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THE RISE OF RENEWABLES AND DISTRIBUTED GENERATION IN MINNESOTA

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I. INTRODUCTION

The renewable energy revolution is coming. The electric utility industry is facing disruptive challenges that are expected to change the industry as a whole.[1] One of the foremost disruptive challenges to the industry is distributed generation (DG).[2] DG refers to electric power generated on the customer side of the meter, usually "located on-site or near its customer base,"[3] "such as rooftop solar panels or wind turbines."[4]

In recent years the price of DG has steadily declined.[5] As the price of DG falls, the availability of the technology rises, allowing more people to turn to DG to produce their own energy.[6] DG can, and is, being used to either supplement individual energy use or to produce enough to cover individual energy consumption in its entirety.[7] At the same time, independent power producers are constructing renewable energy sources or purchasing energy from renewable energy sources to meet mandated renewable energy goals.[8] This combination could add up to a future where fossil

1. PETER KIND, EDISON ELEC. INST., DISRUPTIVE CHALLENGES: FINANCIAL IMPLICATIONS AND STRATEGIC RESPONSE TO A CHANGING RETAIL ELECTRIC BUSINESS 1 (2013).

2. Gina S. Warren, *Vanishing Power Lines and Emerging Distributed Generation*, 4 WAKE FOREST J.L. & POL'Y 347, 357 (2014) ("For utilities, the most significant disruptive innovation is increased utilization and availability of distributed energy resources.").

3. *Id.*

4. Allyson Umberger, Comment, *Distributed Generation: How Localized Energy Production Reduces Vulnerability to Outages and Environmental Damage in the Wake of Climate Change*, 6 GOLDEN GATE U. ENVTL. L.J. 183, 189 (2012).

5. AM. PUB. POWER ASS'N, DISTRIBUTED GENERATION: AN OVERVIEW OF RECENT POLICY AND MARKET DEVELOPMENTS 6 (2013).

6. *Id.* at 5–6; JANET L. SAWIN ET AL., REN21, RENEWABLES 2013 GLOBAL STATUS REPORT 3 (2013) ("In 2012, prices for renewable energy technologies, primarily wind and solar, continued to fall, making renewables increasingly mainstream and competitive with conventional energy sources."); Warren, *supra* note 2, at 347 ("These innovative technologies are not only appealing to today's tech-savvy customers, they are also becoming more economically accessible to the average customer.").

7. Warren, *supra* note 2, at 359 (commenting that people's reliance on the transmission grid will decrease or be completely eliminated after starting to use DG).

8. Daniel A. Lyons, *Federalism and the Rise of Renewable Energy: Preserving State and Local Voices in the Green Energy Revolution*, 64 CASE W. RES. L. REV. 1619, 1664 (2014) ("[S]tate public utility commissions have largely driven greater demand for

fuels and other traditional nonrenewable energy sources (nonrenewables) will become ancillary to renewable energy sources (renewables).

The transition will not occur instantly, but the change is coming[9]: the perpetual rise of renewables[10] can only mean the inevitable decline of nonrenewables.[11] In a world that has a finite amount of energy use, renewable and nonrenewable sources cannot both hold the top spot of the market share; as one rises, the other must fall.[12]

The rise of DG and renewables, while inevitable,[13] is happening faster in some places than others.[14] Minnesota has new policies in place to encourage DG and renewables,[15] but there is

renewable energy, primarily through renewable portfolio standards that require utilities to purchase a certain percentage of their electricity for distribution from renewable sources.").

9. *See* Warren, *supra* note 2, at 347 (citing Dan Yates, *Ending Big Electric Bill Era*, CNBC (July 2, 2013, 11:53 AM), http://www.cnbc.com/id/100842506) (estimating that distributed energy will contribute as much as "20 percent of U.S. power supply by 2020").

10. *See* Reed Landberg, *Renewable Energy Installations to Rise 37% by 2015, BNEF Says*, BLOOMBERG BUS., Apr. 8, 2014, *available at* http://www.bloomberg.com /news/2014-04-08/renewable-energy-installations-to-rise-37-by-2015-bnef-says.html; *see also* Jonathan Fahey, *Renewable Energy Growth Is Rising Around the World, IEA Says*, HUFFINGTON POST (June 26, 2013, 1:19 PM), http://www.huffington post.com /2013/06/26/renewable-energy-growth_n_3504265.html ("Renewable power, including hydropower, is the fastest-growing power generation sector and it is expected to increase by 40 percent in the next five years.").

11. *See* Fahey, *supra* note 10 ("Renewable energy is growing fast around the world and will edge out natural gas as the second biggest source of electricity, after coal, by 2016 . . . .").

12. *See id.*

13. *Experts Weigh Impact of Distributed Generation on Utility Business Model*, E&E TV (Jan. 28, 2014), http://www.eenews.net/tv/videos/1771/transcript ("Jeff Navin: It's not a question as to whether or not there's going to be distributed generation. The question is how can regulators and utilities work to come up with a business model . . . ."); Joe Wiedman et al., *An Action Plan for Distributed Generation*, RENEWABLEENERGYWORLD.COM (Nov. 22, 2013), http://www.renewable energyworld.com/rea/blog/post/2013/11/an-action-plan-for-distributed -generation ("The forces of consumer demand and technological innovation make change inevitable.").

14. *See Renewable Energy in the 50 States*, AM. COUNCIL ON RENEWABLE ENERGY, http://www.acore.org/publications/50states/ (last visited Feb. 22, 2015) (providing reports on the amount of renewable energy production in each state).

15. *See, e.g.*, MINN. STAT. § 216B.164 (2014) (encouraging cogeneration and small power production).

still room for improvement.[16] This Note argues that DG and renewables can and should be implemented more substantially in Minnesota by amending current statutes and changing the utilities' traditional business models. Part II gives a brief overview of energy law in Minnesota.[17] Part III discusses the need for change from nonrenewables to renewables and the emerging technologies that are making that change feasible.[18] Part IV lays out the current policies in Minnesota that both allow for, and hinder, DG and renewables.[19] It also offers recommendations for improvement in Minnesota's current policies based on other states' practices.[20] Finally, Part V discusses the current utility business model and the new model that has been proposed to incentivize DG and renewables.[21]

II. ENERGY LAW IN MINNESOTA

Energy law is a conglomeration of several different areas of law; one of the most prevalent being administrative law directed through regulatory bodies.[22] There are both federal and state regulatory bodies involved in energy regulation, and more specifically, electricity regulation.[23] The Federal Energy Regulatory Commission "regulates the interstate transmission of electricity."[24] Every state has its own regulatory body that promulgates rules based on state statutes.[25] The regulations are used to govern the electric utilities' intrastate activities.[26]

16. *See, e.g.*, John Farrell, *Minnesota's Value of Solar*, INST. FOR LOCAL SELF -RELIANCE (May 1, 2014), http://www.ilsr.org/minnesotas-value-of-solar/ (describing Minnesota's "value of solar" program); *Net Metering*, AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., http://www.aceee.org/topics/net-metering (last visited May 1, 2015) (discussing best practices for net metering).

17. *See infra* Part II.

18. *See infra* Part III.

19. *See infra* Part IV.

20. *See infra* Part IV.

21. *See infra* Part V.

22. Terence Daintith, *A Mirror of Change? The Journal and the Development of Energy Law*, 30 J. ENERGY & NAT. RESOURCES L. 469, 470 (2012) (dividing energy law into two parts, with one part being closely related to administrative law and its regulation of utilities).

23. *See What FERC Does*, FED. ENERGY REGULATORY COMMISSION, http://www.ferc.gov/about/ferc-does.asp (last visited Feb. 22, 2015).

24. *Id.*

25. *See About NARUC*, NAT'L ASS'N REG. UTIL. COMMISSIONERS, http://www

A. *Public Utilities Commission*

Minnesota's electric utility regulatory body is the Public Utilities Commission (PUC).[27] The mission of the PUC is to "create and maintain a regulatory environment that ensures safe, reliable, and efficient utility services at fair and reasonable rates."[28] In furtherance of this mission, the PUC "emphasizes the production and consumption of energy resources that will minimize damage to the environment."[29] The PUC is thus required to take into consideration the reliability of energy services, the reasonableness of rates, and environmental factors when making decisions.

A central responsibility of the PUC is to determine what constitutes a "fair and reasonable rate" for both the utilities and the ratepayers.[30] The PUC is charged with determining a reasonable rate in order "to tame what economists considered a natural monopoly industry."[31] A natural monopoly occurs in the electric utility industry because once "an electric utility erects a transmission line, there is no good economic reason to lay another, competing . . . transmission line."[32] There will not "be enough gains from competition to cover the cost of having two sets of power distribution lines."[33] Thus, the solution to the natural monopolies was for governments to step in and begin regulating.[34] In this way, the natural monopoly is allowed to continue, offering non-monopolistic rates to ratepayers while still providing stable earnings for utility investors.[35]

.naruc.org/about.cfm (last visited Feb. 22, 2015).

26. Lyons, *supra* note 8, at 1626.

27. *The Minnesota Public Utility Commission*, MINN. PUB. UTIL. COMMISSION, http://mn.gov/puc/ (last visited May 1, 2015).

28. *About Us*, MINN. PUB. UTIL. COMMISSION, http://mn.gov/puc/aboutus /index.html (last visited May 4, 2015).

29. *Id.*

30. *See id.*

31. Lyons, *supra* note 8, at 1626; *see also* JOSEPH P. TOMAIN & RICHARD D. CUDAHY, ENERGY LAW IN A NUTSHELL 169–73 (2d ed. 2011).

32. TOMAIN & CUDAHY, *supra* note 31, at 171.

33. Tim Worstall, *Which Should We Have: Public Utilities or Regulated Private Monopolies?*, FORBES (Mar. 24, 2013, 2:33 PM), http://www.forbes.com/sites/tim worstall/2013/03/24/which-should-we-have-public-utilities-or-regulated-private -monopolies/.

34. TOMAIN & CUDAHY, *supra* note 31, at 171.

35. *Id.* at 172–73.

The utility companies annually adjust their rates with the PUC using a complex set of factors to determine the new rate.[36] However, the formula that is used relies heavily on two specific factors: "1) the total dollar amount of capital invested in new assets like power plants and power lines, and 2) the total amount in kilowatt hours of electricity sold to customers, also referred to as 'ratepayers.'"[37] These two factors make up the majority of what is considered the utilities' traditional business model.[38] The more capital investments made, and the more electricity sold, the higher the operating costs and thus the higher the rate.

Unfortunately, under the traditional business model, DG reduces the revenue generated by the utilities.[39] As more people turn to DG, the increased number of people using DG reduces the need for utilities to invest in new power plants and power lines, and it reduces the amount of electricity being sold to customers. However, even though less electricity is being sold, the price of transmission remains the same.[40] This increases the cost for those remaining on the grid, which in turn will motivate those remaining to switch to DG as it becomes cost-effective.[41] Thus, if DG continues

36. *See id.* at 182–92.

37. *Policy Framework to Optimize Efficiency of the Electrical Energy System*, CITIZENS LEAGUE 3, http://citizensleague.org/wp-content/uploads/2013/05/510.RPT_.Policy-Framework-to-Optimize-Efficiency-of-the-Electrical-Energy-System.pdf (last visited May 4, 2015).

38. *Id.*; *see also* William Boyd, *Public Utility and the Low-Carbon Future*, 61 UCLA L. Rev. 1614, 1617–18 (2014); Stephanie Levine, *Increasing Energy Efficiency Through New Utility Business Models*, ECOVA (June 18, 2014), http://www.ecova.com/ecova/blog/2014/june/increasing-energy-efficiency-through-new-utility-business-models.aspx.

39. U.S. DEP'T OF ENERGY, THE POTENTIAL BENEFITS OF DISTRIBUTED GENERATION AND RATE-RELATED ISSUES THAT MAY IMPEDE THEIR EXPANSION 8-1 (2007), *available at* http://www.ferc.gov/legal/fed-sta/exp-study.pdf; Levine, *supra* note 38 ("Under utilities' traditional business models, customer-owned generation and increased energy efficiency reduce the revenue a utility earns.").

40. *See* Levine, *supra* note 38.

41. KIND, *supra* note 1, at 17; Emily Holden, *On-Site Renewable Growth Complicates Utility Planning, Experts Say*, CQ ROLL CALL, Nov. 8, 2013, *available at* 2013 WL 5960875 ("Without action, utilities could wind up in a 'death spiral,' Shuford said, where they are chasing an ever shrinking customer base to pay for infrastructure built for a larger customer base. The higher the rates rise, the more customers leave the system.").

to rise as predicted and the utilities wish to avoid this spiral, they will need to change their business model.[42]

B. Renewable Energy Standard

In 2007, the PUC also took on a new responsibility ascribed to it by a modification to Minnesota Statutes section 216B.1691.[43] The modification created a "mandatory renewable portfolio standard . . . called the Renewable Energy Standard."[44] The mandated goals of the Renewable Energy Standard require specific percentages of overall retail electricity sales to be entirely from eligible energy technologies by specific dates.[45] Eligible energy technologies include solar, wind, hydro-electric under 100 megawatts, hydrogen, or biomass.[46] The ultimate goal is for the state's largest utility, Xcel Energy, to be at 30% eligible energy technologies by 2020 and for all other utilities to be at 25% (including municipal owned utilities and cooperative electrical associations) by 2025.[47] In 2013 there was a further modification to Minnesota Statutes section 216B.1691, specifying that at least 1.5% of the public "utility's total retail electric sales to retail customers in Minnesota" need to be from solar generation by the end of 2020,[48] with an overall goal of 10% for the state by the end of 2030.[49]

42. *See* KIND, *supra* note 1, at 17–18; Holden, *supra* note 41.

43. *See* THE MINN. OFFICE OF ENERGY SEC., MINN. DEP'T OF COMMERCE, REPORT TO THE MINNESOTA LEGISLATURE: PROGRESS ON COMPLIANCE BY ELECTRIC UTILITIES WITH THE MINNESOTA RENEWABLE ENERGY OBJECTIVE AND THE RENEWABLE ENERGY STANDARD 2 (Jan. 7, 2011), *available at* http://cusp.umn.edu/WE_Readings/Lec%202_1%20Compliance%20with%20Renewable%20Energy%20Objectives.pdf; *Renewable Portfolio Standard*, DATABASE ST. INCENTIVES FOR RENEWABLES & EFFICIENCY, http://programs.dsireusa.org/system/program/detail/2401 (last updated Oct. 31, 2014).

44. *Renewable Portfolio Standard*, *supra* note 43.

45. *See* MINN. STAT. § 216B.1691, subdiv. 2(a) (2014).

46. *Id.* § 216B.1691, subdiv. 1(a).

47. *See Renewable Portfolio Standard*, *supra* note 43; *see also* MINN. STAT. § 216B.1691, subdiv. 2(b). "An electric utility that owned a nuclear generating facility as of January 1, 2007, must meet the requirements of this paragraph rather than paragraph (a)." *Id.* The only utility that meets this requirement is Xcel. *See Renewable Portfolio Standard*, *supra* note 43.

48. MINN. STAT. § 216B.1691, subdiv. 2(f).

49. *Id.* § 216B.1691, subdiv. 2(f)(c); *see also Renewable Portfolio Standard*, *supra* note 43.

It is the PUC's responsibility to monitor utility compliance with the Renewable Energy Standards.[50] To monitor compliance, and the eventual attainment of these goals, the PUC created tradable renewable energy certificates (REC).[51] The utilities use RECs to quantify the percentage of retail energy sales generated or procured using eligible renewable resources.[52] "A REC is created for each . . . [megawatt per hour] generated" by an eligible renewable resource.[53] Once a REC is created, it must be "retired,"[54] and the percentage that one megawatt represents is added to a utility's total percentage of retail sales for the year.[55]

III. THE FEASIBILITY OF RENEWABLES AND DISTRIBUTED GENERATION

Academics and the public have been aware of the negative effects that fossil fuels and other nonrenewables have had on our planet for years.[56] However, it has only been in the recent past that the majority of the population began to truly consider both current and future regulatory actions to combat climate change.[57] In so doing, more people have begun to look to renewables as a sustainable power source for themselves and society, turning away from the idea that renewables are just a novelty.[58] This transition is

50. *See Renewable Portfolio Standard*, *supra* note 43 ("Utilities are required to file annual compliance reports with the PUC . . . .").

51. *Id.*

52. *Id.*

53. *Id.*

54. *Id.*

55. *See* DIV. OF ENERGY RES., MINN. DEP'T OF COMMERCE, REPORT TO THE MINNESOTA LEGISLATURE: PROGRESS ON COMPLIANCE BY ELECTRIC UTILITIES WITH THE MINNESOTA RENEWABLE ENERGY OBJECTIVE AND THE RENEWABLE ENERGY STANDARD 7–8 (2013), *available at* http://mn.gov/commerce/energy/images/2013RESLegReport.pdf.

56. Daniel Bodansky, *The United Nations Framework Convention on Climate Change: A Commentary*, 18 YALE J. INT'L L. 451, 453 (1993) (discussing the effects of fossil fuels on climate change and the establishment of the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change in 1990 by the UN)*; see also* Dominique Mosbergen, *Americans Are Getting More Worried About Climate Change, According to New Polls*, HUFFINGTON POST (Sept. 23, 2014, 6:04 PM), http://www.huffingtonpost.com/2014/09/23/climate-change-polls_n_5870534.html.

57. Mosbergen, *supra* note 56.

58. *See* Melissa Powers, *Small Is (Still) Beautiful: Designing U.S. Energy Policies to Increase Localized Renewable Energy Generation*, 30 WIS. INT'L L.J. 595, 606 (2012)

not motivated by a sudden change in the perception of renewables and effects on the environment as much as the transition has been motivated by the feasibility of making a change that is equal parts financially sensible and environmentally appealing.[59]

A. *The Environmental Argument for Renewables*

There are myriad environmental reasons for transitioning from nonrenewables to renewables. The negative impacts of nonrenewable sources are well documented and consist of, but are not limited to, land degradation through mining, environmental ruin through global warming, and public health issues caused by air and water pollution.[60] One-third of the U.S. global warming emissions are created through electricity production.[61] Coal-fired power plants alone account for 25% of the U.S. global warming emissions.[62] Health issues associated with emissions from coal and natural gas plants include "breathing problems, neurological damage, heart attacks, and cancer."[63]

"Minnesota is already experiencing impacts from climate change, and will continue to experience impacts to our ecosystems, natural resources, and infrastructure."[64] The increased temperature during the summer will negatively affect public health and the quality of life due to "increasing heat waves, reduced air quality, and increasing insect-borne and waterborne diseases."[65] The altered

("Renewable energy experienced a remarkable decade of growth from 2001–2011. Renewable energy production actually eclipsed electricity production from nuclear plants in the first quarter of 2011.").

59. *See* Warren, *supra* note 2, at 347–48.

60. *The Hidden Cost of Fossil Fuels*, UNION CONCERNED SCIENTISTS, http://www.ucsusa.org/clean_energy/our-energy-choices/coal-and-other-fossil-fuels/the-hidden-cost-of-fossil.html (last visited May 1, 2015); *see also* Uma Outka, *Environmental Justice Issues in Sustainable Development: Environmental Justice in the Renewable Energy Transition*, 19 J. ENVTL. & SUSTAINABILITY L. 60, 68 (2012).

61. *Benefits of Renewable Energy Use*, UNION CONCERNED SCIENTISTS, http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/public-benefits-of-renewable.html (last visited May 1, 2015).

62. *Id.*

63. *Id.*

64. *Climate Change in Minnesota*, MINN. POLLUTION CONTROL AGENCY, http://www.pca.state.mn.us/index.php/topics/climate-change/climate-change-in-minnesota/greenhouse-gas-emissions-in-minnesota.html (last modified May 8, 2014, 2:02 PM).

65. *Id.*

summer growing season will have an effect on Minnesota's agricultural sector, including "the potential for increased crop yields, increases in heat waves, floods, droughts, insects, and weeds[, which] will present increasing challenges to managing crops, livestock, and forests."[66]

The positive environmental impacts of renewables are just as well documented as the negative impacts of nonrenewables. Renewable energy, while not completely devoid of carbon dioxide emissions, creates far less emissions in comparison to fossil fuels.[67] If implemented on a large scale, renewable energy can significantly reduce global warming emissions.[68] The reduction of global warming emissions can, in turn, have a positive impact by mitigating the negative effects of climate change,[69] which for Minnesota means improved public health and increased climate stability for agriculture.[70] Environmental and health benefits would also accompany reduced air and water pollution that is directly attributable to fossil fuel production.[71]

Renewable energy has its own environmental issues. Large solar power projects can require sizable amounts of land.[72] Large wind projects also suffer from the same land requirement issues and are under siege from conservationists for the effects such projects can have on bird populations and migrations.[73] However,

66. *Id.*

67. *Benefits of Renewable Energy Use*, *supra* note 61 ("Compared with natural gas, which emits between 0.6 and 2 pounds of carbon dioxide equivalent per kilowatt-hour (CO2E/kWh), and coal, which emits between 1.4 and 3.6 pounds of CO2E/kWh, wind emits only 0.02 to 0.04 pounds of CO2E/kWh, solar 0.07 to 0.2, geothermal 0.1 to 0.2, and hydroelectric between 0.1 and 0.5.").

68. *Id.*

69. *Reducing Greenhouse Gas Emissions*, EPA, http://www.epa.gov/climatechange/reducing-emissions.html (last visited Feb. 22, 2015); *see also The Science*, GREENPEACE, http://www.greenpeace.org/usa/en/campaigns/global-warming-and-energy/science/ (last visited Feb. 22, 2015).

70. *See Climate Change in Minnesota*, *supra* note 64.

71. *The Hidden Cost of Fossil Fuels*, *supra* note 60 (discussing the different pollutants that are produced when fossil fuels are combusted and the negative consequences for both the environment and human health); *see also Benefits of Renewable Energy Use*, *supra* note 61.

72. *Examining the Advantages and Disadvantages of Solar Power*, SUSTAINABLE DEV. INFO. (Mar. 10, 2013), http://www.sustainabledevelopmentinfo.com/solar-power-advantages-and-disadvantages/.

73. Jess White, *Disadvantages of Wind Energy*, RENEWABLEENERGYSPOT.COM, http://www.renewableenergyspot.com/disadvantages-of-wind-energy/ (last visited

both solar and wind projects have small scale production options available,[74] which does not exist for fossil fuels, and efforts are being made to alleviate conservationist concerns over the negative effects of large wind projects.[75] There are several other environmental effects of renewable energy;[76] however, these effects are negligible relative to the effects of fossil fuels.[77] All energy sources have pros and cons, but it is the energy sources with the greatest ability to reduce carbon emissions that should be developed and invested in most heavily.

B. *The Economic Argument for Renewables*

Recent technological advances have precipitated a decrease in the cost of renewables.[78] As the technologies become more advanced, the capital costs to produce those technologies declines, and the efficiency of those same products increases.[79] This means

Feb. 22, 2015); *see also* Ros Krasny, *U.S. Extends Permits to 30 Yrs for Wind Farms that Accidentally Kill Eagles*, REUTERS, Dec. 6, 2013, *available at* http://www.reuters.com/article/2013/12/07/wind-farms-eagles-idUSL2N0JM00N20131207.

74. *Environmental Impacts of Solar Power*, UNION CONCERNED SCIENTISTS, http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/environmental-impacts-solar-power.html#.VLLvqfldUdo (last updated Mar. 5, 2013); *Environmental Impacts of Wind Power*, UNION CONCERNED SCIENTISTS, http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/environmental-impacts-wind-power.html#.VLLuzfldUdo (last visited Feb. 22, 2015).

75. *Environmental Impacts of Wind Power*, *supra* note 74.

76. *Environmental Impacts of Renewable Energy Technologies*, UNION CONCERNED SCIENTISTS, http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/environmental-impacts-of.html#.VCDpwPldXO8 (last visited Feb. 22, 2015).

77. *Id.* ("All energy sources have some impact on our environment. Fossil fuels—coal, oil, and natural gas—do substantially more harm than renewable energy sources by most measures . . . .").

78. TRIEU MAI ET AL., RENEWABLE ELECTRICITY FUTURES STUDY: EXECUTIVE SUMMARY iii (2012), *available at* http://www.nrel.gov/docs/fy13osti/52409-ES.pdf ("[I]mprovement in the cost and performance of renewable technologies is the most impactful lever for reducing this incremental cost [associated with high renewable generation].").

79. Peter Kelly-Detwiler, *As Solar Panel Efficiencies Keep Improving, It's Time to Adopt Some New Metrics*, FORBES (July 16, 2013, 10:24 AM), http://www.forbes.com/sites/peterdetwiler/2013/07/16/as-solar-panel-efficiencies-keep-improving-its-time-to-adopt-some-new-metrics/; *see also* ERIC LANTZ, MAUREEN HAND & RYAN WISER, NAT'L RENEWABLE ENERGY LAB., THE PAST AND FUTURE COST OF WIND ENERGY 5 (2012), *available at* http://www.nrel.gov/docs/fy12osti/54526.pdf ("Over the

the average consumer will pay less per unit and will need to purchase fewer total units to achieve the same amount of energy generation as a renewable system purchased only a few years before.

The cost of solar has decreased more than 50% since 2008.[80] Photovoltaic (PV) panels, the technology used for solar panels most commonly found on rooftops, have fallen in price "from $3.80/watt in 2008 to $0.86/watt in 2012"[81] to between $0.69/watt and $0.73/watt in 2014.[82] The PV panel costs are known as "hard costs," but there are also "soft costs" associated with solar energy.[83] Soft costs include financing, installation, interconnection, permitting, legal services, and labor.[84] As solar panel costs fall, the soft costs are starting to take up a larger percentage of the price tag involved in setting up solar generation.[85] However, soft costs have seen their

past 30 years, the cost of wind energy has significantly decreased, due to both capital cost reductions and performance improvements. . . . [A]s capital costs have moderated from their 2009–2010 levels, the cost of wind energy has fallen and is now at an all-time low . . . .").

80. Silvio Marcacci, *Analysis: 50% Reduction in Cost of Renewable Energy Since 2008*, CLEANTECHNICA (Sept. 11, 2013), http://cleantechnica.com/2013/09/11/analysis-50-reduction-in-cost-of-renewable-energy-since-2008/; Zachary Shahan, *What Is the Current Cost of Solar Panels?*, CLEANTECHNICA (Feb. 4, 2014), http://cleantechnica.com/2014/02/04/current-cost-solar-panels/. The focus is on solar and wind energy because they are the most abundant of the renewables. *See* MAI ET AL., *supra* note 78, at 9 ("The United States has diverse and abundant renewable resources, including biomass, geothermal, hydropower, ocean, solar, and wind resources. Solar and wind are the most abundant of these resources.").

81. KIND, *supra* note 1, at 4.

82. *Solar Market Insight Report 2014 Q4*, SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/research-resources/solar-market-insight-report-2014-q4 (last visited Apr. 12, 2014).

83. Kelly-Detwiler, *supra* note 79.

84. *Id.*; Julia Hamm, *What Solar Success Looks Like*, 151 PUB. UTIL. FORT. 10, 11 (2013); *NREL Reports Soft Costs Now Larges Piece of Solar Installation Total Cost*, NAT'L RENEWABLE ENERGY LAB. (Dec. 2, 2013), http://www.nrel.gov/news/press/2013/5306.html.

85. Michael T. Burr, *Beyond the Meter*, 152 PUB. UTIL. FORT. 5, 6 (2014) ("Additionally, soft costs and balance-of-plant hardware now account for more than half of the price of solar systems."); Joshua S. Hill, *NREL: Soft Costs Now Largest Piece of Solar Installation Costs*, CLEANTECHNICA (Dec. 12, 2013), http://cleantechnica.com/2013/12/12/nrel-soft-costs-now-largest-piece-solar-installation-costs; Minh Le, *Help Solve Solar's Big Challenge*, U.S. DEP'T ENERGY (Dec. 2, 2013, 1:00 PM), http://energy.gov/eere/articles/help-solve-solar-s-big-challenge ("'[S]oft costs' of solar energy system . . . now account for up to 64% of the total price of installing residential solar energy systems in the United States.").

own reduction.[86] The cost of installation alone dropped 60% in five years.[87] The reduction in soft costs has come from "financial engineering"[88] and government policies that offer various incentives to promote renewables and offset the soft costs.[89]

The other factor leading to an overall increase in the cost effectiveness of renewables is the consistent improvement in the efficiency of the technology.[90] Solar efficiency is gauged by how well the panel converts sunlight into electricity.[91] In 2000, the average watt of solar had a conversion efficiency of 11%; today, that has been improved 16% to 18%.[92] The difference in percentage may seem minimal, but the difference between a 5% to 7% increase in efficiency is relatively large.[93] With an estimated annual increase of 0.3% per year, the efficiency of each new generation of solar panels will continuously improve and make solar energy more cost effective with each passing year[94]—compare this to a typical coal plant, which has been said to have already hit its efficiency peak.[95]

C. *Reliability*

A central argument against the transition to renewables and DG is the inherent intermittency of production that creates a lack of reliability in the grid.[96] This is a valid concern, in part because a

86. Kelly-Detwiler, *supra* note 79.

87. John Farrell, *The Future of Solar Economics and Policy*, INST. FOR LOCAL SELF-RELIANCE (May 30, 2014), http://www.ilsr.org/future-net-metering-distributed-solar/.

88. Kelly-Detwiler, *supra* note 79.

89. Le, *supra* note 85 ("In the most recent round of the Solar Incubator program, [the Energy Department] announced $10 million to fund outside-of-the-box ideas to lesson solar's hardware and soft costs.").

90. *See* Kelly-Detwiler, *supra* note 79 (improving the economics of the solar industry by increasing the efficiency of the solar panels).

91. *Id.*

92. *Id.*

93. *Id.* ("[A]n additional 2% from 16% to 18%, is a large relative increase, boosting overall electricity output by about 12.5% relative to the initial baseline.").

94. *Id.* ("[T]he average increase in efficiency of conventional panels is likely to improve by approximately 2% over 7 years, or an average of about 0.3% annually.").

95. *How Coal Works*, UNION CONCERNED SCIENTISTS, http://www.ucsusa.org/clean_energy/coalvswind/brief_coal.html#.VCNsLfldXO8 (last visited Feb. 22, 2014) ("But the efficiency of typical coal plants has peaked at about 33 percent, limited mostly by their steam turbines.").

96. Timothy P. Duane & Kiran H. Griffith, *Legal, Technical, and Economic*

complete switch to renewables at the current time would likely create a less reliable grid;[97] however, the lack of reliability will eventually be a losing argument.[98]

The more diverse a utility's energy portfolio is, the more reliable that system becomes.[99] Therefore, an increase in DG and incorporating various renewables into the grid would ultimately increase reliability.[100] However, a portfolio made up of only renewables is not sufficient for grid-wide reliability because of the current limits to storing generated electricity.[101] Some forms of renewables, such as hydropower and geothermal, do not have the same storage issues[102] as the more abundant wind and solar sources[103] because hydropower and geothermal are not intermittent sources of power and thus are not constrained by their ability to store electricity.[104] Currently, the capability to store electricity generated by solar and wind energy is not economically viable enough to support grid-scale capacity.[105]

Challenges in Integrating Renewable Power Generation into the Electricity Grid, 4 SAN DIEGO J. CLIMATE & ENERGY L. 1, 6–7 (2013) ("The specific characteristics of variability, intermittency, and uncertainty associated with the generating output of modern renewable generation technologies present a significant technical challenge to maintain system reliability.").

97. *See* Hari M. Osofsky & Hannah J. Wiseman, *Hybrid Energy Governance*, 2014 U. ILL. L. REV. 1, 32–33 (discussing reliability concerns related to the transition to more intermittent renewables).

98. *See* MAI ET AL., *supra* note 78, at 14 ("Renewable energy resources, accessed with commercially available renewable generation technologies, could adequately supply 80% of total U.S. electricity generation in 2050 while balancing supply and demand at the hourly level.").

99. Duane & Griffith, *supra* note 96, at 9 ("[I]ntegration of multiple resources increases system costs but also generally increases reliability by reducing the system's vulnerability to the loss of any single generator.").

100. Powers, *supra* note 58, at 600 ("If properly deployed, distributed generation systems could help improve the overall reliability of the power grid and thus pave the way for increased growth of larger renewable sources.").

101. *See* PAUL DENHOLM ET AL., NAT'L RENEWABLE ENERGY LAB., THE ROLE OF ENERGY STORAGE WITH RENEWABLE ELECTRICITY GENERATION 46 (2010), *available at* http://www.nrel.gov/docs/fy10osti/47187.pdf; Powers, *supra* note 58, at 598 ("With additional advancement, many experts think it is feasible for renewable power to fuel the entire electricity grid within a relatively short period of time.").

102. MAI ET AL., *supra* note 78, at 12.

103. *Id.* at 9.

104. DENHOLM ET AL., *supra* note 101, at 1.

105. *Id.* at 46 (discussing the issue of sufficiency of electricity storage in that there are ways to store the electricity created by wind and solar but to do so is not

The lack of storage capabilities means that there is still a place for nonrenewables.[106] However, not all nonrenewables are created equal. The use of nuclear power, efficient natural gas, and clean coal are examples of "clean" energies that can be utilized in the interim.[107] The use of these technologies is by no means an equitable substitute for renewables, but they are a better alternative to the use of fossil fuels in their current state.[108] The use of these "clean" energy generators will be necessary to varying degrees until new technologies that are economically viable to store electricity produced from renewables are created.[109] In the end, as the energy storage technology advances, the reliability argument will become more difficult to sustain.

IV. MINNESOTA INCENTIVES AND REGULATIONS FOR INCREASING RENEWABLES AND DISTRIBUTED GENERATION

Minnesota currently has policies in place intended to encourage renewables; however, the policies simultaneously support and impede renewables.[110] The policies create room for renewables in the energy industry,[111] aid in their development,[112]

economically viable).

106. *See* Charles C. Mann, *Renewables Aren't Enough. Clean Coal Is the Future*, WIRED (Mar. 25, 2014, 6:30 AM), http://www.wired.com/2014/03/clean-coal/.

107. MAI ET AL., *supra* note 78.

108. Allison Kole, *Carbon Capture and Storage: How Bad Policy Is By-Passing Environmental Safeguards*, 20 J. ENVTL. & SUSTAINABILITY L. 101, 109 (2014) ("Using CCS can potentially give a coal-fired power plant an 80–90% reduction in CO_2 emissions but would drastically reduce its efficiency and therefore require more coal to operate."); Robert C. Means, *The Climate Policy Landscape*, 4 WAKE FOREST J.L. & POL'Y 319, 324 (2014) (discussing the relative efficiency of natural gas—that it emits 40% less carbon than coal, requires 40% less energy to produce than coal, but that it's a fossil fuel and therefore still produces carbon at a higher rate than wind or solar).

109. *See* Mann, *supra* note 106 ("I don't see how we go forward without [clean coal]." (statement of Steven Chu)).

110. *See* MINN. STAT. § 216B.164, subdiv. 3a(a) (2014) ("[A] customer with a net metered facility having a capacity of 40 kilowatts or greater but less than 1,000 kilowatts that is interconnected to a public utility may elect to be compensated for the customer's net input into the utility system in the form of a kilowatt-hour credit on the customer's energy bill carried forward and applied to subsequent energy bills.").

111. *See id.* § 216B.1691. This statute lays out the percentage of "total retail electric sales to retail customers in Minnesota" that must be "generated by eligible technologies" by specific dates. *Id.* § 216B.1691, subdiv. 2. "Eligible energy

and necessitate their creation,[113] but at the same time artificially restrict their widespread application.[114] The policies in Minnesota can be improved to remove these artificial restrictions, increasing the amount of overall renewable energy while still maintaining reliability. To begin, Minnesota might adjust the current policies to better incentivize DG. Minnesota might also look to emulate other states that have more progressive policies in place.[115]

The most significant impediment to renewables is arguably the utilities themselves.[116] Utilities resist the transition to renewables for legitimate economic reasons[117] but in so doing will be the bearers of their own decline.[118] Current utility economic business models do not allow for a major shift in the dynamics of the energy industry,

technology is defined as "energy technology that generates electricity from" specific renewable energy sources. *Id.* § 216B.1691, subdiv. 1(a).

112. *See id.* § 216C.414 (discussing the "made in Minnesota" performance-based financial incentive for solar products produced and installed in Minnesota).

113. *Id.* § 216B.1691, subdiv. 2f ("[A]t least 1.5 percent of the utility's total retail electric sales to retail customers in Minnesota is generated by solar energy.").

114. *See id.* § 216B.164, subdiv. 4b ("A public utility may request the commission to limit the cumulative generation of net metered facilities under subdivisions 3 and 3a upon a showing that such generation has reached four percent of the public utility's annual retail electricity sales."); *id.* § 216B.164, subdiv. 10 ("[A] public utility *may* apply for commission approval for an alternative tariff that compensates customers through a bill credit mechanism for the value to the utility." (emphasis added)); *id.* § 216B.1691, subdiv. 10 (stating that there is a "value of solar" tariff that can set a higher value for solar produced through distributed generation than the regular retail price paid for net metering; however, the utilities have to approve the value of solar).

115. For a detailed map of metering limits for every state, see *Net Metering*, U.S. DEP'T ENERGY, http://www.usa.org/solar/solarpolicyguide/?id=17 (last visited Feb. 22, 2015).

116. *See* Anthony Allen, Comment, *The Legal Impediments to Distributed Generation*, 23 ENERGY L.J. 505, 507 (2002) (discussing "turf protection" by utilities impeding distributed generation).

117. Stephen Lacey, *The Argument for Why Utilities Should Give Up Operation Control of the Distribution Grid*, GREENTECH MEDIA (Aug. 18, 2014), http://www.greentechmedia.com/articles/read/why-utilities-should-give-up-operational-control-of-the-distribution-grid ("They're also potentially a drain on revenue as demand growth is diminished—giving utilities a reason to fight high penetrations of distributed resources.").

118. *Experts Weigh Impact of Distributed Generation on Utility Business Model*, *supra* note 13 ("Rhone Resch: I think there's a real threat to their business model. If utilities do not evolve and adapt and start providing more services, the services that their customers want, then they are at risk for losing a significant amount of market share.").

and they are therefore generally opposed to any major change.[119] However, despite their unwillingness, changes in the industry are occurring.[120]

A. Distributed Generation in Minnesota

DG is set to play a major role in the energy industry of the future. Using DG, individuals and businesses can offset their energy bill and in some cases become entirely self-sufficient with clean renewable energy for the same price or less than the cost to purchase energy from a utility.[121] Minnesota Statutes chapter 216B covers utilities and encompasses almost all the regulations and policies regarding DG in Minnesota.[122] The Minnesota DG policy has been in place, in various forms, since 1981.[123] The overall goal of the policy is "to give the maximum possible encouragement to cogeneration and small power production consistent with protection of the ratepayers and the public."[124] That being said, the thirty-year-old statute was only recently updated in an attempt to increase the impact of DG.

In 2013, Minnesota House File 729 was adopted, improving DG in the state by revising chapter 216B in several different regards.[125] Four major revisions to chapter 216B were intended to

119. Justin Gillis, *Sun and Wind Alter Global Landscape, Leaving Utilities Behind*, N.Y. TIMES, Sept. 13, 2014, at A1, *available at* LEXIS ("[S]ome utilities, fearful of losing out as the power mix changes, have started attacking rules that encourage solar panels."); *see also* Farrell, *supra* note 87 ("Utilities fighting now are fighting for a 20th century model of centralized control and comfortable monopoly profits.").

120. Rolf Nordstrom, *Minnesota's e21 Initiative Eyes a Sustainable, Carbon-Neutral Energy System for the Land of 10,000 Lakes*, GREAT PLAINS INST. (July 2, 2014), http://www.betterenergy.org/e21-RMI-blog (discussing the changes that are occurring in the industry and the work that is being done to change the current utility business models).

121. Chris Martin et al., *Why the U.S. Power Grid's Days Are Numbered*, BLOOMBERG BUS. (Aug. 22, 2013), http://www.businessweek.com/articles/2013-08-22/homegrown-green-energy-is-making-power-utilities-irrelevant.

122. *See* MINN. STAT. ch. 216B (2014).

123. *Id.* § 216B.164; ELIZABETH DORIS ET AL., NET METERING POLICY DEVELOPMENT IN MINNESOTA: OVERVIEW OF TRENDS IN NATIONWIDE POLICY DEVELOPMENT AND IMPLICATIONS OF INCREASING THE ELIGIBLE SYSTEM SIZE CAP 3 (2009), *available at* http://www.nrel.gov/docs/fy10osti/46670.pdf ("Minnesota began implementing its original a net metering policy in 1981.").

124. MINN. STAT. § 216B.164.

125. Act of May 23, 2013, ch. 85, 2013 Minn. Laws 544; *see* John Farrell,

significantly increase DG's effectiveness: (1) increase the size of the DG system eligible for net metering;[126] (2) include a value of solar standard for compensation of Solar PV;[127] (3) create policies to guide the production of community solar gardens; and (4) establish the Made in Minnesota Solar Thermal Rebate and Solar Thermal Production Credit.

1. Net Metering

Traditionally, the main policy tool for incentivizing DG in Minnesota (and the rest of the United States)[128] has been net metering. Net metering is a way "to keep track of the amount of electricity that flows to and from a customer."[129] The net metering statute then requires the utilities to pay the DG owners for the energy they produce.[130] In practice, the owner of the DG system is billed only for the energy consumed, which is offset by the energy produced through DG.[131]

The DG owner's energy is valued at the average "retail electricity rate."[132] This essentially means that the energy created by the owner is given the same value as the energy created by the utilities.[133] If excess energy is created, the owner is given a bill credit

Minnesota's New (Standard Offer) Solar Energy Standard, GRIST (May 28, 2013), http://grist.org/article/minnesotas-new-standard-offer-solar-energy-standard/.

126. MINN. STAT. § 216B.164, subdiv. 3a(a) ("[A] customer with a net metered facility having a capacity of 40 kilowatts or greater but less than 1,000 kilowatts that is interconnected to a public utility may elect to be compensated for the customer's net input into the utility system in the form of a kilowatt-hour credit . . . .").

127. *Id.* § 216B.164, subdiv. 10(a) ("[A]n alternative tariff that compensates customers through a bill credit mechanism for the value to the utility, its customers, and society for operating distributed solar photovoltaic resources interconnected to the utility system and operated by customers primarily for meeting their own energy needs.").

128. Powers, *supra* note 58, at 635 (discussing the dominance of net metering in the United States).

129. Warren, *supra* note 2, at 372.

130. MINN. STAT. § 216B.164, subdiv. 3(a).

131. Bill Ehrlich, *Net-Metering vs. Value of Solar Tariff (VOST)*, MOSAIC (Apr. 14, 2014), https://joinmosaic.com/blog/net-metering-vs-value-solar-tariff-vost/.

132. Powers, *supra* note 58, at 637.

133. *Id.* ("The existence of net metering thus allows a homeowner to earn full retail rates (which are often at least 3 times higher than wholesale rates) for much of the power she produces from her rooftop solar system.").

that is applied to the next month's bill.[134] At the end of the year any excess bill credit is credited at the avoided cost rate,[135] which is essentially zero, leaving the owner empty handed for the excess produced. For example, if the owner produced more energy than he, she, or it used during the year, the excess energy would only be credited back at a rate that is close to zero, instead of the retail energy rate.

The former statute set the limit at which a DG system could be net metered at a forty-kilowatt capacity.[136] Thus, if an individual or business owned a DG system larger than forty-kilowatts, they were not eligible for net metering. It has been shown that "[c]apacity limits can greatly restrict the expansion of on-site renewable generation and restrain the market for new renewable energy systems."[137] This restriction limited the use of DG for commercial and industrial customers that needed a system larger than forty-kilowatt to have an appreciable effect on their energy bill.[138] Minnesota House File 729 increased the eligible size of a DG system to 1000 kilowatts and in so doing made DG economically practical for commercial and industrial customers.[139] However, the increase only affects DG owners connected to a "public utility."[140] The public utilities are the large, for-profit utility companies in the state, such

134. MINN. STAT. § 216B.164, subdiv. 3a ("[A] customer . . . may elect to be compensated for the customer's net input into the utility system in the form of a kilowatt-hour credit on the customer's energy bill carried forward and applied to subsequent energy bills.").

135. *Id.* ("Any net input supplied by the customer into the utility system that exceeds energy supplied to the customer by the utility during a calendar year must be compensated at the applicable rate."); *Net Metering*, *supra* note 115.

136. MINN. STAT. § 216B.164 (2004).

137. DORIS ET AL., *supra* note 123, at 9.

138. *See id.* at 21 ("Should the net metering system size cap be increased in Minnesota, commercial and industrial consumers may be more likely to install larger systems in order to take advantage of available these [sic] federal credits and to offset a greater percentage of their electricity load.").

139. *Id.*

140. MINN. STAT. § 216B.164, subdiv. 3a (2014) ("[A] customer with a net metered facility having a capacity of 40 kilowatts or greater but less than 1,000 kilowatts that is interconnected to a *public utility* may elect to be compensated . . . ." (emphasis added)). *See generally* Davide Savenije, *Why Invester-Owned Utilities Should Fear Munis and Co-ops*, UTILITY DIVE (Mar. 27, 2013), http://www.utilitydive.com/news/why-investor-owned-utilities-should-fear-munis-and-co-ops/114574/ (noting that public utilities are also referred to as investor-owned utilities (IOU)).

as Xcel Energy and Otter Tail Power Company.[141] The other two forms of utility in the state, municipal owned utilities (municipals) and cooperative electrical associations (cooperatives), are exempt from the net metering kilowatt increase.[142]

Exempting municipals and cooperatives reduced the incentive to net meter for a large percentage of the state's electricity customers.[143] Forty-three percent of residential customers in Minnesota belong to a municipal or a cooperative.[144] Thirty-six percent of commercial customers in the state belong to a municipal or a cooperative.[145] Eighty-two percent of industrial customers in the state belong to a municipal or cooperative.[146] Taken inversely, only 57% of the residential customers, 64% of the commercial customers, and 18% of the industrial customers statewide are incentivized by the increase in the kilowatt limit. As a result, 42% of the electric customers in Minnesota have little to no incentive to switch to DG.[147] This is contrary to the net metering policy goal of maximizing encouragement for DG.[148] Increasing the limit for

141. *See generally* MINN. STAT. § 216B.02, subdiv. 4 ("'Public utility' means persons, corporations, or other legal entities . . . operating, maintaining, or controlling in this state equipment or facilities for furnishing at retail natural, manufactured, or mixed gas or electric service to or for the public or engaged in the production and retail sale thereof but does not include (1) a municipality or a cooperative electric association . . . .").

142. *Compare id.* § 216B.164, subdiv. 3(a), *with id.* § 216B.164, subdiv. 3(b).

143. *See Meet Minnesota's Municipal Utilities,* MINN. MUN. UTIL. ASS'N, http://www.mmua.org/about/utilities.htm (last visited Feb. 22, 2015). There are approximately 2,294,000 residential customers connected to a municipal owned utility, cooperative, or public utility. *Id.* Approximately 994,000 of those are connected to municipal owned utilities or cooperatives. *Id.*

144. *Id.*

145. *Id.* There are approximately 266,000 commercial customers connected to a municipally owned utility, Cooperative, or public utility. *Id.* Approximately 97,000 of those are connected to municipal owned utilities or cooperatives. *Id.*

146. *Id.* There are approximately 8700 industrial customers connected to a municipal owned utility, cooperative, or public utility. *Id.* Approximately 7200 of those are connected to a municipal owned utility or cooperative. *Id.*

147. *Id.* Minnesota has approximately 2,568,700 total electric customers. Approximately 1,098,200 of them are connected to municipal owned utilities or cooperatives. *Id.*

148. MINN. STAT. § 216B.164, subdiv. 1 (2014) ("This section shall at all times be construed in accordance with its intent to give the maximum possible encouragement to cogeneration and small power production consistent with protection of the ratepayers and the public.").

municipals and cooperatives would increase the incentive to switch to DG for all those currently being excluded.[149]

The increase in DG systems allowed to net meter also came with a caveat: "A public utility may request the [PUC] to limit the cumulative generation of net metered facilities . . . upon a showing that such generation has reached 4% of the public utility's annual retail electricity sales."[150] This works as a possible aggregate cap on the amount of DG that will be allowed within the state and, if upheld by the PUC, would further disincentivize DG.[151] The PUC will consider several different criteria on which to base its decision,[152] but it can only limit additional net metering upon a determination that "additional net metering obligations would cause [a] significant rate impact, require significant measures to address reliability, or raise significant technical issues."[153] In a recent study conducted by the Lawrence Berkley National Laboratory, it was found that a 10% penetration rate for net-metered PV solar would equate to roughly a 3% increase for all ratepayers.[154] Using the laboratory's numbers puts the rate increase at below 1.5% for ratepayers in Minnesota once a 4% cap is reached.[155] Whether 1.5% qualifies as a "significant rate increase" would be up to the PUC to determine.

149. DORIS ET AL., *supra* note 123, at i.

150. MINN. STAT. § 216B.164, subdiv. 4b.

151. Chris Clarke, *Report: California Should Remove Limits on Net Metered Solar*, KCET (Feb. 25, 2013, 3:30 PM), http://www.kcet.org/news/rewire/utilities/report-california-should-remove-limits-on-net-metered-solar.html; *see also* AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., *supra* note 16 ("Limits on individual and aggregate system capacities can prevent system owners from installing the most efficient or cost-effective systems, and sometimes even prevent them from meeting on-site load requirements.").

152. MINN. STAT. § 216B.164, subdiv. 4b ("[T]he commission shall consider: (1) the environmental and other public policy benefits of net metered facilities; (2) the impact of net metered facilities on electricity rates for customers without net metered systems; (3) the effects of net metering on the reliability of the electric system; (4) technical advances or technical concerns; and (5) other statutory obligations imposed on the commission or on a utility.").

153. *Id.*

154. ANDREW SATCHWELL ET AL., ERNESTO ORLANDO LAWRENCE BERKELEY NAT'L LAB., FINANCIAL IMPACTS OF NET-METERED PV ON UTILITIES AND RATEPAYERS: A SCOPING STUDY OF TWO PROTOTYPICAL U.S. UTILITIES 60 (2014), *available at* http://emp.lbl.gov/sites/all/files/LBNL%20PV%20Business%20Models%20Report_no%20report%20number%20%28Sept%2025%20revision%29.pdf.

155. A 3% increase at 10% penetration equals a 1.5% increase at 5%

Another method being applied in some states is to limit net metering not by kilowatt, but by demand.[156] Colorado and the District of Columbia have set the limit for net metering at 120% of demand, and in so doing have created a limit based on the need of the customer.[157] This strategy has the benefit of allowing net metering of any size based on consumption. It thus does not arbitrarily exclude those who may need a larger system. Minnesota could follow the lead of these jurisdictions and base the limit on the level of demand. This would further the goal of maximizing encouragement for DG by allowing net metering for all industries.

Net metering also has the distinct benefit in that it creates RECs that the customer is entitled to and can be purchased by the utility.[158] Thus, increasing limits for capacity allowed to net meter, while also increasing the limits for the aggregate amount of net metering and including municipals and cooperatives within the net metering statutory framework, would lead to the creation of more RECs for the utilities to purchase and thus add to the utilities' renewable portfolio standards.

2. *Value of Solar*

The most innovative new policy to come out of the revisions to Minnesota Statutes chapter 216B is also, arguably, the most controversial. The value of solar tariff allows utilities to set a value for PV solar energy produced by DG as an alternative to the net metering retail rate.[159] The valuation of solar works in essentially the same way as net metering; a solar energy producer is charged for the energy consumed and is credited back for the energy produced from the PV solar.[160] However, there are three main

penetration. Thus, a 4% penetration would be under a 1.5% increase.

156. *Net Metering*, *supra* note 115.

157. *See id.*

158. *In re* Commission Inquiry into Ownership of Renewable Energy Credits Used to Meet Minnesota Requirements at 1, 6, E-999/CI-13-720 (Minn. P.U.C. July 22, 2014).

159. MINN. STAT. § 216B.164, subdiv. 10(b) (2014) ("The alternative tariff is in lieu of the applicable rate under subdivisions 3 and 3a.").

160. *Id.* § 216B.164, subdivs. 10(c)(3)–(4) ("[C]harges the customer for all electricity consumed by the customer at the applicable rate schedule for sales to that class of customer; credits the customer for all electricity generated by the solar photovoltaic device at the distributed solar value rate established under this subdivision . . . .").

differences between net metering and the value of solar: (1) the energy produced from PV solar is credited back at the value of solar rate;[161] (2) the value of the solar rate can be locked in by a twenty-five year contract;[162] and (3) the value of solar produces RECs that transfer directly to the utilities.[163]

The value of solar rate is calculated by the utility and must include "the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value."[164] The methodology, as well as the final value attributed to solar, are then subject to the approval of the PUC,[165] but the final decision to implement the value is in the hands of the utilities themselves. Value of solar is considered innovative because of the inclusion of externalities in the calculation, such as the avoided environmental, fuel, and new power plant purchase costs.[166]

The twenty-five year contract has benefits for both the utilities and the solar energy producer.[167] For producers, it helps to secure financing.[168] A producer is more likely to be able to secure a loan for the PV solar system if there is a guaranteed return on the investment. With a twenty-five year contracted rate of return for the energy produced, the investment becomes financially secure and borrowing costs are lowered.[169] There is an additional benefit in the fact that the current value of solar rate is projected to be greater than the retail rate.[170] So, initially, the producer will pay for energy at the retail rate and will receive a higher rate for the energy produced from the PV solar.

161. *Id.* § 216B.164, subdiv. 10(c)(5).

162. *See id.* § 216B.164, subdiv. 10(k) ("[A] term of at least 20 years . . ."); JOHN FARRELL, INST. FOR LOCAL SELF-RELIANCE, MINNESOTA'S VALUE OF SOLAR: CAN A NORTHERN STATE'S NEW SOLAR POLICY DEFUSE DISTRIBUTED GENERATION BATTLES?, iii (2014), *available at* http://www.ilsr.org/wp-content/uploads/2014/04/MN-Value-of-Solar-from-ILSR.pdf (discussing the value of the 25-year contract).

163. MINN. STAT. § 216B.164, subdiv. 10(i).

164. *Id.* § 216B.164, subdiv. 10(f).

165. *Id.* § 216B.164, subdiv. 10(e).

166. *See* John Farrell, *Could Minnesota's "Value of Solar" Make Everyone a Winner?*, INST. FOR LOCAL SELF-RELIANCE (Mar. 13, 2014), http://www.ilsr.org/minnesotas-value-solar-winner/ (discussing the adoption of externalities in the value of solar calculation).

167. *See id.*

168. *See id.*

169. FARRELL, *supra* note 162, at 6.

170. *Id.*

The benefit to the utilities from the contract comes with time. The retail rate for energy has historically risen every year, recently measured at an increase of 4%–5% per year.[171] The value of solar rate, on the other hand, is locked in for twenty-five years.[172] Over time, the utilities will be paying less for the value of solar than they will for the retail rate.[173]

This scenario, while a benefit for the utilities, has split the support for the value of solar. Under the statute, the value of solar is to be recalculated and approved every year.[174] It has been projected that because of the annual recalculation, the value of solar will actually introduce more uncertainty, not less.[175] The uncertainty created by the annual recalculation is predicted to dissuade any long-term investors from entering the market.[176] The statute also requires that the value of solar remain above the retail rate for the first three years.[177] Due to this, it is predicted that there will be a significant boom and bust if the utilities choose to implement the value of solar.[178] For the first three years, while the value of solar is required to be higher than the retail rate, the industry will see rapid growth.[179] After the three-year period, the utilities will recalculate a value of solar rate that is less than the retail rate, and the financial incentive will disappear, along with the investors.[180]

During the legislative process, several compromises were made to get the value of solar legislation passed.[181] One of the compromises was to give the RECs created using the value of solar

171. *Id.* at 14.

172. *Id.* at i.

173. *Id.* at 15.

174. MINN. STAT. § 216B.164, subdiv. 10(h) (2014).

175. 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/.

176. Yann Brandt, *Does VOST=FiT, What Is a Value of Solar Tariff (VOST)?*, SOLARWAKEUP, http://www.solarwakeup.com/2014/02/25/does-vostfit-what-is-a-value-of-solar-tariff-vost/ (last visited Feb. 22, 2015); *see also* Jossi, *supra* note 175.

177. MINN. STAT. § 216B.164, subdiv. 10(j).

178. Anne Smart, *Value of Solar Tariffs (VOSTs) Are Value of Solar Taxes*, HUFFINGTON POST (MAR. 28, 2015, 5:14 PM), http://www.huffingtonpost.com/anne-smart/value-of-solar-power-tariffs-_b_5051448.html.

179. *Id.*

180. *See id.*

181. FARRELL, *supra* note 162, at i–ii.

directly to the utilities.[182] RECs created through the value of solar directly benefit utilities by making more RECs available to reach their renewable energy standards at no additional costs to the utility.

Another compromise to get the value of solar passed was the amendment to continue to allow the utilities to make the final determination of whether to implement the value of solar.[183] This compromise created yet more controversy. Giving the utilities the decision to use the value of solar completely removes the power from the consumer.[184] The statutory language provides that the value of solar is "in lieu of" the retail rate for net metering.[185] Thus, if a utility decides to use the value of solar, the option to net meter will no longer be available to consumers. Removing the option to net meter has removed a benefit of DG, the democratization of the energy grid.[186] When people produce their own power, it reduces their dependence on utilities and, in return, gives them greater political and economic power to challenge the utilities' monopoly.[187] This power is lost when utilities are allowed to make decisions for the consumer.[188]

The most current controversy is the possibility of being taxed on income generated through the value of solar tariff.[189] The purchase of power produced from solar generators by utilities has created the following question: does this qualify as income, and can it therefore be taxed?[190] The IRS is in the process of formally reviewing the value of solar tariffs to determine the answer to this question.[191] It is because of these controversies that many solar

182. *Id.* at 16; *see also* MINN. STAT. § 216B.164, subdiv. 10(i).

183. FARRELL, *supra* note 162, at 14.

184. Andy Colthorpe, *TASC: Minnesota Value of Solar Tariff Will 'Entrench Monopoly' of Utilities*, PV-TECH (Apr. 21, 2014), http://www.pv-tech.org/news/tasc_minnesota_value_of_solar_tariff_will_entrench_monopoly_of_utilities.

185. MINN. STAT. § 216B.164, subdiv. 10(b).

186. *See* John Farrell, *Solar and the New (Democratic) Energy Economy*, INST. FOR LOCAL SELF-RELIANCE (Sept. 19, 2014), http://www.ilsr.org/solar-new-energy-economy/.

187. *Id.*

188. *See id.*

189. *See* Edgar Meza, *IRS to Review Value of Solar Tariffs in Austin, Texas*, PV MAG. (Sept. 25, 2014), http://m.pv-magazine.com/news/details/beitrag/irs-to-review-value-of-solar-tariffs-in-austin–texas_100016561/.

190. *See id.*

191. *Id.*

advocate groups are against the value of solar tariffs.[192] It is their opinion that net metering was working just fine for growing the solar market, so why fix what was not broken?[193]

The success or failure of the value of the solar tariff in Minnesota may help other states to determine whether the value of solar should be adopted in their state and, if adopted, what characteristics the value of solar should have. In Minnesota, the compromises made to get the value of solar bill enacted changed the bill from its original form and, in the process, reduced some of the benefits to the consumer.[194] However, the purpose behind the value of solar, determining a market-based price around environmental value, still exists.[195] The final question remains: will any Minnesota utilities actually implement a value of solar tariff once a price is determined?[196]

3. Community Solar Gardens

The central argument against DG and net metering is the cycle mentioned previously.[197] The more people who begin to use DG and net meter, the higher the rates will increase for those who do not.[198] Those who do not use DG are: (1) those who cannot afford the hefty upfront costs associated with implementing a DG system,[199] (2) those who do not "own a home with a structurally

192. *See, e.g.*, *id.*

193. *See* Will Craven, *Why Solar Net Metering Beats a Value-of-Solar Tariff Every Time*, GRIST (May 12, 2014), http://grist.org/article/why-solar-net-metering-beats-a-value-of-solar-tariff-every-time/; Amanda H. Miller, *Could FITs Be a Bad Fit for the U.S.*, RENEWABLE ENERGY WORLD (Aug. 30, 2013), http://www.renewableenergyworld.com/rea/blog/post/2013/08/could-fits-be-a-bad-fit-for-the-u-s.

194. FARRELL, *supra* note 162, at 8–11.

195. *See* Farrell, *supra* note 16.

196. *See Value of Solar Tariff Methodology*, MINN. DEP'T COMMERCE, http://mn.gov/commerce/energy/businesses/energy-leg-initiatives/value-of-solar-tariff-methodology%20.jsp (last visited Feb. 22, 2015). Xcel Energy is the first utility to create a methodology for calculating the value of solar and the first utility to have their value of solar methodology approved by the PUC, but the tariffs adoption by the utilities is voluntary. Dan Haugen, *Minnesota Becomes First State to Set 'Value of Solar' Tariff*, MIDWEST ENERGY NEWS (Mar. 12, 2014), http://www.midwestenergynews.com/2014/03/12/minnesota-becomes-first-state-to-set-value-of-solar-tariff/.

197. *See generally* Holden, *supra* note 41.

198. *See id.*

199. Powers, *supra* note 58, at 639 ("For many people, the upfront costs of renewable technology are prohibitively expensive.").

suitable roof,"[200] or (3) those whose homes do not receive enough sunlight or wind to make DG economically viable.[201] The percentage of individuals who fall into one of these three categories is estimated to be 75% of the population.[202] The solution to these issues may be in Minnesota's new community solar garden statute.[203]

A community solar garden is defined by statute as "a facility that generates electricity by means of a ground-mounted or roof-mounted solar photovoltaic device whereby subscribers receive a bill credit for the electricity generated in proportion to the size of their subscription."[204] Put another way, a community solar garden is "owned, developed, or controlled—in full or in part—by residents of the community in which the project is located."[205] In practice, the residents are purchasing a subscription to a percentage of the energy produced by the community solar garden and selling that percentage to the utility.[206] The individual who purchases the subscription to the energy will receive an energy credit at the applicable retail rate, until a value of solar rate is adopted.[207] Under the current program, that same individual will receive a specified amount per kilowatt-hour (kWh) from the utilities for the RECs created through their percentage of the community solar garden.[208] Anyone located within, or contiguous to, a county that has a community solar garden can offset their energy use with solar

200. Samantha Booth, Comment, *Here Comes the Sun: How Securities Regulations Cast a Shadow on the Growth of Community Solar in the United States*, 61 UCLA L. REV. 760, 768 (2014) ("The most glaring deficiency of the residential model is that an individual must own a home with a structurally suitable roof as a prerequisite to solar ownership.").

201. *See id.* at 768–69 (discussing siting issues with residential solar).

202. *See id.* at 774.

203. *See generally* MINN. STAT. § 216B.1641 (2014).

204. *Id.* § 216B.1641(b).

205. Deborah Behles, *From Dirty to Green: Increasing Energy Efficiency and Renewable Energy in Environmental Justice Communities*, 58 VILL. L. REV. 25, 45 (2013).

206. *See* MINN. STAT. § 216B.1641(b).

207. *Id.* § 216B.1641(d).

208. *Id.* § 216B.164, subdiv. 10(i); Order Approving Solar-Garden Plan with Modifications at 1, 5, Docket No. E-002/M-13-867 (Minn. P.U.C. Sept. 17, 2014); John Farrell, *Community Solar Gardens Sprouting in Minnesota*, INST. FOR LOCAL SELF-RELIANCE (Apr. 22, 2014), http://ilsr.org/community-solar-gardens-sprouting-minnesota/ (discussing the REC compensation rates and how the REC rates are not eligible if Made in Minnesota was used for a community solar garden project).

energy through a subscription.[209] The individual can also choose to purchase only a limited amount of energy,[210] up to 120% of their current demand, making it a solar option that is far less cost restrictive.

By statute, Xcel Energy was required to create a community solar garden program.[211] The plan Xcel created was subsequently approved by the PUC on September 17, 2014.[212] However, plans to build community solar gardens had been in the works long before then.[213] On December 12, 2014, Xcel opened the door for community solar gardens, and within one week, Xcel received over 400 applications from solar developers.[214] Unfortunately, Xcel was the only utility required to present a community solar garden plan, although a few cooperatives have started their own.[215] Therefore, to purchase energy from a community solar garden, the individual must be within Xcel's territory or the territories of the few other utilities on board. By only requiring Xcel to offer community solar gardens, the majority of the state is currently without the community-garden option. A revision in which all public utilities, or all utilities generally, are required to offer community solar programs would give electricity customers across the state equal opportunity access to community solar.

For now it is up to each individual utility to decide for itself if it wants to introduce programs of its own.[216] Choosing to do so could have distinct benefits for the utilities. Under the statute, the utilities are allowed to develop their own community gardens.[217] If utilized,

209. MINN. STAT. § 216B.1641(c).

210. *See id.* § 216B.1641(b) ("Each subscription shall be sized to represent at least 200 watts of the community solar garden's generating capacity . . . .").

211. *Id.* § 216B.1641(a).

212. Order Approving Solar-Garden Plan with Modifications, *supra* note 208.

213. *See* David Shaffer, *First Solar Garden in Minneapolis Sold Out*, STAR TRIB. (Minneapolis), Feb. 18, 2014, at 07A, *available at* 2014 WLNR 4523394.

214. David Shaffer, *Xcel Energy Gets 427 Solar Garden Applications*, STAR TRIB. (Minneapolis), Dec. 20, 2014, at 01D, *available at* 2014 WLNR 36305496.

215. Bryna Godar, *Community Solar Spreads Across State*, POSTBULLETIN.COM, http://www.postbulletin.com/business/community-solar-spreads-across-state/article_9ae6ab7e-ad35-55fb-bb58-e8417cdb0f91.html (last updated Nov. 5, 2014, 1:36 AM)

216. MINN. STAT. § 216B.1641(a) ("Other public utilities may file an application at their election.").

217. *Id.* ("The owner of the community solar garden may be a public utility or any other entity or organization that contracts to sell the output from the community solar garden to the utility under section 216B.164.").

this simple fact has the potential to catalyze a transition for utilities from being DG's largest opponent to one of its supporters. By allowing utilities to purchase and operate community solar gardens, it enables them to enter the DG market on their own.[218] Utilities fear DG because it costs them customer sales, which in turn lowers their bottom line and forces them to increase other customers' rates.[219] If a utility becomes the owner of a community solar garden, there is no loss of customer sales; the current customers simply transition to the community solar system and continue to pay the utility.

Another benefit for those utilities that choose to invest in their own community solar garden is a reduction in transmission costs. An inherent benefit of DG is lowered transmission costs.[220] The closer an individual is to the source of the energy, the less the cost of transmitting the energy.[221] For example, the cost of sending energy from the Prairie Island Nuclear Power Plant to homes across Minnesota is going to cost more in transmission than sending energy from a community solar garden within Bloomington, Minnesota to other homes in Bloomington, Minnesota.[222] Utilities would receive the benefit of lowering their transmission costs without losing customer sales, conceivably increasing their bottom line.

The community solar garden statute does not restrict the aggregate total number of gardens, distinct from the 4% cap that limits the application of the net metering.[223] Because of this, the number of community solar gardens allowed within the state is

218. Jeff St. John, *Survey: Utilities See Threat, Opportunity in Distributed Generation*, GREENTECH MEDIA (Aug. 13, 2014), http://www.greentechmedia.com/articles/read/Utilities-See-Threat-Opportunity-in-Distributed-Generation.

219. David Roberts, *Solar Panels Could Destroy U.S. Utilities, According to U.S. Utilities*, GRIST (Apr. 10, 2013), http://grist.org/climate-energy/solar-panels-could-destroy-u-s-utilities-according-to-u-s-utilities/ ("As ratepayers opt for solar panels (and other distributed energy resources like micro-turbines, batteries, smart appliances, etc.), it raises costs on other ratepayers and hurts the utility's credit rating.").

220. Warren, *supra* note 2, at 363 ("Distributed generation can be less expensive because few or no transmission lines need to be built to distribute the electricity, and as technology has improved manufacturing costs have decreased.").

221. *See id.*

222. *See generally id.*

223. *Compare* MINN. STAT. § 216B.1641 (2014), *with id.* § 216B.164, subdiv. 4b.

unlimited. On the other hand, the community solar garden statute restricts systems' sizes to the same 1000 kWh (1MW) capacity limit to which net metering is held.[224] It also restricts the allotment of ownership to 40% of the total shares for a single customer and requires at least five subscribers per garden.[225] These provisions were created with the intention of keeping large customers from crowding out opportunities for smaller, more residential ownership.[226]

Having a 40% ownership cap may seem limiting; however, the PUC revised the definition of community solar garden sites, stating that multiple sites "situated in close proximity to one another can share distribution infrastructure."[227] The PUC also states that a customer can subscribe to multiple community solar gardens.[228] This allows solar customers to subscribe to multiple solar gardens that may be located in close proximity to each other to achieve greater solar production.[229]

For this policy to be effective, there needs to be more than one community solar garden in a semi-local area to which customers can subscribe. Because the development of community solar gardens is in its early stages, only a limited number of community solar gardens exist across the state.[230] It is also unknown how long it will be before enough solar gardens become available for a customer to subscribe to more than one garden, or if community solar gardens will even be available to every Xcel customer.

One solution may be to increase the 1000 kWh limit to allow for a greater amount of kWh for the percentage purchased per customer. This increase would also benefit utilities that manufacture and maintain their own community solar gardens by allowing them to build larger facilities.

224. MINN. STAT. § 216B.1641(b).

225. *Id.* § 216B.1641(a).

226. *See* Order Approving Solar-Garden Plan with Modifications, *supra* note 208, at 10–11.

227. *Id.* at 15.

228. *Id.* at 11.

229. *Id.*

230. David Boyd, *Minnesota Solar Gardens: Progress Report*, ENERGYBIZ, Sept.–Oct. 2014, at 41, 41, *available at* http://energycentral.fileburstcdn.com/EnergyBiz Magazine/2014/SeptOct14.pdf.

4. *Made in Minnesota*

As the name implies, the Made in Minnesota (MiM) solar incentive program is for PV solar[231] and solar thermal[232] systems that are manufactured here in Minnesota.[233] MiM is a lottery-based system[234] where applicants hope to be awarded one of two incentives.[235] The solar thermal project incentive is a direct 25% rebate on the installed project costs.[236] For PV projects, the production incentive is a dollar amount equivalent to the amount per kWh produced. The per kWh incentive rate is set based on a variety of factors, including the qualifying solar panel's size, panel manufacturer, and the type of owner who qualifies.[237] In addition, because the incentive is paid for by the utilities, the incentive program creates RECs that are transferred directly to the utilities.[238]

The programs have been shown to be effective,[239] but there is room for improvement. The 25% solar-thermal rebate program is limited, depending on the type of producer: $2500 for residential, $5000 for multiple family, and $25,000 for industrial projects.[240] The solar PV production incentive is only allowed for systems under forty kilowatts,[241] even though many commercial and industrial customers can utilize systems up to twenty-five times greater under the net metering statute.[242] Further, the PV

231. MINN. STAT. § 216C.413, subdiv. 1(1).
232. *Id.* § 216C.416, subdiv. 1.
233. *Id.* § 216C.411(a)(1).
234. *Id.* § 216C.415, subdiv. 2.
235. *See id.* § 216C.416, subdiv. 3.
236. *Id.*
237. *Made in Minnesota Solar Energy Production Incentive*, DATABASE ST. INCENTIVES FOR RENEWABLES & EFFICIENCY, http://programs.dsireusa.org/system/program/detail/5418 (last updated Jan. 7, 2015).
238. *Id.*
239. Elizabeth Dunbar, *Strong Solar Power Demand Outstripping Minnesota Subsidy Program*, MINN. PUB. RADIO NEWS (Mar. 7, 2014), http://www.mprnews.org/story/2014/03/07/solar-power-demand-minnesota.
240. MINN. STAT. § 216C.416, subdiv. 3. ("The maximum rebate for a single family residential dwelling installation is the lesser of 25 percent of the installed cost of a complete system or $2,500. The maximum rebate for a multiple family residential dwelling installation is the lesser of 25 percent of the installed cost of a complete system or $5,000. The maximum rebate for a commercial installation is the lesser of 25 percent of the installation cost of the complete system or $25,000.").
241. *Id.* § 216C.415, subdiv. 1.
242. *See id.* § 216B.164, subdiv. 3a.

production incentive is capped at $15 million a year.[243] Both the solar thermal rebate and the solar PV production incentive are only available to public utility customers, again leaving out the substantial portion of Minnesota's electric customers served by municipals and cooperatives.[244]

The solar PV production incentive in particular has been demonstrated to be in high demand.[245] In 2013, 282 residents applied for the program, and 251 (89%) were funded.[246] For commercial applicants, only 39% were funded.[247] In total, 12 megawatts were applied for, and if all applicants had been funded, it "would have doubled the amount of solar capacity in the state in 2013 in one year."[248] This illustrates the overwhelming demand for the MiM program, and the barriers presented by its limited funding.

Increasing these incentives would not be financially difficult. The MiM incentives are paid from funds provided by utility companies' spending on energy conservation improvements.[249] By statute, each public utility is required to use "1.5[%] of its gross operating revenues from service provided in the state," and 2% for Xcel, to "spend and invest for energy conservation improvements."[250] The utilities are required to place 5% of these funds into the MiM account to be used for the incentives.[251] The MiM incentives account for, at most, 0.1% of a utility's gross operating revenue. Doubling MiM annual expenditures to $30 million would help to meet the established demand, at a cost of just 0.2% of the gross operating revenue.

Including municipals and cooperatives would be manageable because they already have their own conservation improvement funds.[252] The municipal and cooperative conservation improvement

243. *Id.* § 216C.412, subdiv. 2(b).

244. *See id.* § 216C.412, subdiv. 2.

245. Dunbar, *supra* note 239.

246. Frank Jossi, *Businesses Flock to 'Made in Minnesota' Solar Program*, MIDWEST ENERGY NEWS (Oct. 10, 2014), http://www.midwestenergynews.com/2014/10/10/businesses-flock-to-made-in-minnesota-solar-program/.

247. *Id.*

248. *Id.*

249. MINN. STAT. § 216C.412.

250. *Id.* § 216B.241, subdiv. 1a.

251. *Id.* § 216C.412, subdiv. 2.

252. *See id.* § 216B.241, subdiv. 1b.

funds mirror the public utility's funds at 1.5%.[253] Earmarking 5% or 10% of that fund for MiM would open up 42% of the electric customers in the state[254] to increased incentives for solar energy.

Due to the fact that the MiM incentive is capitalized from an existing program fund, with specific caps on the overall expenditure, expanding the percentage allocated to MiM would not affect the bottom lines of either the public utilities or the municipals and cooperatives. While an increase in the percentage allotted to MiM necessarily decreases investments in other programs, the MiM incentive program has two distinct advantages. First, MiM is beneficial to the utilities, allowing for the creation of additional RECs that are diverted directly to the utilities. Second, it is in high demand with the solar producers, who reap the direct benefits. Alternatively, policymakers wishing to avoid diverting money from other programs could push for an overall increase in the percentage allotted to the conservation improvement funds of public utilities, cooperatives, and municipals.

V. ADJUSTING THE BUSINESS MODEL

A central argument made by utilities against DG and increasing net metering and community solar limits is the same argument pointed to throughout this Note: as more individuals use DG, rates will rise faster for others who are still solely dependent on the utilities.[255] The rise of DG is essentially a foregone conclusion,[256] but the increase in rates is not. Utilities can remain cost effective without increasing the rates of those who have not transitioned to DG, through various means.[257] Two of the main recommendations

253. *Id.* (requiring municipalities to spend 1.5% of gross revenues from the sale of electricity and cooperatives to spend 1.5% of gross operating revenues from all service in the state on energy improvements).

254. *Meet Minnesota's Municipal Utilities*, *supra* note 143; *see supra* note 147 and accompanying text.

255. Holden, *supra* note 41.

256. *Experts Weigh Impact of Distributed Generation on Utility Business Model*, *supra* note 13 ("Jeff Navin: It's not a question as to whether or not there's going to be distributed generation. The question is how can regulators and utilities work to come up with a business model that allows the utilities to earn revenue and make a profit to remain viable and stable . . . .").

257. *See* Berthold Hannes & Matt Abbot, *Distributed Energy: Disrupting the Utility Business Model*, BAIN & COMPANY (Apr. 17, 2013), http://www.bain.com/publications/articles/distributed-energy-disrupting-the-utility-business-model.aspx.

are (1) for the utilities to enter the DG market[258] or (2) for the PUC and the utilities to change the existing business model.[259]

A. *Entering the Distributed Generation Market*

Utilities can enter the DG market in two ways.[260] First, utilities can start manufacturing DG systems, including rooftop solar PV, and sell or lease them to homeowners, either directly themselves or through partners.[261] Currently, the majority of the residential rooftop solar industry is occupied by third-party installers with no direct benefit to utilities.[262] "However, [entering this market] is a natural fit for utilities, as they are already selling electricity to customers."[263] Their experience gives them "proprietary system knowledge . . . brand recognition and an existing relationship with their customers."[264] Utilities in Minnesota would not be alone if they began investing in DG, as utilities in several states, such as California, Virginia, and Arizona, are already investigating the opportunity or have already invested.[265]

258. *Id.*

259. *Experts Weigh Impact of Distributed Generation on Utility Business Model*, *supra* note 13 ("Jon Wellinghoff: . . . . Utilities, I think, are going to have to change and have to evolve, and evolve in ways that they can restructure their business models to be accommodating to and consistent with this new distributed world."); *Policy Framework to Optimize Efficiency of the Electrical Energy System*, *supra* note 37, at 17.

260. *Exploring Models for Regulated Utilities to Enter the Residential Solar Distributed Generation Market,* COLUMBIA SCH. INT'L & PUB. AFF., https://sipa.columbia.edu/academics/capstone-workshops/exploring-models-for-regulated-utilities-to-enter-the-residential-solar-distributed-generation (last visited May 1, 2015).

261. *See id.*

262. Omar Arriaga et al., *Utilities Can Win by Entering the Distributed Solar Market*, EDGE NOTES (Mar. 5, 2014) https://centers.fuqua.duke.edu/edgenotes/2014/03/05/utilities-can-win-by-entering-the-distributed-solar-market/.

263. *Id.*

264. Coley Girouard & Frank Swigonski, *STATE: Arizona Regulators Ponder Utility-Owned Rooftop Solar While Competitors Object to Monopoly Advantages*, ADVANCED ENERGY ECON. (Nov. 20, 2014 3:21 PM), http://blog.aee.net/state-arizona-regulators-ponder-utility-owned-rooftop-solar-while-competitors-object-to-monopoly-advantages.

265. Nichola Groom, *Big Utilities Pushing into Booming Home Solar Market*, REUTERS, Oct. 22, 2014, *available at* http://www.reuters.com/article/2014/10/22/us-utilities-solar-idUSKCN0IB16I20141022; Arriaga et al., *supra* note 262; David Savenije & Ethan Howland, *Are Utilities Missing the Rooftop Solar Opportunity?*, UTILITY DIVE (Jan. 6, 2014), http://www.utilitydive.com/news/are-utilities-missing-the-rooftop-solar-opportunity/208441/.

Moving into the DG industry is not without its risks. Recently, a controversy arose over two utilities in Arizona that submitted proposals to the Arizona Corporation Commission, Arizona's equivalent to Minnesota's PUC, that would allow them access to the residential solar market.[266] The third-party solar companies opposed the proposal, stating that the utilities participation "is an inappropriate activity for a state-sponsored, regulated monopoly."[267] The Arizona Corporation Commission has not ruled on the proposal yet,[268] but their decision will likely be debated in other states across the country in the near future.[269] As Minnesota's solar industry grows and third-party companies become stronger, these companies are likely to resist utilities' encroachment on their market position, as evidenced in Arizona.[270]

The second option for DG market entry is for utilities to construct and operate their own community solar gardens, which is currently allowed by statute.[271] Utilities can capture the benefits of reducing transmission costs,[272] avoiding the loss of customer sales[273] and the need to increase rates.[274] As seen in Arizona and elsewhere, some individuals in the solar industry do not like the idea of the utilities entering their market,[275] but if the end goal is to decrease carbon emissions, then this option deserves strong consideration.

B. *Changing the Traditional Business Model*

The PUC and the utilities can change the long-standing traditional business model[276] to avoid increasing rates for those not

266. Girouard & Swigonski, *supra* note 264.
267. *Id.*
268. *Id.*
269. *Id.*
270. *See id.* (noting that, as in Arizona, third-party companies in Minnesota are unlikely to accept the utilities encroachment on what the third-parties feel is their territory, the DG market).
271. MINN. STAT. § 216B.1641(a) (2014).
272. Warren, *supra* note 2, at 363 ("Distributed generation can be less expensive because few or no transmission lines need to be built to distribute the electricity, and as technology has improved manufacturing costs have decreased.").
273. Holden, *supra* note 41.
274. *Id.*
275. Arriaga et al., *supra* note 262; Girouard & Swigonski, *supra* note 264.
276. KIND, *supra* note 1, at 18 ("Identify new business models and services that can be provided by electric utilities in all states to customers in order to recover

using DG and avert the ensuing spiral that is predicted to occur.[277] As mentioned above, utilities generate revenue under the traditional business model through two means: (1) owning more capital assets, and (2) selling more energy.[278] DG directly impedes this process by reducing the amount of energy sold, reducing the need to build future assets, and thus reducing the revenue a utility earns.[279] Some analogize DG's threat to electric utilities to the effect that cell phones had on the telecommunications industry; this disruption is a central reason for recommending a new business model for utilities.[280]

One of the most highly-recommended new models for Minnesota is a performance-based regulatory framework in which utilities are rewarded for "efficient delivery of reliable, affordable and clean electricity."[281] A performance-based framework for regulation sets a price cap or revenue cap for the rates that a utility can charge.[282] The cap is based on a complex formula that includes different performance standard metrics, which serve as incentives that can increase or decrease the cap based on performance instead of sales.[283] The performance standard metrics recommended include, among others, "overall system efficiency; consistent control of rates and costs to consumers; total environmental impact of a utility; customer-level reliability and quality of service; individual customer-level efficiency and reduced overall demand, and more."[284] The performance-based framework

lost margin while providing a valuable customer service . . . .").

277. *See* Holden, *supra* note 41.

278. *Policy Framework to Optimize Efficiency of the Electrical Energy System*, *supra* note 37, at 16.

279. *See* Levine, *supra* note 38; *Policy Framework to Optimize Efficiency of the Electrical Energy System*, *supra* note 37, at 15.

280. KIND, *supra* note 1, at 14; Warren, *supra* note 2, at 357–58.

281. *Policy Framework to Optimize Efficiency of the Electrical Energy System*, *supra* note 37, at 17; *see also* Ron Davis, *Acting on Performance-Based Regulation*, ELECTRICITY J., May 2000, at 13, 15, *available at* http://regulationbodyofknowledge.org/wp-content/uploads/2013/03/Davis_Acting_on_Performance.pdf; Herman K. Trabish, *Can Performance-Based Ratemaking Save Utilities?*, UTILITY DIVE (Apr. 17, 2014), http://www.utilitydive.com/news/can-performance-based-ratemaking-save-utilities/252683/.

282. Davis, *supra* note 281, at 15.

283. *Id.*

284. *Policy Framework to Optimize Efficiency of the Electrical Energy System*, *supra* note 37, at 16.

thus allows, and even motivates, utilities to find more efficient means of delivering energy, including renewables and DG.[285]

Instituting a performance-based regulatory framework in Minnesota would require the PUC and the utilities to make a number of changes, including adjusting utilities' regulatory framework, removing the incentives for increasing capital assets and kilowatt hours sold, and replacing these incentives with the set of performance standard metrics stated above. The utilities would need to adjust their business model to facilitate meeting the new metrics. Introducing these changes would certainly entail a large amount of work and would be a daunting task for both the PUC and the utilities; however, the transition to a new model may not be as difficult as it appears.

The task of transitioning to a new business model is less daunting when taking into consideration that "[m]ost—if not all—of the metrics required to achieve a holistic performance based regulatory model in Minnesota are currently in use today by utilities or regulators."[286] Currently, the metrics are only used "as requirements for utilities to continue operating[,] . . . to achieve simple cost recovery of investments," or "to judge the performance of a [public utility]."[287] They are not used "to provide a rate of return or similar financial reward" to the utilities.[288] However, calculating a rate of return from existing, repurposed metrics is far simpler than creating and implementing a whole new metric system for a complex industry from scratch.

VI. CONCLUSION

DG is poised to become one of the most influential new technologies of this century. It has the potential to substantially help reduce carbon emissions by introducing greater amounts of renewables and it allows people to have control over their own energy. Policies currently in place should be reexamined and improved to meet the growing demand for DG in Minnesota. Utilities should also take advantage of the opportunities presented to them for DG instead of attempting to fight the oncoming wave.

285. *See id.*
286. *Id.* at 17.
287. *Id.*
288. *Id.*