retail rate. This delay is unnecessary and may discourage utilities from making the initial switch to VOST. Although three years may not seem like a long time, especially in terms of industry forecasting, solar PV is a dynamic technology. Adopting VOST, merely to delay benefits associated with the alternative is counterproductive.

D. Shorten the Contract Term

Twenty-year contracts for FITs are not unusual,[217] but decreasing the contract term for VOST may also eliminate hesitancy on behalf of utilities. Minnesota has not adopted a statewide FIT policy or other long-term contractual arrangements between utilities and individual customer-generators.[218] Simply decreasing VOST's term from twenty-five to fifteen years could alleviate concern about promulgating large amounts of these agreements.

VI. Conclusion

As enacted, the VOST methodology fails to achieve its intended goal. Making VOST mandatory, eliminating the embargo, shortening the contract term, and above all ensuring the methodology is financially attractive, would improve the current methodology. Amending Minnesota's methodology may also inspire similar policies nationwide. Until utilities elect for the alternative in Minnesota, however, other states would be wise to postpone enacting legislation. Where inquiry at PUCs is ongoing, stakeholders should consider the extent to which compensation schemes will encourage solar expansion. In some markets, Minnesota's approach may do little to advance renewable development and even distract from concurrent energy policy. The environmental benefits of solar PV are undeniable, but whether the value of solar concept is viable statewide is yet to be determined. As the country continues to embrace renewable resources and confronts challenges associated with distributed generation, jurisdictions will necessarily contemplate how much solar power is worth.

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214. *See Value of Solar Tariff Methodology: Timeline*, Minn. Dep't Commerce, http://mn.gov/commerce/energy/businesses/energy-leg-initiatives/value-of-solar-tariff-methodology%20.jsp (last visited Aug. 28, 2015).

215. Clean Power Research, *supra* note 18, at 42.

216. *Id.*; *see also* Taylor et al., *supra* note 186, at 19–20 (discussing VOST assumptions).

217. *See Feed-In Tariff: A Policy Tool Encouraging Deployment of Renewable Electricity Technologies*, *supra* note 195 (explaining that most U.S. contracts are for ten to twenty years).

218. *See id.* (Minnesota does not mandate FITs nor do utilities within Minnesota voluntarily offer FITs to customers).