COMPROMISE IN COLORADO: SOLAR NET METERING AND THE CASE FOR "RENEWABLE AVOIDED COST"

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INTRODUCTION

How much would you pay to lower your neighbor's electric bill? Or, how much would you ask of your neighbor in order to lower yours? As the number of net-metered rooftop-solar[1] energy systems in the United States has increased exponentially in recent years,[2] these questions have grown increasingly pertinent. Among the various legislative and policy instruments fueling the propagation of rooftop solar, and the growth of renewable energy in general,[3] net metering is currently one of the most prevalent and contentious.[4]

Put simply, net metering is a billing mechanism available to electric utility customers with rooftop-solar installations.[5] Net metering allows these customers to "bank" as a credit each kilowatt-hour (kWh) of solar generation not consumed immediately, and allows the banked credits to be used to offset the customers' consumption of energy provided by their electric utility during times when their rooftop systems do not meet their immediate energy needs.[6] If these customers generate

1. For purposes of this Comment, the phrase "rooftop solar" is used to describe any solar energy system that qualifies as "retail distributed generation" under Colorado's Renewable Energy Standard. COLO. REV. STAT. § 40-2-124(1)(a)(VIII) (2014). Such systems are "located on the site of a customer's facilities," must provide energy primarily to serve the customer's demand, and must be sized to provide "no more than one hundred twenty percent of the average annual consumption" of the customer. *Id.*

2. Between 2011 and 2012 alone, the number of newly installed, net-metered rooftop-solar systems grew from 61,400 to 89,620—a 46 percent annual growth rate. SOLAR ELEC. POWER ASS'N (SEPA), RATEMAKING, SOLAR VALUE AND SOLAR NET ENERGY METERING—A PRIMER 1 (2013) [hereinafter SEPA PRIMER], *available at* http://www.solarelectricpower.org/media/51299/sepa-nem-report-0713-print.pdf, *archived at* http://perma.cc/5Y56-AVQK. SEPA "is an educational non-profit organization dedicated to helping utilities integrate solar energy into their portfolio." *About SEPA*, SOLAR ELEC. POWER ASS'N, https://www.solarelectricpower.org/about-sepa.aspx (last visited Jan. 16, 2015), *archived at* https://perma.cc/EP8Y-GYLN. Its "membership is comprised of over 900 electric utilities, solar companies and other companies with an interest in solar electricity." *Id.* Both Xcel Energy and Vote Solar, opponents in Colorado's net-metering debate, are SEPA members. *Member Directory*, SOLAR ELEC. POWER ASS'N, https://www.solarelectricpower.org/about-sepa/members.aspx (last updated Oct. 17, 2014), *archived at* https://perma.cc/DA5D-LH2Y.

3. Dennis L. Arfmann et al., *The Regulatory Future of Clean, Reliable Energy: Increasing Distributed Generation*, Special Issue, 40 COLO. LAW. 31, 36–39 (Oct. 2011).

4. *See* SEPA PRIMER, *supra* note 2, at 1; *see also infra* Part II.

5. *See* SEPA PRIMER, *supra* note 2, at 1.

6. *See id.*

enough energy to send excess energy back to the grid, they are allowed "essentially to run their electric meters backwards."[7] The result is that, through net metering, rooftop-solar customers "pay utilities less, sometimes much less, for energy."[8] In 2012 alone, approximately one gigawatt (GW) of net-metered rooftop solar was added to the country's generation mix.[9]

At the state level, Colorado is among the country's leaders in installed solar, ranking eighth among states in cumulative solar capacity.[10] Most of the rooftop-solar installations in Colorado receive net metering through the state's largest retail electricity provider, Public Service Company of Colorado[11]—a subsidiary of Xcel Energy Inc. (for purposes of this Comment, Public Service Company of Colorado is referred to as "Xcel").[12] Xcel serves 1.4 million electricity customers in Colorado,[13] accounting for over half of all retail electricity sales in the state.[14] As of October 2013, there were 17,000 residential rooftop solar systems participating in Xcel's primary net-metering program: Solar*Rewards.[15]

7. *See* Ker Than, *As Solar Power Grows, Dispute Flares Over U.S. Utility Bills*, NAT'L GEOGRAPHIC (Dec. 24, 2013), http://news.nationalgeographic.com/news/energy/2013/12/131226-utilities-dispute-net-metering-for-solar, *archived at* http://perma.cc/5B3A-3JPT.

8. *See id.*

9. *See* LENA HANSEN & VIRGINIA LACY, ROCKY MOUNTAIN INST., A REVIEW OF SOLAR PV BENEFIT & COST STUDIES 7 (2d ed. 2013) [hereinafter RMI REPORT], *available at* http://www.rmi.org/Knowledge-Center%2FLibrary%2F2013-13_eLabDERCostValue, *archived at* http://perma.cc/JY9Z-H8Z2.

10. *See Solar Industry Data*, SOLAR ENERGY INDUS. ASS'N (SEIA), http://www.seia.org/research-resources/solar-industry-data (last visited Nov. 9, 2014), *archived at* http://perma.cc/4YGQ-F8P6.

11. *See Colorado Electricity Profile 2012*, tbl.3, U.S. ENERGY INFO. ADMIN. (2014), http://www.eia.gov/electricity/state/colorado, *archived at* http://perma.cc/9453-H99H [hereinafter *Colo. Electricity*]; *see also* Mark Jaffe, *Battle Brewing Over Future of Rooftop Solar in Colorado*, DENV. POST (Sept. 1, 2013, 12:01 AM), http://www.denverpost.com/business/ci_23986721/battle-brewing-over-future-rooftop-solar-colorado, *archived at* http://perma.cc/F3U6-D7WA.

12. *Subsidiaries*, XCEL ENERGY, http://www.xcelenergy.com/About_Us/Our_Company/Corporate_Governance/Subsidiaries (last visited Nov. 9, 2014), *archived at* http://perma.cc/5JXQ-AGXH.

13. *Colorado Communities Served*, XCEL ENERGY, https://www.xcelenergy.com/About_Us/Our_Company/Service_Areas/Colorado_Communities_Served (last visited Nov. 9, 2014), *archived at* https://perma.cc/84B6-ZD7E.

14. *See Colo. Electricity*, *supra* note 11, tbl.3.

15. Tom McGhee, *Demonstrators Say Xcel Plan Undervalues Homeowners' Solar Value*, DENV. POST (Dec. 12, 2013, 12:01 AM), http://www.denverpost.com/news/ci_24706794/demonstrators-say-xcel-plan-undervalues-homeowners-solar-value, *archived at* http://perma.cc/YQ9D-UBJL. For general information regarding

Like many sources of renewable energy, the observed growth—and, perhaps, continued viability—of rooftop solar in Colorado depends largely upon a variety of government-sponsored or government-mandated incentives, rebates, subsidies, and other cost-mitigating programs.[16] Despite their contribution to solar energy's proliferation, many of these programs remain controversial. In Colorado and a growing number of other states,[17] net metering is currently among the most hotly debated of these enabling programs. On the surface, net metering appears simply to trade energy for energy, providing solar customers with in-kind compensation for their excess generation. However, there is more to the transaction than meets the eye, and a growing faction of onlookers maintains that the cost savings realized by solar customers are coming from other utility customers' pockets.[18]

Although net metering is popular with the solar industry and many utility customers, it is "controversial among utilities and cautiously considered by regulators."[19] Facilitating rooftop solar with net metering "introduces challenges to distribution system engineering and design, questions about ratepayer equity, and [disruptions] to the regulatory compact that has directed utility investment and operations for over a century."[20] A key component of the net-metering debate is the

Xcel's Solar*Rewards program, see *Solar*Rewards for Residences*, XCEL ENERGY, http://www.xcelenergy.com/Energy_Solutions/Residential_Solutions/Renewable_Energy_Solutions/SolarRewards_for_Residences [hereinafter *Solar*Rewards*] (last visited Jan. 16, 2015), *archived at* http://perma.cc/5MKR-MQCG.

16. *See* Warren G. Lavey, *Overcoming Conceptual and Practical Hurdles to Market-Based Discovery of Prices for Utility Procurements from Rooftop Solar Systems*, 25 TUL. ENVTL. L.J. 289, 291–92 (2012).

17. *See, e.g.*, Gabe Elsner, *The Campaign Against Net Metering: ALEC and Utility Interests' Next Attack on Clean Energy Surfaces in Arizona*, HUFFINGTON POST (Nov. 19, 2013, 12:00 PM), http://www.huffingtonpost.com/gabe-elsner/the-campaign-against-net-_b_4297678.html, *archived at* http://perma.cc/M9DF-HX5U (discussing net-metering debates in Arizona); Diane Cardwell, *Solar Panel Payments Set off a Fairness Debate*, N.Y. TIMES (June 4, 2012), http://www.nytimes.com/2012/06/05/business/solar-payments-set-off-a-fairness-debate.html, *archived at* http://perma.cc/6T34-MB9X (discussing net-metering program scrutiny in California, Massachusetts, New York, Virginia, and Louisiana).

18. *See, e.g.*, *A Million Solar Roofs? At What Cost to Colorado Ratepayers?*, COLO. CONSUMER COAL. (Dec. 10, 2013), http://coconsumercoalition.org/a-million-solar-roofs-at-what-cost-to-colorado-ratepayers, *archived at* http://perma.cc/D6S6-F7BF.

19. *See* SEPA PRIMER, *supra* note 2, at 1.

20. *See id.*

challenge of assessing the costs and benefits of rooftop solar.[21] Broken down, this assessment involves attempting to place a "value" on each kWh of excess energy produced by a rooftop-solar installation.[22] A related and "[e]ven more fundamental question[]" involves the challenge of reconciling utility cost-recovery models with increasing rooftop-solar penetration on utilities' distribution grids.[23] In Colorado, Xcel currently credits rooftop-solar customers' excess generation at the full retail electricity rate of 10.5¢ per kWh (¢/kWh).[24] Xcel maintains that this compensation rate overstates the value of rooftop-solar energy; the solar industry strongly disagrees.[25]

This Comment explores the net-metering value debate from a doctrinal, regulatory, and pragmatic perspective and concludes that the current practice of crediting net-metering customers' excess generation at the retail electricity rate creates an untenable cross-subsidy between participant and non-participant ratepayers. However, the Comment also concludes that, given Colorado's commitment to achieving higher renewable penetration levels[26] and the solar industry's growing but not-yet-self-sufficient status, some net-metering incentive is still in the public interest.

Part I supplies foundational information necessary for understanding the net-metering debate and aims to provide context for the interconnection between Xcel, net metering, and Colorado law by grounding the net-metering debate within Colorado's regulatory scheme and American public utility and energy law. Part II brings the present debate into focus,

21. *Id.* at 4.

22. *See id.*

23. *See id.*

24. McGhee, *supra* note 15.

25. *See infra* Part II. For a neutral synopsis of the parties' contentions, see Denv. Post Editorial Bd., Editorial, *Why It's Critical to Find Balance on Solar Credits*, DENV. POST (July 26, 2014, 5:01 PM), http://www.denverpost.com/editorials/ci_26216847/why-its-critical-find-balance-solar-credits, *archived at* http://perma.cc/6464-ZZ89.

26. *See* 4 COLO. CODE REGS. § 723-3-3651 (2014). The phrase "renewable penetration levels" refers to the amount of renewable generation interconnected with and available on an electric grid. *See* DEBRA LEW ET AL., NAT'L RENEWABLE ENERGY LAB. (NREL), IMPACT OF HIGH SOLAR PENETRATION IN THE WESTERN INTERCONNECTION 1–3 (2010), *available at* http://www.nrel.gov/docs/fy11osti/49667.pdf, *archived at* http://perma.cc/GJG4-4KEH. As a simple solar-focused illustration, if 20 percent of the electricity available on an electric grid were generated by solar panels, then the solar penetration level on that grid would be 20 percent.

summarizing the cost-benefit arguments set forth by each side and establishing necessary analytic parameters for the cross-subsidy question. Part III analyzes these arguments and the most important considerations bearing on the net-metering debate. Part III concludes that, although Colorado's rooftop-solar customers should be given some compensation for their excess generation, they are currently being subsidized by non-participant ratepayers to an extent contrary to the law. Having determined that a cross-subsidy exists, Part IV answers the question of what course of action this determination requires, concluding that Colorado should seek a legal and equitable middle ground. Part IV suggests that this intermediate solution be achieved through a new price measure for rooftop-solar energy: "renewable avoided cost."

I. BACKGROUND

To better understand the significance of rooftop solar and the current net-metering debate, this Part will examine briefly the foundation upon which these concepts operate. Section A discusses Amendment 37 and the Renewable Energy Standard that it established. Section B discusses net metering under Amendment 37 and its implications for Xcel. Finally, section C provides a brief overview of foundational public utility law doctrine and its applicability to Xcel and the rates Xcel charges its Colorado customers.

A. *Amendment 37: Colorado's Renewable Energy Standard*

In 2004, Colorado became the first state to adopt a Renewable Portfolio Standard (RPS)[27] by ballot initiative when voters passed Amendment 37.[28] An RPS is "a regulatory mandate to increase production of energy from renewable sources such as wind, solar, biomass, and other alternatives."[29]

27. Colorado's program is called a Renewable Energy Standard (RES) but is functionally equivalent to an RPS.

28. *Colorado, Renewable Energy Standard,* DATABASE STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (DSIRE), http://programs.dsireusa.org/system/program/detail/133, *archived at* http://perma.cc/KD4P-ETEN; *see also* COLO. REV. STAT. § 40-2-124 (2014).

29. *Renewable Portfolio Standards*, NAT'L RENEWABLE ENERGY LAB. (NREL), http://www.nrel.gov/tech_deployment/state_local_activities/basics_portfolio_stand

As of March 2013, twenty-nine states and the District of Columbia had implemented mandatory RPSs, and eight additional states had enacted voluntary programs with similar goals.[30] A typical RPS requires utilities to generate or purchase a certain percentage of their overall annual electricity from renewable sources by a specific date.[31] RPS programs often set interim targets as well, requiring an escalating percentage of electricity from renewable sources each year until the year in which the program's final percentage-target is set.[32]

Colorado's program comports with these typical characteristics. Colorado's Renewable Energy Standard (RES) requires each qualifying retail utility (QRU) to generate or purchase electricity from eligible energy resources[33] in the minimum amount of 30 percent of its retail electricity sales in Colorado by 2020.[34] The RES likewise requires QRUs to achieve various escalating interim targets leading up to 2020.[35] Under Amendment 37, a QRU is defined as a "provider of retail electric service in the state of Colorado, other than municipally owned utilities that serve forty thousand customers or fewer."[36] Xcel fits within this definition and therefore is a QRU subject to the RES's mandate.[37] The RES also provides that QRUs may

ards.html (last updated Sept. 8, 2014), *archived at* http://perma.cc/Y7VW-QJN3.

30. *RPS Data*, DATABASE STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (DSIRE), http://www.dsireusa.org/rpsdata/index.cfm (last visited Jan. 15, 2015), *archived at* http://perma.cc/LSW8-D85E (under "Archives By Year," follow "2013"; then follow "RPSspread031813.xlsx" hyperlink). The twenty-nine states with mandatory RPSs are Arizona, California, Colorado, Connecticut, Delaware, Hawaii, Illinois, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, Texas, Washington, and Wisconsin. *Id.* The eight states with voluntary programs are Indiana, North Dakota, Oklahoma, South Dakota, Utah, Vermont, Virginia, and West Virginia. *Id.*

31. *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, 610 (2012).

32. *See id.*

33. "'Eligible energy resources' means recycled energy and renewable energy resources." COLO. REV. STAT. § 40-2-124(1)(a). "'Renewable energy resources' means solar, wind, geothermal, biomass, new hydroelectricity with a nameplate rating of ten megawatts or less, and hydroelectricity in existence on January 1, 2005, with a nameplate rating of thirty megawatts or less." *Id.* § 40-2-124(1)(a)(VII).

34. *Id.* §§ 40-2-124(1)(c)(I), (c)(I)(E).

35. *See id.* § 40-2-124(1)(c)(I).

36. *Id.* § 40-2-124(1).

37. *See Colorado Communities Served*, *supra* note 13; *see also Rates &*

fund their RES-related costs through a rate adjustment capped at a maximum of 2 percent of the total annual electric bill of each customer.[38] Xcel collects this 2 percent upward rate-adjustment through its "renewable energy standard adjustment" (RESA).[39] The implications of Xcel's RESA in the net-metering debate are broached further in the ensuing pages.

Colorado's RES also includes a 3 percent distributed generation (DG) carve-out in its 2020 target.[40] Thus, although a QRU must still derive 30 percent of its retail electricity sales from eligible energy sources, it must acquire 3 percent of such sales from DG specifically.[41] A DG carve-out establishes a minimum sub-percentage of electricity from renewable resources that a utility must produce or acquire from distributed resources.[42] Colorado's RES divides DG into two categories: retail DG and wholesale DG.[43] The statute defines wholesale DG as "a renewable resource with a nameplate rating of thirty megawatts [(MW)] or less and that does not qualify as retail [DG]."[44] Retail DG, on the other hand, is defined as "a renewable energy resource that is located on the site of a customer's facilities and is interconnected on the customer's side of the utility meter."[45] The statute provides further that retail DG must provide electricity primarily to serve the customer's electricity load and must be sized to generate "no more than one hundred twenty percent" of the average yearly electricity consumption of the customer at that site.[46] Of the 3 percent of electricity sales attributed to the DG carve-out, at least half (1.5 percent) must be derived from retail DG.[47]

Rooftop solar qualifies as retail DG.[48] In 2013, Xcel

Regulations, XCEL ENERGY, https://www.xcelenergy.com/About_Us/Rates_&_Regulations (last visited Nov. 9, 2014), *archived at* https://perma.cc/M2N7-L2F3.

38. COLO. REV. STAT. § 40-2-124(1)(f)–(g).

39. *See* 4 COLO. CODE REGS. § 723-3-3652(cc) (2014) ("'Renewable energy standard adjustment' or 'RESA' means a forward-looking cost recovery mechanism used by an investor owned QRU to provide funding for implementing the renewable energy standard.").

40. *See* COLO. REV. STAT. § 40-2-124(1)(c)(I)(E).

41. *Id.*

42. *See* Powers, *supra* note 31, at 662.

43. COLO. REV. STAT. § 40-2-124(1)(a)(III).

44. *Id.* § 40-2-124(1)(a)(IX).

45. *Id.* § 40-2-124(1)(a)(VIII).

46. *Id.*

47. *Id.* § 40-2-124(1)(c)(II)(a).

48. *See* Trevor D. Stiles, *Regulatory Barriers to Clean Energy*, 41 U. TOL. L.

acquired over 77 percent of its retail DG from small- and medium-sized rooftop-solar installations; it acquired the remainder from larger, customer-sited solar installations and community solar installations.[49] QRUs' RES compliance is measured in renewable energy credits (RECs), which QRUs obtain from purchases of renewable energy at a rate of one REC per megawatt hour (MWh) produced.[50] Xcel collects RECs from its Solar*Rewards customers' rooftop-solar units.[51] The interrelationship between rooftop solar and Xcel's retail-DG compliance requirements remains an important underlying precept in the following discussion of net metering under Amendment 37.

B. Net Metering and Amendment 37

As noted above, when a customer's rooftop-solar unit is net metered, the unit is connected to a bi-directional meter that measures both the energy used by the customer and the excess energy produced by the customer, and then "nets" those amounts against each other.[52] When the customer is consuming energy from the utility's grid, the meter runs forward; when the customer's solar installation is producing more energy than the customer demands at a given time, the excess energy is sent to the utility's grid, causing the meter to run backward.[53]

In the Energy Policy Act of 2005 (EPAct 2005), Congress endorsed net metering by amending the Public Utilities Regulatory Policies Act of 1978 (PURPA) to include a provision requiring all electric utilities to make available to consumers a net-metering service.[54] The Colorado General Assembly,

REV. 923, 925 (2010); *see also* SEPA PRIMER, *supra* note 2, at 10–11.

49. *See* PUB. SERV. CO. OF COLO., 2014 RENEWABLE ENERGY STANDARD PLAN vol. 2, tbl.4-3 (2013) [hereinafter XCEL RES PLAN VOL. 2], *available at* http://www.xcelenergy.com/staticfiles/xe/Regulatory/Regulatory%20PDFs/CO-RES-Plan-2014-Vol-2.pdf, *archived at* http://perma.cc/SQ6Y-LEQQ.

50. 4 COLO. CODE REGS. §§ 723-3-3659, 3652(t) (2014).

51. *See* PUB. SERV. CO. OF COLO., 2014 RENEWABLE ENERGY STANDARD PLAN vol. 1, § 5, at 5, 8, 12 (2013) [hereinafter XCEL RES PLAN], *available at* http://www.xcelenergy.com/staticfiles/xe/Regulatory/Regulatory%20PDFs/CO-RES-Plan-2014-Vol-1.pdf, *archived at* http://perma.cc/TR67-RUFD.

52. Steven Ferrey, *Virtual "Nets" and Law: Power Navigates the Supremacy Clause*, 24 GEO. INT'L ENVTL. L. REV. 267, 273 (2012).

53. *Id.*

54. Energy Policy Act of 2005, Pub. L. No. 109-58, § 1251(a), 119 Stat. 594,

however, acted preemptively, rendering effective Colorado's RES—including a net-metering mandate[55]—before EPAct 2005's passage.[56] Pursuant to the RES's mandate,[57] Xcel offers net metering to customers who install rooftop solar.[58] Such customers can opt to receive net-metering service in one of two ways.

The first arrangement—Net Metering Service (Schedule NM) alone—amounts to a straightforward bill credit for excess energy produced against energy consumed and allows the customer to retain the RECs associated with the energy produced from his or her system.[59] The second option—

962 (2005) (codified as amended at 16 U.S.C. § 2621 (2012)).

55. COLO. REV. STAT. § 40-2-124(1)(e) (2014).

56. Amendment 37 became effective on December 1, 2004. *DSIRE Colo. RES*, *supra* note 28.

57. COLO. REV. STAT. § 40-2-124(1)(e)(I)(B).

58. Actually, Xcel voluntarily offered net metering in one form or another to its Colorado customers as early as 1988, when the Colorado Public Utilities Commission (Commission) first approved Xcel's promulgating a net-metering tariff. *See* CHRIS LARSEN & HENRY ROGERS, N.C. SOLAR CTR., NATIONAL SUMMARY REPORT ON STATE FINANCIAL AND REGULATORY INCENTIVES FOR RENEWABLE ENERGY 30 (2000), *available at* http://www.hhrogersii.com/portfolio/ncsolarcenter/DSIRE_National_Summary_Report_State.pdf, *archived at* http://perma.cc/KV96-GPTD.

59. *See* PUB. SERV. CO. OF COLO., SCHEDULE OF RATES FOR ELECTRIC SERVICE AVAILABLE IN THE ENTIRE TERRITORY SERVED BY PUBLIC SERVICE COMPANY OF COLORADO 92–92B (2013) [hereinafter XCEL RATE SCHEDULES], *available at* http://www.xcelenergy.com/staticfiles/xe/Regulatory/Regulatory%20PDFs/rates/CO/psco_elec_entire_tariff.pdf, *archived at* http://perma.cc/CY8B-BGWX. There now appears to be disagreement regarding whether a QRU must offer net metering outside of its standard rebate offer (SRO) program (i.e., Solar*Rewards, for Xcel) and whether a net-metering customer may retain ownership of his or her RECs. When this section B was first drafted, Xcel maintained a webpage (which has since been removed) entitled "Net Metering Only PV Installations," the content of which suggested that a customer's rooftop unit could be net metered without the customer's enrollment in Solar*Rewards and that the customer could, but need not, sell his or her RECs to Xcel. The Commission's net metering rule also suggests that net metering must be provided irrespective of SRO enrollment. *See* 4 COLO. CODE REGS. § 723-3-3664(a) (2014).

Now, Xcel and others take the position that net metering is mandated by Amendment 37 only in conjunction with a QRU's SRO program. *See, e.g.*, Initial Brief of Pub. Serv. Co. of Colo. Addressing the Legal Questions Set Forth in Decision No. C14-0615-I, at 8, Comm'n Consideration of Retail Renewable Distributed Generation & Net Metering, No. 14M-0235E (Colo. P.U.C. July 31, 2014), *available at* https://www.dora.state.co.us/pls/efi/EFI.Show_Filing?p_fil=G_301897&p_session_id= ("QRUs are only 'obligated under Colorado law to offer net metering to customers' to the extent that those customers are participants in the standard offer program . . . ."). Xcel maintains further that a customer receiving net metering through a QRU's SRO program must sell his or her RECs to the QRU. *Id.* at 9–11. The Colorado Office of Consumer Counsel, for its part, Photovoltaic Service (Schedule PV) combined with Schedule NM—offers the same bill credit scheme as Schedule NM but also requires customers to enter into a twenty-year REC purchase contract with Xcel.[60] Xcel's Solar*Rewards program embodies this second option.

Xcel implements Solar*Rewards both to comply with the RES's mandatory "standard rebate offer" (SRO) provision[61] and to make available a permissible standard offer to purchase customers' RECs.[62] As delineated originally in the Code of Colorado Regulations, Xcel was required under the SRO provision to offer an upfront rebate of $2.00 per watt (W) to customers who installed rooftop-solar units and opted to join Solar*Rewards.[63] The company was also required to offer any residential Solar*Rewards customer an upfront payment for the RECs estimated to be generated by the customer's system over the twenty-year REC purchase contract term.[64] In response to market changes and in accordance with a settlement agreement between Xcel and the solar industry, however, the Colorado Public Utilities Commission (Commission) in 2012 relieved Xcel of its obligations to offer an upfront rebate and an upfront REC payment.[65] Instead, Xcel now offers Solar*Rewards customers a so-called "performance-based incentive" under which Xcel pays such customers for the

disagrees with the proposition that a QRU can refuse to provide net metering outside of its SRO program, but asserts that a QRU is entitled to a net-metered customer's RECs under either scenario. *See* Legal Brief of the Colo. Office of Consumer Counsel Pursuant to Decision No. C14-0615-I, at 5–7, *Comm'n Consideration*, No. 14M-0235E, *available at* https://www.dora.state.co.us/pls/efi/EFI.Show_Filing?p_fil=G_301902&p_session_id=.

This issue requires Commission resolution and is still pending as of January 2015. The author suspects that, as of now, the two net-metering options described in the text are still available, but Xcel has not yet responded to direct inquiry. Regardless, the substance of this Comment will not be materially affected by the ultimate disposition of this issue.

60. *See* XCEL RATE SCHEDULES, *supra* note 59, at 93–93F.

61. *See* COLO. REV. STAT. § 40-2-124(1)(e)(I); *see also* Pub. Serv. Co., No. C12-0606, at 3–6, 20–23 (Colo. P.U.C. June 8, 2012), *available at* http://coseia.org/wp-content/uploads/2014/02/C12-0606_11A-418E.pdf, *archived at* http://perma.cc/C64B-B8CC.

62. *See* COLO. REV. STAT. § 40-2-124(1)(e)(III).

63. *See* 4 COLO. CODE REGS. § 723-3-3658(a) (2014). For example, if a customer installed a 5kW system, Xcel would have to offer that customer an upfront payment of $10,000. *See id.*

64. *See id.* § 723-3-3658(f)(VIII).

65. *See* Pub. Serv. Co., No. C12-0606, *supra* note 61, at 22–23.

RECs produced by their rooftop-solar systems over time.[66] Although Xcel receives the customers' RECs throughout the twenty-year contract term, the company pays customers for their RECs during the contract's first ten years only.[67] The company uses these RECs to meet its compliance requirements under the RES.[68] According to Xcel, Solar*Rewards has since 2006 "paid over $300 million in incentives to Colorado customers"[69] and helped to install more than 22,945 rooftop systems, amounting to more than 221MW of rooftop-solar capacity.[70]

Having covered rudimentarily the statutory scheme governing net metering in Colorado and the net-metering programs implemented by Xcel within that scheme, the following section supplements that background understanding with a brief overview of the bedrock public utility law principles that impose backstop governance over Xcel and the Commission. Consequently, these principles also serve as the basic legal framework within which the net-metering debate is situated.

C. *Designating the Legal Framework: The Traditional Utility Model and Cost-of-Service Rate Design*

Although a minority of states have restructured their retail electricity markets to integrate some form of competition,[71] Colorado is not among these states and instead follows the traditional public utility model in its retail electricity sector. Under the traditional model, a state grants a utility permission to supply electricity to all customers in a specified geographic region (or, service territory) within the state.[72] This grant amounts to a monopoly franchise and renders the utility insulated from competition inside of its

66. *See id.* at 23.

67. XCEL RES PLAN, *supra* note 51, § 5, at 12.

68. *See* 4 COLO. CODE REGS. § 723-3-3658(b).

69. This figure presumably includes SRO payments and upfront REC payments made prior to the Commission's 2012 decision to relieve Xcel of those payment obligations.

70. *Solar*Rewards*, *supra* note 15.

71. *See* William Boyd, *Public Utility and the Low-Carbon Future*, 61 UCLA L. REV. 1614, 1631 (2014) ("Today, fifteen states have some form of retail choice.").

72. *See* SCOTT HEMPLING, REGULATING PUBLIC UTILITY PERFORMANCE: THE LAW OF MARKET STRUCTURE, PRICING AND JURISDICTION 14–15 (2013).

designated territory.[73] But in exchange, the utility undertakes a duty to serve all customers within its given territory and submits to rate regulation by the state.[74] Thus, as operator of an electric utility in Colorado, Xcel currently enjoys a monopoly over electricity supply within its service territory but also has a duty to serve every customer in that territory and to do so at retail rates approved by the Commission. The retail rates charged by the utility to its customers must be "just and reasonable" and are calculated based on "cost-of-service."[75]

Cost-of-service regulation uses as a starting point the utility's estimated revenue requirements for a given year.[76] Based on this figure, the Commission establishes the rate that the utility must charge its customers for electric service.[77] Ultimately, a utility is generally entitled to recover from its customers an amount sufficient to cover its operating and capital costs.[78] The amount recovered must allow the utility to provide a rate of return to its investors comparable to returns in other enterprises with similar risks and sufficient to establish the utility's financial integrity, thereby allowing it to attract further investment and maintain its credit.[79] The "just and reasonable" cost-of-service rate standard is necessary to ensure not only that the utility does not unduly benefit from its monopoly but also that the utility's returns are predictable enough to maintain its financial stability and allow it to continue to provide vital energy to the public.[80] Thus, "the [Commission] must . . . set rates which protect both: (1) the right of a public utility company and its investors to earn a rate of return reasonably sufficient to maintain the utility's financial integrity; and (2) the right of consumers to pay a rate which accurately reflects the cost of service rendered."[81]

The retail rates charged to Coloradans by Xcel operate

73. *See id.*
74. *Id.*
75. *See id.* at 216–19.
76. *See* SEPA PRIMER, *supra* note 2, at 8–9.
77. *See id.*
78. *See* Fed. Power Comm'n v. Hope Natural Gas Co., 320 U.S. 591, 603 (1944).
79. *Id.*
80. *See* Pub. Serv. Co. v. Pub. Utils. Comm'n, 26 P.3d 1198, 1204–05 (Colo. 2001).
81. Colorado-Ute Elec. Ass'n, Inc. v. Pub. Utils. Comm'n, 760 P.2d 627, 642 (Colo. 1988) (citation omitted) (internal quotation marks omitted).

within this paradigm.[82] Accordingly, Xcel's renewable energy expenditures and other revenue requirements under the RES must be reflected in its retail rates and collected from its Colorado ratepayers.[83] The implications of Colorado's traditional public utility regulatory scheme for the net-metering debate are discussed in greater detail below. For now, a salient point to carry forward is that applicable public utility law assumes that any pre-approved costs incurred by Xcel—including those associated with net metering—are ultimately borne by its ratepayers.[84] Relatedly, those cost-inclusive rates must be "just and reasonable" as determined by the Commission.[85] As we will see, the issue at the heart of Colorado's net-metering scheme is not that the costs of net metering, if any, *are* shouldered by ratepayers, but rather *which* ratepayers are shouldering these costs.[86] In order to illustrate this central issue, it is necessary to spell out the underlying rate-design mechanics that, at least theoretically, lead to a cross-subsidy when rooftop-solar systems are net metered at the full retail electricity rate.

The cost to a utility of providing energy can be divided generally into two components: demand (or fixed) costs and energy (or variable) costs.[87] Demand costs encompass fixed capital expenses, such as the cost of constructing generation, transmission, and distribution infrastructure,[88] whereas energy costs encompass "variable operating and maintenance expenses consisting primarily of fuel costs . . . ."[89] Thus, in cost-of-service jurisdictions, public utilities commissions set the rates paid by utility customers such that both of these cost

82. *E.g.*, Pub. Serv. Co. v. Pub. Utils. Comm'n, 644 P.2d 933, 939 (Colo. 1982).

83. *See* COLO. REV. STAT. § 40-2-124(1)(f)–(g) (2014).

84. *See id.*; *Hope Natural Gas*, 320 U.S. at 603–05.

85. *See Colorado-Ute*, 760 P.2d at 638 ("The setting of just and reasonable rates, both as to level and design, goes to the very essence of the Commission's duties under . . . public utilities law.").

86. *See, e.g.*, David Schmitt, *Net Metering: Getting Beyond the Controversy*, 2011 A.B.A. SEC. PUB. UTIL. COMM. & TRANSP. 417, 420 (discussing Xcel's cross-subsidy contentions in particular).

87. *Colorado-Ute*, 760 P.2d at 643; *see also* Electric & Steam Rates Pub. Serv. Co., No. 95I-513E, 1995 WL 735606, at II.B.1 (Colo. P.U.C. Nov. 2, 1995) ("Fixed costs . . . are essentially independent of any energy that may be generated, transmitted, or delivered to customers; variable costs . . . vary with the amount of energy generated, transmitted, or delivered.").

88. *See Colorado-Ute*, 760 P.2d at 642–43.

89. *Id.* at 643.

components are covered.[90] Consequently, Xcel's retail electricity rate—10.5 ¢/kWh[91]—includes not only the cost of producing one kWh of energy, but also a portion of the cost of the infrastructure needed to produce and deliver that kWh of energy.

Enter net metering. When a net-metered rooftop-solar installation produces an excess unit of energy and sends it to the grid, that unit offsets the cost to the utility of producing one unit of energy—i.e., the "energy cost" component of the utility's per-unit rate. As just noted, however, energy cost is only one aspect of that rate; much of the rate is dedicated to recovery of demand cost.[92] Thus, plainly, when a net-metering scheme compensates rooftop solar at the full retail rate, the net-metered customer's energy cost contribution is effectively credited as both an energy cost and a demand cost contribution. Yet, the demand cost component of the utility's rate has not, at least ostensibly, actually been offset. The result is that rooftop-solar customers pay for a smaller portion of the utility's fixed costs than they did before.[93] Under cost-of-service regulation, though, the utility must nonetheless recover in full its (otherwise prudently incurred) fixed costs from ratepayers.[94] Rather than being internalized by the utility as losses, the costs avoided by rooftop-solar ratepayers are foisted onto the utility's non-rooftop-solar ratepayers, a demographic that shrinks with each net-metered rooftop unit installed.[95] Consequently, as "system costs are being spread over a smaller pool of ratepayers, . . . rates are going up for the people who

90. *Id.*; Paul L. Joskow & Richard Schmalensee, *Incentive Regulation for Electric Utilities*, 4 YALE J. ON REG. 1, 6 (1986).

91. *See supra* note 24 and accompanying text.

92. *See Colorado-Ute*, 760 P.2d at 643 (discussing how Colorado utilities' rates generally are comprised more of demand costs than energy costs); *see also* Mark Newton Lowry & Lawrence Kaufmann, *Performance-Based Regulation of Utilities*, 23 ENERGY L.J. 399, 411 (2002) ("Energy transmission and distribution are unusually capital intensive businesses.").

93. Boyd, *supra* note 71, at 1677. The advantages of this arrangement for solar customers are blatant. *Accord* DAVE GROSSMAN, THE ASPEN INST., THE FUTURE OF THE U.S. ELECTRICITY SECTOR 12 (2013), *available at* http://www.aspeninstitute.org/sites/default/files/content/docs/pubs/2013_energy_policy_forum.pdf, *archived at* http://perma.cc/7YQB-4V4R ("Solar has been moving from utilities to rooftops in part because of the benefits of selling solar power against the retail margin . . . .").

94. *See supra* notes 76–81, 84 and accompanying text.

95. *See* Boyd, *supra* note 71, at 1675–76.

cannot afford rooftop solar."[96]

And therein lies the potential cross-subsidy: non-rooftop-solar customers shouldering a disproportionate amount of the costs of the system infrastructure needed to serve all customers; that is, unless rooftop solar generates benefits to all ratepayers that equal or exceed the fixed cost contributions otherwise averted by rooftop-solar ratepayers. Hence the importance of determining the value of excess rooftop generation, the central issue in Colorado's current net-metering debate. Thus, before returning to some of the principles outlined above, it is first necessary to delve into the subject for which this Part provided foundation. The following Part brings us up to date on the net-metering debate by delineating the debate's triggers as well as each side's contentions.

II. XCEL VERSUS THE SOLAR INDUSTRY: THE CURRENT NET-METERING DEBATE

Of course, the current, public net-metering debate did not simply materialize out of thin air. The debate's primary trigger—Xcel's filing of its 2014 RES compliance plan—and the subsequent solar-industry reaction are discussed briefly in section A. Then, section B provides an overview of the debate's persisting nucleus: conflicting views of rooftop solar's value, as presented by Xcel's and the solar industry's respective cost-benefit studies.

A. Xcel's 2014 RES Compliance Plan

QRUs are required to submit regulatory compliance plans to the Commission in accordance with a pre-determined schedule.[97] Among other requirements, the compliance plan must detail the QRU's strategy for meeting the RES's mandates for a given year or span of years.[98] In its 2014 RES compliance plan, Xcel made a number of propositions related to

96. GROSSMAN, *supra* note 93, at 6. For a synopsis of the logical, albeit dejected, ultimate extension of this arrangement, see Boyd, *supra* note 71, at 1675–76 (discussing the popular "death spiral" concept).

97. 4 COLO. CODE REGS. § 723-3-3657(a) (2014).

98. *Id.* § 723-3-3657(a)–(b).

net metering.[99] Each proposition seeks to extract more money from net-metered customers, or put another way, to curtail the savings that those customers realize via net metering.

First, the company asked to add to its RESA tariff a "fair share" charge for net-metering customers who install their rooftop units on or after January 1, 2014.[100] Xcel likely derives legal support for this "fair share" charge from the RES itself.[101] This charge, or "Net Metering Incentive," would equal the utility's lost revenue from the energy sales the utility would have made to the customer had the customer's rooftop-solar unit not generated its own energy, minus the utility's avoided cost from not having to produce that energy.[102] Second, Xcel proposed to add to its Schedule NM tariff a "Production Meter Charge" applicable to customers who install their rooftop-solar facilities on or after January 1, 2014.[103] This cost would be deducted from the REC payments made by the utility to the customer.[104] Third, Xcel proposed an alteration to its Schedule PV tariff that would expand its "small PV program" from systems 10kW and under to systems 25kW and under.[105] This alteration would effectively demarcate Xcel's medium PV program to systems between 25.1kW and 500kW.[106] According to Xcel, this third proposal stems from an increase in residential applications seeking to enroll in Solar*Rewards systems larger than 10kW, which under present apportionment would fall within the medium PV program.[107] Xcel offers different incentives to customers under its medium PV program than it does under its small PV program, including a higher REC price.[108]

In addition to these proposals, Xcel also asked the

99. XCEL RES PLAN, *supra* note 51, § 1, at 10–11.

100. *Id.* § 1, at 10.

101. The RES provides that "the commission may ensure that customers who install retail distributed generation continue to contribute . . . their *fair share* to their utility's renewable energy program fund . . . even if such contribution results in a charge that exceeds two percent of such customers' annual electric bills." COLO. REV. STAT. § 40-2-124(1)(g)(IV)(B) (2014) (emphasis added).

102. *See* XCEL RES PLAN, *supra* note 51, § 8, at 3.

103. *See id.* § 9, at 3–4.

104. *Id.* at 4.

105. *Id.*

106. *See Solar*Rewards, supra* note 15 (follow "Details").

107. XCEL RES PLAN, *supra* note 51, § 9, at 4.

108. *See Solar*Rewards*, *supra* note 15. (follow "Details"); *see also* XCEL RES PLAN, *supra* note 51, § 5, at 12–14.

Commission to approve its plan to acquire through its Solar*Rewards and Solar*Rewards Community programs 42.5MW of additional solar generation in 2014.[109] Of the 42.5MW, 36 would be allocated to rooftop solar through the Solar*Rewards program.[110] Despite its offer to facilitate high levels of additional rooftop-solar deployment, Xcel maintained that it has sufficient retail-DG RECs to meet its RES compliance requirements for 2014.[111] Xcel's proposed rooftop-solar acquisition, however, included a critical caveat: the company conditioned its 42.5MW proposal on Commission approval of including the Net Metering Incentive in its RESA charge to new net-metering customers.[112] If the Commission rejected this proposal, Xcel would seek approval of the acquisition levels delineated under its "Minimum Compliance" plan: 6MW through Solar*Rewards and 6.5MW through Solar*Rewards Community.[113] Xcel maintains that this allocation of its expenditures—i.e., acquiring less capacity through Solar*Rewards but the same amount through Solar*Rewards Community—is designed to reflect the market response to its Solar*Rewards programs, an allocation approach allowed under Commission regulations.[114]

The solar industry vehemently opposed Xcel's proffered compliance plan. Online articles portraying the industry's perspective abound: "Xcel Continues to Attack Rooftop

109. XCEL RES PLAN, *supra* note 51, § 5, at 5.

110. *Id.*

111. *Id.* § 1, at 5.

112. *See id.* § 9, at 3. Now, it appears that Xcel will no longer seek a reduced acquisition level. *See* Donna Bryson, *Contentious Solar Energy Issue Raised in Colorado*, BLOOMBERG BUSINESSWEEK (Mar. 12, 2014), http://www.businessweek.com/ap/2014-03-12/contentious-solar-energy-issue-raised-in-colorado, *archived at* http://perma.cc/84ZV-WM8S ("Xcel spokesman Mark Stutz said . . . the company was no longer proposing a reduction . . . .").

113. XCEL RES PLAN, *supra* note 51, § 5, at 9–10.

114. *Id.* at 10; *see also* 4 COLO. CODE REGS. § 723-3-3655(f). Rule 3655(f) states:

> In a final decision concerning the investor owned QRU's compliance plan, as between residential and nonresidential retail renewable distributed generation, the Commission shall direct the investor owned QRU to allocate its expenditures for the acquisition of retail renewable distributed generation according to the proportion of RESA revenues derived from each of these customer groups; *except that the investor owned QRU may acquire retail renewable distributed generation at levels that differ from these group allocations based upon market response to the QRU's programs.*

Id. (emphasis added).

Solar";[115] "Solar for Me but Not for Thee: Xcel's Plan to Undermine Rooftop Solar";[116] "Colorado Solar Advocates Fight Xcel's Proposal to Gut Solar Net Metering."[117] These titles represent a small sample of the available literature. The president of one Boulder-based solar installation company referred to the net-metering debate as an "existential struggle" and "a question of survival" for the solar industry in Colorado.[118] Other solar advocates accuse Xcel of trying to "get rid of" rooftop solar, which they say Xcel views as competition.[119] Xcel counters the industry's reaction, maintaining that its proposal is intended merely to spark a dialogue about net metering in Colorado.[120]

Much of the debate centers on disagreement between the two sides' calculation of the costs and benefits attributable to both the energy produced from rooftop-solar installations and the increased presence of the installations themselves.[121] Prior to filing its 2014 compliance plan, Xcel conducted a study intended to assess the potential costs and benefits of rooftop solar to its energy system. That study formed the foundation for Xcel's net-metering-related compliance-plan proposals.[122] The study also prompted opposition from the solar industry, which produced critique studies of its own in response. Xcel's and the solar industry's studies are discussed in the following section.

115. Joanna Schroeder, *Xcel Continues to Attack Rooftop Solar*, DOMESTICFUEL.COM (Nov. 12, 2013), http://domesticfuel.com/2013/11/12/xcel-continues-to-attack-rooftop-solar, *archived at* http://perma.cc/K33N-EYKV.

116. Anne Butterfield, *Solar for Me but Not for Thee: Xcel's Plan to Undermine Rooftop Solar*, HUFFINGTON POST (Sept. 23, 2013, 4:44 PM), http://www.huffingtonpost.com/anne-butterfield/solar-for-me-but-not-for-thee_b_3956513.html, *archived at* http://perma.cc/6R9Z-BUW3.

117. Chris Meehan, *Colorado Solar Advocates Fight Xcel's Proposal to Gut Net Metering*, INDUS. NEWS (Aug. 17, 2013), http://www.industrial-news.info/85691/colorado-solar-advocates-fight-xcel's-proposal-to-gut-solar-net-metering, *archived at* http://perma.cc/7DGU-5LPQ.

118. Jaffe, *supra* note 11.

119. *See, e.g.*, Annie Lappe, *Xcel Energy Puts Rooftop Solar in Jeopardy in Colorado*, VOTE SOLAR (July 29, 2013), http://votesolar.org/2013/07/29/xcel-energy-puts-rooftop-solar-in-jeopardy-in-colorado, *archived at* http://perma.cc/K2L5-F8FG.

120. Herman K. Trabish, *Xcel Colorado Responds to the Solar Industry on Net Metering*, GREENTECH MEDIA (Aug. 1, 2013), http://www.greentechmedia.com/articles/read/xcel-colorado-responds-to-the-solar-industry-on-net-metering, *archived at* http://perma.cc/8HEX-5VCD.

121. *See* RMI REPORT, *supra* note 9, at 4–5.

122. *See* XCEL RES PLAN, *supra* note 51, § 9, at 1–3.

B. *Burdens and Benefits: A Tale of Two Studies*

Pursuant to Commission directive,[123] Xcel conducted a study of the costs and benefits of rooftop solar in Colorado and published its findings in a 2013 report.[124] The company used an avoided cost methodology that focused on energy-system costs that might be deferred or avoided as a result of adding rooftop solar to the company's distribution system.[125] Ultimately, Xcel's study concluded that, when calculating gas prices at a base-case scenario,[126] the company's net avoided energy-system costs from rooftop solar amounted to $80.40/MWh.[127] This figure was calculated on a twenty-year levelized basis, a time period that reflects both the estimated useful life of a rooftop-solar unit and the standard contract length for REC purchase agreements under the RES.[128] Xcel further concluded that, "consistent with the findings of prior studies on other utility systems and the Company's expectations," the majority of Xcel's savings are from avoided energy costs, which vary greatly depending on the price of natural gas.[129] Using its base gas cost as a starting point, Xcel also estimated net avoided costs under low and high gas cost scenarios: the lower the price of gas, the more diminished the utility's cost savings (and vice-versa).[130] Although Xcel's study relied on a base gas

123. *See generally* Pub. Serv. Co., No. C09-0923 (Colo. P.U.C. Aug. 20, 2009).

124. XCEL ENERGY SERVS., INC., COSTS AND BENEFITS OF DISTRIBUTED SOLAR GENERATION ON THE PUBLIC SERVICE COMPANY OF COLORADO SYSTEM (2013) [hereinafter XCEL STUDY], *available at* http://votesolar.org/wp-content/uploads/2013/12/11M-426E_PSCo_DSG_StudyReport_052313.pdf, *archived at* http://perma.cc/6B55-W3D2.

125. *Id.* at i. Because the study focused on costs "that impact the physical [Xcel] electric supply system directly," it did not include "costs associated with: 1) participant out-of-pocket expenses, 2) administration of the Solar*Rewards program, or 3) incentive payments made to participants under the Solar*Rewards program." *Id.* at 3.

126. The base-case scenario represents a chosen forecasted market cost for natural gas over the twenty-year period of the study. *See id.* at 21–22.

127. *Id.* at 43.

128. *See* R. THOMAS BEACH & PATRICK G. MCGUIRE, CROSSBORDER ENERGY, NET BENEFITS OF SOLAR DISTRIBUTED GENERATION FOR THE PUBLIC SERVICE COMPANY OF COLORADO: A CRITIQUE OF PUBLIC SERVICE COMPANY OF COLORADO'S DSG BENEFIT AND COST STUDY 2 (Sept. 20, 2013) [hereinafter SOLAR INDUSTRY I], *available at* http://www.oursolarrights.org/files/1413/8297/8834/Critique_of_Xcel_Study_of_the_Benefits_of_Distributed_Solar_Generation.pdf, *archived at* http://perma.cc/W6YR-M9RF; *see also* XCEL STUDY, *supra* note 124, at 2.

129. XCEL STUDY, *supra* note 124, at 42.

130. *See id.* at 43.

cost, the study notes that the actual price of gas for at least the early years of the study period was approximately 50 percent lower than the base gas cost used.[131]

Xcel's study did not include figures expressing the cost to the company of facilitating net-metered rooftop solar.[132] However, revenue-loss figures were presented in the company's 2014 RES compliance-plan filings.[133] There, in an exhibit accompanying the testimony of Xcel's Director of Regulatory Administration and Compliance, Xcel estimated its annual revenue losses attributable to net metering for each year of a twenty-year period.[134] These numbers suggest that Xcel's net-metering-related revenue losses by themselves outweigh the general rooftop solar-related benefits to its system.[135] For example, in the company's residential sector alone, Xcel's study estimated that the company's net costs range from $58.79/MWh in 2014 to $54.71/MWh in 2033.[136] According to Xcel, 100 percent of these losses are borne by non-rooftop-solar customers.[137] Xcel also maintains that these estimates are conservative and serve best as reasonable floors on expected revenue losses.[138] This is because the estimates may assume that a greater percentage of rooftop-solar output occurs during winter and off-peak periods, and a smaller percentage occurs during summer and on-peak periods.[139] To the extent that this assumption is flawed, Xcel maintains, the estimated net-metering incentive received by rooftop-solar customers has been undervalued.[140]

The solar industry reacted immediately to Xcel's study and compliance-plan filing. In September 2013, the Vote Solar Initiative (Vote Solar)—a non-profit solar-energy interest

131. *Id.* at v.

132. *See id.* at 3.

133. *See* Exhibit No. SBB-1, Direct Testimony and Exhibits of Scott B. Brockett, Pub. Serv. Co., No. 13A-0836E (Colo. P.U.C. July 24, 2013), *available at* https://www.dora.state.co.us/pls/efi/EFI.Show_Filing?p_fil=G_169757&p_session_id=.

134. *See id.*

135. *See id.*

136. *Id.*

137. Direct Testimony of Scott B. Brockett, Pub. Serv. Co., No. 13A-0836E, at 6 (Colo. P.U.C. July 24, 2013), *available at* https://www.dora.state.co.us/pls/efi/EFI.Show_Filing?p_fil=G_169757&p_session_id=.

138. *See id.* at 8–10.

139. *Id.* at 8.

140. *Id.*

group[141]—commissioned Crossborder Energy (Crossborder), a consulting firm, to conduct a critique of Xcel's study.[142] This study accepted many of the general criteria assessed by Xcel and agreed with Xcel's avoided cost estimates as to some of those criteria, but the study argued that Xcel had undervalued or failed to quantify a number of other criteria.[143] Applying its reformulated net avoided costs to Xcel's revenue-loss statistics, the Vote Solar study concluded that, based on the hypothetical emissions-cost figure used in Xcel's study, rooftop solar contributes an annual net benefit of $6.7 million to the Xcel system.[144] The study added that, if calculated using the study's own "[h]igh scenario" for hypothetical emissions costs, rooftop solar's net benefit to Xcel's system equaled $10.9 million annually.[145]

Less than three months later, in preparation for the solar industry's current challenge to Xcel's net-metering proposals, The Alliance for Solar Choice (TASC)—a solar-industry-funded interest group[146]—commissioned Crossborder to revisit its initial study.[147] Crossborder maintains that TASC asked it to "refine and update" its critique based on "further discovery conducted over the last several months" following the release of Crossborder's initial study.[148] Like the Vote Solar study, the TASC study agreed with the criteria considered by Xcel's study and with Xcel's avoided-cost estimates as to some of those criteria.[149] In addition, the revised study deferred to Xcel's estimates for avoided line losses and reduced nominally the

141. *See About Us*, VOTE SOLAR INITIATIVE, http://votesolar.org/about-us (last visited Nov. 8, 2014), *archived at* http://perma.cc/SFD6-QJ9N.

142. SOLAR INDUSTRY I, *supra* note 128, at 1.

143. *Id.* at 1–2.

144. *Id.* at 11–12.

145. *Id.*

146. *See About Us*, THE ALLIANCE FOR SOLAR CHOICE, http://allianceforsolarchoice.com/about-us (last visited Nov. 8, 2014), *archived at* http://perma.cc/SFV7-UYRD.

147. R. THOMAS BEACH & PATRICK G. MCGUIRE, CROSSBORDER ENERGY, BENEFITS AND COSTS OF SOLAR DISTRIBUTED GENERATION FOR THE PUBLIC SERVICE COMPANY OF COLORADO: A CRITIQUE OF PSCO'S DISTRIBUTED SOLAR GENERATION STUDY 1 (Dec. 2, 2013) [hereinafter SOLAR INDUSTRY II], *available at* http://www.oursolarrights.org/files/5513/8662/3174/Crossborder_Study_of_the_Benefits_of_Distributed_Solar_Generation_for_PSCo.pdf, *archived at* http://perma.cc/P6PU-FU9E.

148. *Id.*

149. *See id.* at 2–3.

Vote Solar study's avoided transmission cost estimates.[150] The revised study's net avoided cost calculation did, however, include critical input changes.

Whereas the Vote Solar study accepted Xcel's avoided distribution cost estimate of $0.50/MWh[151] and did not discuss that cost-benefit category, the TASC study estimated avoided distribution cost at $6.00/MWh—a 1200 percent increase.[152] The TASC study also increased the avoided emissions cost portion of its calculation to $27.40/MWh,[153] compared to the $5.10/MWh estimate used in Xcel's study and the Vote Solar study's "Base GHG"[154] calculation.[155] Finally, the new study appended a "10% adder" to its estimated calculation of the system-wide benefits of rooftop solar.[156] Crossborder maintains that the adder represents rooftop solar's "potential additional economic, reliability, and environmental benefits" as well as "indirect 'societal' benefits."[157] Ultimately, the new study revised Crossborder's prior estimation of rooftop solar's net benefits to Xcel's system, positing that rooftop solar delivers an annual net benefit of $16.6 million.[158]

Rather than creating a cross-subsidy from non-rooftop-solar customers to rooftop-solar customers, as Xcel's study suggests, the solar industry's studies attempt to demonstrate not only that no cross-subsidy exists, but instead that rooftop-solar customers deliver millions of dollars in annual benefits to non-rooftop-solar customers. Thus, where one emerges in the net-metering debate appears to depend largely on one's chosen perspective. Attempting to answer the question of who is right or wrong may always involve subjectivity and will almost certainly depend on the way in which the question is framed. To be sure, both Xcel's and the solar industry's positions are in

150. *Compare id.* at 3, 7–9, 14, *with* XCEL STUDY, *supra* note 124, at 43, *and* SOLAR INDUSTRY I, *supra* note 128, at 6–8.

151. *See* SOLAR INDUSTRY I, *supra* note 128, at 8.

152. *See* SOLAR INDUSTRY II, *supra* note 147, at 9–11, 14.

153. *Id.* at 6–7, 14.

154. "GHG" stands for "greenhouse gas" and represents the type of emissions whose costs are being calculated as avoided in the cost-benefit studies of rooftop solar presented here. *See* SOLAR INDUSTRY II, *supra* note 147, at 6.

155. XCEL STUDY, *supra* note 124, at 43; SOLAR INDUSTRY I, *supra* note 128, at 8. The revised study's figure also exceeds the Vote Solar study's "High GHG" estimate of $24.80/MWh. SOLAR INDUSTRY I, *supra* note 128, at 5–6, 9.

156. SOLAR INDUSTRY II, *supra* note 147, at 13–14.

157. *Id.* at 12–13.

158. *Id.* at 15.

some ways "right" and in others "wrong." The challenge, then, is to determine which aspects of their calculations should be relevant in putting a price on rooftop solar. As has been suggested, assessments of this challenge have produced little agreement.[159] In such a hotly-contested sphere, what, if anything, can help ground this inquiry? The answer could lie, it seems, in the same legal foundation upon which the current net-metering debate necessarily rests.[160]

Admittedly, laws and regulations often tell us very little about the physical phenomena, economic principles, and statistical derivations that overlap to inform calculations of the "value" of a kWh-unit of excess rooftop-solar generation. Given that reality, this Comment attempts neither to arrive at an actual, monetary value for such a kWh-unit nor to conclusively prove or disprove the validity of any study's chosen methodology. Where the law can guide us, though, is in framing the value question and the ancillary net-metering debate. The law governs the regulatory framework in which this debate takes place and defines the outer boundaries beyond which certain value-related considerations must lie. Specific statutes and regulations, as well as their underlying goals and principles, help us to hone in on what should be considered, and caselaw doctrine prescribes some limitations on the sum of those considerations. With these notions in mind, the next Part addresses the critical cross-subsidy question underlying the net-metering debate.

III. SUBSIDY OR NO, AND WHICH WAY DOES IT GO?

The numerous studies addressing the costs and benefits of rooftop solar often have reached divergent conclusions.[161] As seen in the above comparison of Xcel's and the solar industry's studies, these divergences often have to do with differences in opinion regarding, to a lesser extent, what factors should be quantified and, to a greater extent, what value should be attributed to each factor.[162] Xcel claims that overvaluing net-metered rooftop-solar energy is effectuating a cross-subsidy by

159. *See* RMI REPORT, *supra* note 9, at 12.
160. *See supra* Part I.C.
161. *See generally* RMI REPORT, *supra* note 9 (discussing sixteen different solar cost-benefit studies).
162. *See supra* Part II.B.

which non-rooftop-solar ratepayers shoulder a disproportionate amount of the utility's costs for the transmission, distribution, and backup generation that all electricity consumers need.[163] In other words, non-rooftop-solar customers pay for the system benefits that rooftop-solar customers enjoy.[164] On the other hand, solar-industry advocates stress that there are additional environmental and societal benefits provided by rooftop solar—benefits that they claim many studies fail to quantify properly.[165] These net-metering proponents also argue that utilities' assessments undervalue the amount of otherwise necessary system-upgrade costs that rooftop solar negates.[166]

The following Part argues that net metering in Colorado, at least as composed currently, does create a cross-subsidy between non-rooftop-solar customers and rooftop-solar customers. In sections B and C, the Part analyzes the parties' contentions regarding the cost-benefit equation's two most disputed categories—external[167] and hard system-related factors[168]—and concludes that the solar industry's reliances are largely misplaced. But first, section A provides a preliminary aside that is useful to consider before approaching the cross-subsidy discussion.

A. Regulators' Caution

As an initial matter, both the Colorado legislature and the Commission have long expressed hesitancy regarding rooftop solar and net metering, even while pushing forth with statutes and regulations aimed at encouraging their growth. This hesitancy arguably could stem from an implicit acknowledgment that DG presents a challenge to the traditional utility model.[169] Although Colorado's legislature

163. *See* Schmitt, *supra* note 86, at 420, 424–26.

164. *See id.*

165. *See, e.g.*, Zachary Shahan, *True Value of Solar Power*, CLEAN TECHNICA (June 26, 2011), http://cleantechnica.com/2011/06/26/true-value-of-solar-power, *archived at* http://perma.cc/4WRE-7SX6.

166. *See, e.g.*, SOLAR INDUSTRY II, *supra* note 147, at 7–11; Schmitt, *supra* note 86, at 425–26.

167. Here, "external" refers to any potential health, societal, environmental, and emissions-related benefits of rooftop solar.

168. "Hard system-related factors" refers generally to tangible grid- and supply-related cost categories, such as fuel, poles, wires, generators, etc.

169. For a brief summary of this "challenge," see Schmitt, *supra* note 86, at 427.

and the Commission undoubtedly are aware of that issue, their hesitancy appears to stem more from a concern over ratepayer equity.

As early as 2005, the Commission recognized that net metering rooftop-solar customers' generation could create an intraclass cross-subsidy from non-net-metering customers to net-metering customers.[170] In *In re Public Service Co.*, the Commission approved a settlement agreement between Xcel and other parties under which Xcel agreed to withdraw proposals to implement significant changes in its net-metering policies.[171] Although the Commission found it in the public interest to approve the parties' agreement, the Commission expressed concern regarding the potential that net-metering customers were being subsidized by other customers.[172] The Commission approved the net-metering rates "with the assumption" that no substantial cross-subsidy was occurring; however, the Commission explicitly reserved the right to revisit the rates in order to "discontinue any subsidization" if further study indicated that such a cross-subsidy existed.[173] The Commission then ordered Xcel to conduct a cost-benefit study of rooftop solar in order to address unanswered "cost and subsidization questions associated with [rooftop-solar] generation."[174]

Colorado's General Assembly implicitly expressed a similar caution in Amendment 37 itself.[175] The RES provides that, after 2014 and upon application by a QRU, the Commission is free to reduce or eliminate the RES's DG carve-out if the Commission finds that the carve-out is "no longer in the public interest."[176] The RES allows the Commission to make this reduction determination on its own authority; conversely, if the Commission wishes to increase the DG carve-out, it must first report its findings to the general assembly.[177] Cautionary provisions regarding net metering specifically are also

170. *See* Pub. Serv. Co., No. C05-0412, at 40–41 (Colo. P.U.C. Apr. 11, 2005), *available at* http://www.dora.state.co.us/puc./DocketsDecisions/decisions/2005/C05-0412_04S-164E.pdf.

171. *Id.* at 39–41.

172. *See id.* at 40–41.

173. *Id.* at 41.

174. *See id.* at 41–42.

175. *See* COLO. REV. STAT. § 40-2-124(1)(c)(II)(C) (2014).

176. *Id.*

177. *See id.*

included. Aside from the RES's general rate-impact provision, section 40-2-124(1)(g)(IV)(B) authorizes the Commission to "ensure that customers who install distributed generation continue to contribute, in a nondiscriminatory fashion, their fair share to their utility's renewable energy program fund . . . even if such contribution results in a charge that exceeds two percent of such customers' annual electric bills."[178] Here, the legislature anticipated one potential source of cross-subsidy: that rooftop-solar customers might pay less than non-solar customers for the very program that enabled the former customers' rooftop installations in the first place.[179]

In light of the hesitancy displayed by the entities responsible for beneficial rooftop-solar and net-metering policies, at a time when rooftop-solar customers numbered much fewer than today, the possibility that a real cross-subsidy is now occurring should come as a surprise to no one. This background assessment serves to help ground the net-metering debate, lest the broader, ideological perspectives and personal ambitions commonly associated with each party render any functional discourse hopeless. Having acknowledged objective indications of the potential for a cross-subsidy, the next sections analyze the primary considerations upon which an ultimate determination of whether there is a cross-subsidy depends.

B. The Role of Societal, Environmental, and Emissions-Related Factors in a Cost-Based Inquiry

This section proceeds in two subsections. Subsection 1 addresses external cost-benefit categories from a ratemaking perspective—the perspective that this Comment posits is required by law. Nevertheless, subsection 2 endeavors to defuse the solar industry's contentions regarding external cost-benefit categories from a more holistic, societal perspective as well.

178. *Id.* § 40-2-124(1)(g)(IV)(B).
179. *See id.*

1. A Ratemaking Perspective

Central to the solar industry's arguments for retail-rate net-metering credit are the intangible societal, emissions-related, and other environmental benefits flowing from rooftop solar—benefits that the industry claims continue to be undervalued. For example, TASC's critique of Xcel's cost-benefit study claims that Xcel's study undervalues avoided emissions-regulation costs and fails to include reduced water usage, avoided land costs for transmission and distribution or generation infrastructure, economic development, job creation, and avoided health impacts.[180] These claims, however, distract from the real focus of the inquiry. The issue at hand is the rate at which rooftop-solar output is valued (and therefore, the rate at which rooftop-solar owners' bills are offset). As such, the relevant characteristics of rooftop solar, insofar as calculating the rate at which these systems' output should be credited is concerned, are those characteristics involved in cost-of-service rate calculation.[181] In practice, utilities have little ability to stray from consideration of these characteristics. Indeed, "[i]nvestor-owned utilities are almost always directed by regulatory guidelines. Their solar-impact and rate analyses would have little latitude, in terms of what input variables to include or how to assess them, until they receive approval from their state regulatory commissions."[182]

As a regulated investor-owned utility, Xcel is compelled by law to follow rate calculation and design methodologies approved by the State of Colorado through the Commission.[183] In states with traditional-model electricity distribution sectors, like Colorado, regulators limit their consideration of societal and environmental impacts in ratemaking to those that are internal and related directly to a utility's cost-of-service and revenue requirement for a given test year.[184] Thus, these impacts are not typically covered in rates.[185] As stated by the Colorado Supreme Court, "[u]nder the prevailing norms of utility regulation, rates are to be set at a level that covers the

180. SOLAR INDUSTRY II, *supra* note 147, at 2.
181. *See* SEPA PRIMER, *supra* note 2, at 12.
182. *Id.* at 32.
183. *See generally* COLO. REV. STAT. § 40-3-101 (2014).
184. SEPA PRIMER, *supra* note 2, at 14.
185. *Id.* at 31.

utility's legitimate costs and expenses in providing service . . . ."[186] The solar industry's proffered external factors do not fall within the category of the utility's legitimate costs and expenses.[187] Even assuming that Xcel's current generation practices have a negative impact on these external categories, because Xcel does not—or more accurately, Xcel's Colorado ratepayers do not—pay an actual price for these negative impacts, Xcel does not experience a cost reduction from whatever beneficial contributions increased rooftop solar might otherwise make.[188]

Although emissions costs may become an eventual reality, the solar industry's reliance on high emission-cost projections fails for the same reasons. This Comment denies neither the existence of external societal emissions costs nor the possibility of a regulation-imposed emissions cost in the future. It merely emphasizes that, under current public utility law, non-existent emissions costs are irrelevant to utility rates, and thus their projections are useless in calculating the cost of net metering to non-rooftop-solar ratepayers.[189] In order to sustain the position that using Xcel's avoided emissions-cost calculations is

186. CF&I Steel, L.P. v. Pub. Utils. Comm'n, 949 P.2d 577, 584 (Colo. 1997).

187. *See* SEPA PRIMER, *supra* note 2, at 31.

188. *See CF&I Steel*, 949 P.2d at 584. The solar industry's arguments for benefits associated with reduced water usage and avoided land costs, although factors that enter the cost-benefit calculus from a ratemaking perspective, fail for more pragmatic reasons. The asserted benefit of reduced water usage, for instance, rests on a shaky assumption that Xcel would substitute energy not obtained from rooftop solar with energy obtained from fossil fuels. Xcel has, however, demonstrated its commitment to acquiring energy from larger wind and solar projects. *See* J. BANK ET AL., NREL, HIGH PENETRATION PHOTOVOLTAIC CASE STUDY REPORT 8 (2013) [hereinafter NREL PV REPORT], *available at* http://www.nrel.gov/docs/fy13osti/54742.pdf, *archived at* http://perma.cc/SV5Z-8R8B. Indeed, even if Xcel acquired less renewable generation from rooftop solar, it would remain bound by the overall renewable percentage targets established in the RES. Thus, to the extent rooftop-solar generation is being used to satisfy a portion of those targets, Xcel would have to replace that generation with generation from other renewable energy sources (i.e., non-fossil-fuel sources). Similarly, the asserted benefit of avoided land costs rests on the assumption that Xcel does not already own land set aside for future generation facilities, would not outfit its own facilities with solar panels at a lower cost, would not purchase power from independent renewable generation facilities, and/or would not retrofit its aging fossil fuel-fired plants with new turbines. In fact, Xcel is already pursuing the latter option. *See* Cathy Proctor, *Natural Gas Power Plants Emit 40% Less CO2 Than Coal Plants, Study Says*, DENV. BUS. J. (Jan. 10, 2014, 3:54 PM), http://www.bizjournals.com/denver/blog/earth_to_power/2014/01/natural-gas-power-plants-produce-40.html, *archived at* http://perma.cc/ZK2B-VPDL.

189. *See* SEPA PRIMER, *supra* note 2, at 31.

reasonable, though, it is helpful to point out an additional infirmity in the solar industry's avoided emissions-cost position.

The TASC study relied on the White House's Interagency Working Group (IWG) estimations of carbon emissions cost;[190] however, this reliance may be misplaced. As Massachusetts Institute of Technology economist Robert Pindyck points out, "the models [used by the IWG] are so deeply flawed as to be close to useless as tools for policy analysis. Worse yet, their use suggests a level of knowledge and precision that is simply illusory, and can be highly misleading."[191] Although advocating for an emissions price, Pindyck reveals that the methodology used by the IWG contains at least two fundamental flaws and concludes that the IWG's modeling is unlikely to be helpful.[192] He also suggests that the IWG's chosen base discount rate—upon which the value to society of GHG abatement "depends critically"—of 3 percent is more or less arbitrary.[193] Others suggest that a discount rate of around 7 percent—the rate prescribed in the Office of Management and Budget's regulatory analysis guidelines—is more appropriate.[194] The TASC study, using the 3 percent discount rate, relied on a carbon cost of $35 per metric ton projected for 2012 and growing by 2.1 percent plus inflation every year thereafter.[195]

190. SOLAR INDUSTRY II, *supra* note 147, at 6; *see also* INTERAGENCY WORKING GROUP ON SOCIAL COST OF CARBON, TECHNICAL UPDATE OF THE SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS (May 2013) [hereinafter IWG REPORT], *available at* http://www.whitehouse.gov/sites/default/files/omb/inforeg/social_cost_of_carbon_for_ria_2013_update.pdf, *archived at* http://perma.cc/G8ZY-BM64.

191. Robert S. Pindyck, *Climate Change Policy: What Do the Models Tell Us?*, 51 J. ECON. LITERATURE 860, 861–62 (2013), *available at* http://web.mit.edu/rpindyck/www/Papers/PindyckClimateModelsJELSept2013.pdf, *archived at* http://perma.cc/VFW8-D5B6.

192. Robert S. Pindyck, *Pricing Carbon When We Don't Know the Price*, ENERGY & ENVT., Summer 2013, at 44–45, *available at* http://web.mit.edu/rpindyck/www/Papers/PricingCarbonRegulation2013.pdf, *archived at* http://perma.cc/T8FP-GKDD.

193. *See id.* Discount rates, in the context of conducting cost-benefit analyses for potential regulations, are "used to convert future dollars to their present value." Richard L. Revesz & Matthew R. Shahabian, *Climate Change and Future Generations*, 84 S. CAL. L. REV. 1097, 1100 (2011). The lower the discount rate, the higher the present value of a given future benefit. *See id.*

194. Chip Knappenberger, *'Social Cost' of Carbon vs. Climate Science*, MASTERRESOURCE (Jan. 31, 2014), http://www.masterresource.org/2014/01/social-cost-carbon-vs-climate-science, *archived at* http://perma.cc/SD7X-CQEW.

195. *See* SOLAR INDUSTRY II, *supra* note 147, at 6; IWG REPORT, *supra* note 190, at 18, tbl.A1.

Use of the 3 percent discount rate produces a vastly greater emissions cost than even the 5 percent alternative also displayed in the IWG report.[196] Lastly, Pindyck indicates that, based on "most likely" scenarios, the cost of emissions is as low as $10 per metric ton, which Xcel's projected emissions-cost figure eclipses.[197] Thus, given that hypothetical emissions costs are irrelevant to the cost-benefit calculus from a ratemaking perspective, Xcel's gratuitous cost estimate is hardly unreasonable.

To summarize, the rate at which excess rooftop-solar generation is credited is inseparably a function of the rates charged by Xcel through its regulator-prescribed cost-of-service rate formulation.[198] The attributes of rooftop solar that are relevant to its rate value must therefore be only those attributes that bear on and are included in Xcel's actual costs.[199] If a benefit of rooftop solar nevertheless fails to offset a utility's costs, that benefit has no impact on the allocation of the utility's revenue requirement among ratepayers.[200] The cross-subsidy borne by non-rooftop-solar ratepayers does not shrink in the face of unmonetized benefits, and as far as rate-related value is concerned, under current Colorado law, those potential benefits are irrelevant.[201] Thus, from a ratemaking perspective, the solar industry's reliance on these externalities as justification for higher net-metering credit is misplaced.[202]

2. A Societal Perspective

Perhaps more importantly, however, the solar industry's reliance on the potential external benefits of rooftop solar to bolster net-metering rates is misplaced from a societal perspective, too. Practically speaking, rooftop solar and its associated RECs are only beneficial to Xcel to the extent that those RECs can be used to comply with Colorado's RES.[203]

196. IWG REPORT, *supra* note 190, at 18, tbl.A1.
197. *See* Pindyck, *supra* note 192, at 46; XCEL STUDY, *supra* note 124, at 26.
198. *See* SEPA PRIMER, *supra* note 2, at 5–6.
199. *See* CF&I Steel, L.P. v. Pub. Utils.Comm'n, 949 P.2d 577, 584 (Colo. 1997).
200. *See id.*
201. *See id.*
202. *See* SEPA PRIMER, *supra* note 2, at 31.
203. *See* Gregory K. Lawrence & Athena Y. Velie, *Developing Markets for Renewable Energy Certificates and Their Impact on Project Finance*, *in* ENERGY AND ENVIRONMENTAL PROJECT FINANCE LAW AND TAXATION: NEW INVESTMENT TECHNIQUES 95–96 (Andrea Kramer & Peter Fusaro eds. 2010).

Among other reasons, this is because public utilities commissions encourage utilities to provide electricity at the lowest possible cost,[204] and Xcel-generated or purchased energy from coal and natural gas plants currently account for the cheapest sources of generation available to the company.[205] In the context of satisfying the RES, Xcel's procurement of rooftop solar is one component of overall RES compliance to which the company devotes RESA funds.[206] To date, Xcel's RESA account is in the negative due in large part to payouts and revenue losses incurred under the Solar*Rewards program.[207] This negative balance exists despite the fact that Xcel is required under the RES to derive only 1.5 percent of its 30 percent RES mandate for the year 2020 from retail DG, of which rooftop solar is only one qualifying option.[208]

Xcel has enough RECs from rooftop solar to satisfy the RES's retail-DG carve-out requirement in 2014 without any further procurements.[209] After 2014, Xcel anticipates that it will require for RES compliance only 6MW of rooftop solar each year going forward.[210] Instead of using future RESA funds to expand its Solar*Rewards program, Xcel could invest that money in larger-scale renewable energy generation projects that will produce more energy at a lower cost, or Xcel could purchase renewable energy from existing, independent renewable projects at a price much cheaper than the current retail rate at which the company credits excess rooftop-solar generation.[211] For example, the Commission recently approved

204. *See, e.g.*, Generic Hearings Concerning the Rate Structure of All Electric Utils. Operating Under the Jurisdiction of the Pub. Utils. Comm'n of Colo., No. C79-1111, 1979 WL 461818 (Colo. P.U.C. July 27, 1979) (decision) ("This Commission's primary responsibility is to assure that rates charged to consumers for electricity are the lowest possible . . . .").

205. *See Colo. Electricity*, *supra* note 11, tbl.6 (listing costs of energy produced from coal, petroleum, and natural gas).

206. *See generally* XCEL RES PLAN, *supra* note 51.

207. *See id.* § 7, at 10 ("Through 2011 the primary driver for the negative RESA balance was the up-front incentives provided in the Solar*Rewards program."); *see also* Kriss, *Xcel Energy to Restart Solar Rewards Program*, SOLAR SPHERE (Mar. 23, 2011), http://www.spheralsolar.com/blog/xcel_energy_to_restart_solar_rewards_program, *archived at* http://perma.cc/6JAV-9CFY.

208. COLO. REV. STAT. § 40-1-124(1)(c)(II)(A) (2014).

209. XCEL RES PLAN, *supra* note 51, § 5, at 9.

210. *See id.*

211. *See* Ethan Howland, *The Solar Net Metering Fight Heads to Colorado*, UTIL. DIVE (Dec. 12, 2013), http://www.utilitydive.com/news/the-solar-net-metering-fight-heads-to-colorado/205368, *archived at* http://perma.cc/F5CL-JEQA.

two Xcel contracts to purchase from utility-scale solar projects a total of 170MW of energy.[212] Under these contracts, Xcel will obtain solar energy for about half the cost of obtaining the same amount of energy from rooftop-solar installations.[213] The RECs associated with energy from these alternative renewable sources would not only satisfy the RES mandate equivalently to the RECs produced from rooftop solar in excess of the 1.5 percent carve-out,[214] but would do so at a significantly lower cost to ratepayers.[215] This alternative renewable energy procurement would also result in the same external benefits as would procurement of rooftop solar.[216]

Perhaps in anticipation of this argument, the solar industry studies strike preemptively by positing rooftop-solar generation as a "100% renewable product."[217] The studies contend that "[i]t is critical that the avoided cost benefits of [rooftop solar] be calculated assuming that, in the absence of [rooftop solar], [Xcel] would have to supply the same product received by customers who install [rooftop solar]."[218] Presumably, some of the lower-cost wind and solar options that Xcel could pursue alternatively would not rise to the level of "100% renewable product."[219] Assuming for the sake of argument that it were true that alternative renewable sources would not generate "100% renewable product," the studies themselves concede that this standard is not required under Colorado's RES.[220]

The solar industry seeks to compare the value generated by rooftop-solar energy to that of the energy provided by Xcel under its Windsource program.[221] Windsource allows Xcel customers to pay a premium for energy generated solely by

212. *Id.*
213. *See id.*
214. *See* XCEL RATE SCHEDULES, *supra* note 59, at 93A (explaining that a rooftop-solar REC is the same as any other REC for RES compliance purposes).
215. *See* Howland, *supra* note 211.
216. *See, e.g.*, SEPA PRIMER, *supra* note 2, at 28 (discussing potential environmental impacts of rooftop solar as within the broader category of environmental impacts from solar energy generally).
217. SOLAR INDUSTRY I, *supra* note 128, at 9; SOLAR INDUSTRY II, *supra* note 147, at 12. Because the TASC study incorporates verbatim the Vote Solar study's argument on this point, this portion of the Comment references the solar industry studies generally but, for simplicity, cites to the Vote Solar study only.
218. SOLAR INDUSTRY I, *supra* note 128, at 9.
219. *See id.*
220. *Id.* at 9–10.
221. *Id.* at 10.

wind projects.[222] According to the industry studies, customers would have to pay a price equivalent to the current Windsource premium of $2.16 per 100kWh-block[223] in order to attain the same so-called "100% renewable product" that they currently receive through their rooftop-solar installations.[224] Thus, the studies maintain, rooftop solar contributes an added benefit of "Avoided 100% Renewables Costs" equal to $22.00/MWh.[225] This comparison is a non sequitur, at least insofar as quantifying the benefit to all ratepayers of rooftop solar is concerned. As already discussed, Colorado's RES has no "100% renewable product" requirement.[226] Thus, there exists no "100% renewable" cost that Xcel is avoiding by facilitating rooftop solar.[227] In addition, the Windsource premium is a voluntary payment made by individuals who want to affirmatively support the dispatch of renewable energy generation.[228] The extra cost is borne by those individuals alone.[229] By contrast, the cost of net metering excess rooftop-solar generation is imposed on all ratepayers and serves to *lower* the costs of the individual rooftop-solar customers allegedly seeking "100% renewable" energy.

The solar industry's arguments regarding the job-creation-related economic benefits of rooftop solar are similarly tempered from a societal perspective. To be sure, rooftop solar has created jobs in Colorado.[230] By one solar-industry estimate, solar companies currently employ 3,600 people in Colorado.[231] This figure places Colorado sixth among the States in solar jobs, with most of these jobs relating to the installation and

222. *See Windsource for Residences*, XCEL ENERGY, http://www.xcelenergy.com/Save_Money_&_Energy/Residential/Renewable_Energy_Programs/Windsource_for_Residences_-_CO [hereinafter *Windsource*] (last visited Feb. 6, 2014), *archived at* http://perma.cc/D652-MZTT.

223. *Id.*

224. SOLAR INDUSTRY I, *supra* note 128, at 10.

225. *Id.*

226. *See generally* COLO. REV. STAT. § 40-2-124 (2014).

227. *Id.*

228. *See Windsource*, *supra* note 222.

229. *See* XCEL RES PLAN, *supra* note 51, § 1, at 6–7.

230. The Vote Solar Initiative, *Colorado Public Utilities Commission Decision Keeps Rooftop Solar Shining*, ELECTRICENERGYONLINE.COM (Jan. 29, 2014), http://www.electricenergyonline.com/detail_news.php?ID=468200&titre=Colorado+Public+Utilities+Commission+Decision+Keeps+Rooftop+Solar+Shining&cat=;87;59, *archived at* http://perma.cc/8UM7-EZ3S.

231. *Id.*

manufacture of solar panels.[232] Setting aside arguments that reducing net-metering credits will not significantly impede solar jobs in Colorado in light of other available incentives and falling solar-panel costs,[233] or that these 3,600 jobs, too, are being subsidized by non-rooftop-solar ratepayers,[234] it suffices to note that the solar industry's argument here loses significant ground when considering that, of course, Xcel is also a major job-provider in Colorado. According to one estimate, Xcel has nearly 12,000 Colorado employees.[235] Thus, the obvious counterargument to the solar industry here is that Xcel itself provides over three times as many Colorado jobs as does the entire solar industry.[236] To the extent that net metering reduces Xcel's revenues in the short-run while simultaneously challenging Xcel's business model by incentivizing further rooftop-solar penetration in the long-run,[237] net metering has the potential to effectuate an overall *detriment* to Colorado's job market by threatening Xcel's financial viability.

Having demonstrated that the law mandates that, to the extent rate-related cross-subsidies are involved, the net-metering debate be framed from a ratemaking perspective, the TASC study's statistical emphasis on elevated hypothetical avoided emissions costs and a 10 percent adder for societal avoided costs is legally misplaced.[238] This proper framing also dispels the potential rooftop-solar net benefits arrived at under

232. *See* Mark Harden, *Colorado 6th for Solar-Energy Jobs*, DENV. BUS. J. (Apr. 18, 2013, 1:52 PM), http://www.bizjournals.com/denver/blog/earth_to_power/2013/04/colorado-6th-for-solar-energy-jobs.html, *archived at* http://perma.cc/5ZMV-874Q.

233. It is worth noting here that Xcel is increasing its efforts to obtain energy from large-scale solar projects, *see e.g.*, Howland, *supra* note 211, and that these projects will continue to feed Colorado's panel manufacture and installation industry because the projects are located in Colorado. *See* Eric Peterson, *Rooftop Solar Debate*, COLO. BIZ (Feb. 1, 2014), http://www.cobizmag.com/articles/rooftop-solar-debate, *archived at* http://perma.cc/22CD-MAVF.

234. *See* William Yeatman, *The Great Solar Rip-Off: By the Numbers*, ENERGY POL'Y CTR. INDEP. INST. (Apr. 23, 2013), http://energy.i2i.org/ 2013/04/23/the-great-solar-rip-off-by-the-numbers, *archived at* http://perma.cc/ 7ZTK-V7QQ.

235. Cathy Proctor, *Xcel Energy CEO: HQ Might Leave Minneapolis*, DENV. BUS. J. (July 26, 2013, 1:23 PM), http://www.bizjournals.com/denver/blog/earth_to_power/2013/07/xcel-energy-inc-ceo-tells-paper.html, *archived at* http://perma.cc/36V7-578E.

236. *Compare* The Vote Solar Initiative, *supra* note 230, *with* Proctor, *supra* note 235.

237. *See* Schmitt, *supra* note 86, at 426–27.

238. *See* SOLAR INDUSTRY II, *supra* note 147, at 6–7, 13–14.

the Vote Solar study's "[h]igh GHG" case.[239] Carrying forward the base GHG estimate of $5.10/MWh used in both Xcel's study and the solar industry's initial study,[240] the next section addresses the hard system-related cost categories still in dispute.

C. Hard System-Related Factors

Xcel and the solar industry agree on the level of avoided costs attributable to rooftop solar in a few relevant categories.[241] In order to maintain focus on the two categories in which the parties' calculations diverge most drastically—avoided transmission and avoided generation costs—the following discussion assumes solar-industry agreement with Xcel on solar integration costs and avoided distribution costs, line losses, and ancillary service costs.[242] Consistent with the general approach of the Comment, this section does not attempt to arrive at a specific, objectively correct figure for the value of any hard-system category. This section does, however, briefly examine the parties' conclusions and considered factors and shows that, almost irrespective of rooftop solar's contribution to avoided transmission and generation costs, Xcel's system will require vast upgrades over time that cannot

239. *See* SOLAR INDUSTRY I, *supra* note 128, at 9, 11.

240. *Id.* at 8; XCEL STUDY, *supra* note 124, at 26, 43.

241. *Compare, e.g.*, XCEL STUDY, *supra* note 124, at 43, *with* SOLAR INDUSTRY I, *supra* note 128, at 8, *and* SOLAR INDUSTRY II, *supra* note 147, at 14.

242. *Compare* XCEL STUDY, *supra* note 124, at 43, *with* SOLAR INDUSTRY I, *supra* note 128, at 8, *and* SOLAR INDUSTRY II, *supra* note 147, at 14. Although both solar industry studies deferred to Xcel's solar integration costs (which are posited as costs incurred, not costs avoided), Crossborder came to different conclusions in each study regarding avoided distribution costs, avoided line losses, and avoided ancillary service costs. The first study deferred to Xcel's $0.50/MWh estimation of avoided distribution costs, but projected avoided line losses at a higher value than did Xcel, and included ancillary avoided costs, which Xcel's study did not include. The second study reversed course, calculating avoided distribution costs at $6.00/MWh but deferring to Xcel's avoided line losses projection and leaving avoided ancillary costs out of the equation. This Comment assumes Xcel's estimates for each of the two included categories and assumes exclusion of the third. These agreements are assumed both for purposes of simplicity and because Crossborder's reversal on line losses and ancillary costs were grounded expressly in the new-information rationale upon which it explained its revisiting the initial study, while its reversal on distribution costs does not appear grounded in new information and does appear to rely on at least one non-rooftop-solar cost driver, an extremely narrow data sampling, and several other statistical infirmities. Ultimately, though, both categories have a comparatively minimal impact on the overall cost-benefit calculation.

equitably be left to an ever-diminishing number of non-rooftop-solar customers.

The parties' approaches to quantifying avoided transmission costs differ significantly.[243] Thus, because the intent here is not to discern an ultimately appropriate methodology or scientifically correct end result, and because avoided transmission costs in this context are directly linked to avoided generation costs,[244] this discussion assumes that any signaled reduction or increase in the parties' avoided generation-capacity estimates would likewise result in a corresponding reduction or increase in avoided transmission estimates.

The value of rooftop solar to a utility's generation-capacity costs depends heavily on (1) when the utility shows a need for incremental generation,[245] and (2) what capacity value is assigned to rooftop solar.[246] Xcel maintains that it will need no incremental generation until 2017 and thus assigned a low capacity value to rooftop solar for its study period up to 2017.[247] This approach appears to comport with common consensus.[248] The TASC study, on the other hand, borrowed a proxy method used by Xcel in calculating capacity value for Demand-side Management (DSM) programs and used that method to argue that Xcel is relying currently on rooftop solar for capacity.[249] Therefore, the TASC study maintains, Xcel should factor in a need for incremental generation in the years

243. *Compare* XCEL STUDY, *supra* note 124, at 37–41, *with* SOLAR INDUSTRY II, *supra* note 147, at 7–9.

244. *See* XCEL STUDY, *supra* note 124, at 37–38. The study also notes that avoided transmission costs correlate to avoided distribution costs as well; but here, avoided distribution costs are assumed to be negligible. *See id.*

245. "Incremental generation" refers to additional generation necessary to meet a utility's load. Incremental generation could be necessary because of an increase in demand for electricity or because of a reduction in output from a utility's existing generation portfolio, or both. It is "incremental" because it refers to additions of generation sized to accommodate a given increment of demand growth or supply reduction, usually equivalent to a small fraction of the utility's overall generation capacity. *See* SEPA PRIMER, *supra* note 2, at 12–13, 26 (discussing "incrementalism" in ratemaking and generation-capacity planning).

246. *See id.* at 26.

247. *See* XCEL STUDY, *supra* note 124, at 23.

248. *See, e.g.*, SEPA PRIMER, *supra* note 2, at 26 ("[U]tilities with excess capacity in the near-term would assign little to no value to . . . [rooftop-solar] systems, because they are not avoiding or deferring generation additions until those years when load growth or retirements are forecast to establish a need for . . . capacity.").

249. SOLAR INDUSTRY II, *supra* note 147, at 5–6.

leading up to 2017, too.[250] This analysis does not, however, show that Xcel would need excess capacity before 2017 but for the installed rooftop solar.[251] To the contrary, the figures presented in Xcel's 2011 Electric Resource Plan, upon which both parties' studies rely, suggest that Xcel has more MW of excess capacity in the years leading up to 2017 than total MW of installed rooftop-solar capacity.[252] The resource plan also claims to have taken rooftop-solar resources into account already.[253] Thus, to the extent that the TASC study relied on capacity demand for the first five years of its study period, its avoided capacity calculation is likely overinflated.

The solar industry also relied on a different measure of capacity value than Xcel did.[254] Xcel used effective load carrying capability (ELCC) values collected from actual rooftop-solar units in 2009 and 2010.[255] This approach was also endorsed by the California Public Utilities Commission (CalPUC) in its recent study of the costs and benefits of rooftop solar in California.[256] There, the CalPUC recognized that "ELCC is a more appropriate measure of capacity values" in states with high RPS targets.[257] The CalPUC study also confirmed Xcel's assertion, and the belief of many observers, that increased rooftop-solar penetration leads to decreasing capacity value over time.[258] To the extent that the TASC study rejected using ELCC because of its small sample size and

250. *Id.*

251. *Id.*

252. *See* PUB. SERV. CO. OF COLO., 2011 ELECTRIC RESOURCE PLAN vol. 1, at 27, tbl.1.4-2 (2011), *available at* http://www.xcelenergy.com/staticfiles/xe/Regulatory/Regulatory%20PDFs/PSCo-ERP-2011/Exhibit-No-KJH-1-Volume-1.pdf, *archived at* http://perma.cc/JUA5-9H7D.

253. *Id.*

254. *See* SOLAR INDUSTRY II, *supra* note 147, at 3–4.

255. XCEL STUDY, *supra* note 124, at 24.

256. CAL. PUB. UTILS. COMM'N, CALIFORNIA NET ENERGY METERING RATEPAYER IMPACTS EVALUATION app. C, at C-7 (2013) [hereinafter CALPUC REPORT], *available at* http://www.cpuc.ca.gov/NR/rdonlyres/C311FE8F-C262-45EE-9CD1-020556C41457/0/NEMReportWithAppendices.pdf, *archived at* http://perma.cc/YDX5-A7X9.

257. *See id.* After California's 33 percent mandate, Colorado's 30 percent mandate is the next highest by-2020 RPS target among the States. *See Renewable Portfolio Standard Policies*, DATABASE STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (DSIRE) (Sept. 2014), http://www.dsireusa.org/documents/summarymaps/RPS_map.pdf, *archived at* http://perma.cc/2PPA-UPXS.

258. *See* CALPUC REPORT, *supra* note 256, app. C, at C-8; XCEL STUDY, *supra* note 124, at ii; SEPA PRIMER, *supra* note 2, at 27.

because it deviated from prior projections,[259] the study's rejection may have been unfounded and Xcel's figures may be more trustworthy.

Though rooftop solar does contribute to reducing Xcel's hard costs, it does not eliminate them or reduce them to an extent that net-metering participants are justified in passing the bulk of these costs along to non-participants. Increased renewables render upgrades to utilities' infrastructure more important than ever.[260] Indeed, "[i]t is impossible to talk about developing renewable energy resources in the United States without also talking about developing electric transmission infrastructure."[261] Similarly, increased rooftop solar will not prevent the need for Xcel to continue to build or purchase new generation capacity.[262] Current Federal Energy Regulatory Commission (FERC) orders require Xcel to carry planning reserves for the full extent of a customer's load, regardless of whether the customer has installed rooftop solar.[263] Because solar is an intermittent resource, fossil fuel-fired plants—namely, natural gas plants—are needed to maintain system stability, at least for the foreseeable future.[264] This need to obtain more natural gas-fired generation is especially pronounced for Xcel, which is scheduled to remove 1,300MW of coal-fired generation from its energy portfolio by 2017.[265] Thus,

259. SOLAR INDUSTRY II, *supra* note 147, at 3–4.

260. *See, e.g.*, Alexandra B. Klass & Elizabeth J. Wilson, *Interstate Transmission Challenges for Renewable Energy: A Federalism Mismatch*, 65 VAND. L. REV. 1801, 1802 (2012).

261. *Id.* This quotation and the sentence preceding it are not intended to suggest that rooftop solar itself exacerbates the need for transmission infrastructure upgrades. Rather, the RES's 30-percent-by-2020 mandate, as a whole, contributes to such a need. *See generally id.* The point is to note that, at a time when upgrades to transmission systems affecting all electricity consumers are becoming paramount, net-metered consumers' contributions to such upgrades are waning.

262. *See* Steven Weissman, *Effective Renewable Energy Policy: Leave it to the States?*, 3 SAN DIEGO J. CLIMATE & ENERGY L. 345, 349 (2011–2012).

263. *See* XCEL STUDY, *supra* note 124, at i. Planning reserves encompass supplemental generation capacity held by utilities for deployment in the event of unusually high peak demand. *See* Cent. & S. W. Servs., Inc., 49 FERC ¶ 61,118, 61,503 (1989) (Trabandt, Comm'r, concurring) ("In the electric industry, companies must maintain cushions in case they need more capacity to meet demand. We call cushions, reserves, that utilities use in their planning 'planning reserves.' These reserves help the electric industry maintain steady service, or reliability.").

264. *See* Weissman, *supra* note 262, at 349.

265. XCEL STUDY, *supra* note 124, at ii.

increased rooftop-solar penetration still will not obviate Xcel's need for continued investment in distribution, transmission, and generation assets.

The above value considerations lead inevitably to the conclusion that net-metering ratepayers do not shoulder their full share of electricity system costs, and therefore shift a portion of those costs to other ratepayers. This type of cross-subsidy has long been a concern of the Colorado entities in charge of regulating rates.[266] As currently composed, Colorado's full retail-rate net-metering credit runs the risk of violating the "just and reasonable" doctrine.[267] Under that doctrine, although the Commission has authority to establish different rates for different classes, "consumers within the same class of service should be subject to substantially similar rates."[268] Furthermore, "overcompensation cannot be just and reasonable."[269] When the cross-subsidy exposed above is combined with the RES-imposed 2 percent RESA subsidy already in place, the argument against retail-rate net metering gains considerable traction. The question becomes, then, are there other options? Should Colorado's net-metering policy be eliminated, or is there an appropriate middle ground? In the next Part, this Comment seeks to answer these questions in the affirmative by positing "renewable avoided cost" as a legally and equitably acceptable median approach.

IV. THE CASE FOR "RENEWABLE AVOIDED COST"

"Avoided cost" generally is defined as "the cost to [an] electric utility of the electric energy which, but for the purchase from [a] cogenerator or small power producer, such utility would generate or purchase from another source."[270] Here, Xcel's avoided cost under that traditional definition relates to the price Xcel would pay to produce or purchase alternative energy, but for the energy sent to the grid from its customers'

266. *See supra* Part III.A.

267. *See supra* Part I.C; *see also* CF&I Steel, L.P. v. Pub. Utils. Comm'n, 949 P.2d 577, 584–85 (Colo. 1997).

268. *CF&I Steel*, 949 P.2d at 584.

269. Elec. Power Supply Ass'n v. FERC, 753 F.3d 216, 225 (D.C. Cir. 2014) (citation omitted).

270. Am. Paper Inst., Inc. v. Am. Elec. Power Serv. Corp., 461 U.S. 402, 406 (1983) (quoting PURPA, 16 U.S.C. § 2621 (2012)).

rooftop-solar installations.[271] Because avoided-cost rates are "not to exceed the incremental cost to the utility of alternative electric energy,"[272] avoided cost traditionally has been understood to reflect the price of acquiring energy from the cheapest possible alternative source.[273] Thus, in Colorado, Xcel's avoided cost under a traditional formulation reflects its cost in producing or purchasing energy generated from a coal-fired power plant.[274] Recently, however, FERC reasoned that avoided cost could be calculated differently in the context of renewable generation sources, at least in certain circumstances.[275] FERC's reasoning provides persuasive foundational support for considering a similar approach in Colorado.

In *California Public Utilities Commission* (*CalPUC II*), FERC considered the CalPUC's request for clarification of a previous FERC order.[276] In the previous order, *CalPUC I*, the CalPUC had sought a declaratory finding that FERC's Federal Power Act (FPA) and PURPA jurisdiction did not extend to certain combined heat and power (CHP) generating facilities located in California.[277] The CalPUC wanted to promote CHPs' renewable energy generation by implementing a feed-in tariff[278] program that would have required utilities to offer to purchase CHPs' energy for a set, contractual time period at a

271. *See id.*

272. Phoenix Power Partners, L.P. v. Pub. Utils. Comm'n, 952 P.2d 359, 361 (Colo. 1998) (citing PURPA, 16 U.S.C. § 2621 (2012)).

273. *E.g.*, Bradley Motl, *Reconciling German-Style Feed-In Tariffs With PURPA*, 28 WIS. INT'L L.J. 742, 753 (2011). This understanding is reflective of public utility commissions' general duty to ensure that customers pay the lowest rates possible. *See supra* note 204 and accompanying text.

274. *See* City of Boulder v. Pub. Utils. Comm'n, 996 P.2d 1270, 1275–76 (Colo. 2000) (stating that calculation of avoided cost in Colorado is made with reference to the cost of power generation at Pawnee, a coal-fired power plant); *see also Colo. Electricity*, *supra* note 11, tbl.6 (listing costs of energy produced from coal, petroleum, and natural gas).

275. *See* Cal. Pub. Utils. Comm'n (*CalPUC II*), 133 FERC ¶ 61,059, 61,265–67 (2010) (order granting clarification and dismissing rehearing).

276. *Id.* at 61,265.

277. Cal. Pub. Utils. Comm'n (*CalPUC I*), 132 FERC ¶ 61,047, 61,326 (2010) (order on petitions for declaratory order).

278. Although beyond the scope of this Comment, a feed-in tariff is another command-and-control regulatory instrument being used in countries around the world to facilitate greater solar and other renewable energy generation. *See* David Grinlinton & LeRoy Paddock, *Climate Change and the Future of Energy: The Role of Feed-In Tariffs in Supporting the Expansion of Solar Energy Production*, 41 U. TOL. L. REV. 943, 944–45 (2010). For more on feed-in tariffs, see generally *id.*

CalPUC-established price greater than avoided cost.[279] The CalPUC did not attempt to situate its program as an implementation of PURPA.[280]

Under PURPA, state public utilities commissions may require utilities to purchase power from most "qualifying facilities" (QFs) under long-term contracts at a per-unit price equivalent to a given utility's avoided cost.[281] Because states are given authority to determine avoided cost rates, this aspect of PURPA represents an exception to the general inability of states to control the rates of wholesale sales of electricity.[282] However, because the CalPUC did not argue that its feed-in tariff for CHP generation was an implementation of PURPA, FERC found that the CalPUC's program impermissibly set rates for wholesale sales of electricity and was preempted by the FPA.[283] But, FERC also declared that the CalPUC *could* force utilities to purchase energy from CHP generators at set prices if those generators qualified for and obtained QF status pursuant to PURPA.[284] Such mandated purchases, however, had to be set at a rate equivalent to the purchasing utilities' avoided cost.[285]

In this context, FERC considered in *CalPUC II* the CalPUC's request that it be allowed to establish different tiers of avoided cost.[286] A multi-tiered approach would allow the CalPUC to retain jurisdiction over the rates charged to utilities by CHP generators as QFs while achieving its objective of setting such rates at a higher per-unit price than a traditional avoided-cost formulation would yield.[287] Relying on its own precedent, FERC concluded that the avoided-cost calculation was sufficiently flexible to allow consideration of the particular

279. *See CalPUC I*, 132 FERC at 61,326–27. FERC was "not asked" in *CalPUC I* to determine whether the CalPUC's requested purchase price for CHP energy exceeded the California purchasing utilities' avoided cost. *Id.* at 61,338. But, the fact that the CalPUC was seeking to establish a purchase price greater than the utilities' avoided cost under a traditional formulation is evidenced by its initiation of *CalPUC II* and its arguments therein.

280. *See id.*

281. *See* PURPA § 210, 16 U.S.C. § 824a-3 (2012).

282. *See CalPUC I*, 132 FERC at 61,337–38.

283. *Id.*

284. *Id.* at 61,338.

285. *Id.*

286. *CalPUC II*, 133 FERC at 61,265.

287. *See id.* at 61,262–63.

costs that given electric utilities were avoiding.[288] FERC reasoned further that this flexibility allowed a state public utilities commission to consider obligations imposed by the state that required utilities to purchase energy from specific sources.[289] When determining avoided cost, FERC maintained, a state "must in its process reflect prices available from all sources *able to sell to the utility* whose avoided cost is being determined."[290] Thus, "if a state required a utility to purchase 10 percent of its energy needs from renewable resources, then a [fossil fuel-fired] unit, for example, would not be a source 'able to sell' to that utility for the specified renewable resources segment of the utility's energy needs, and thus would not be relevant to determining avoided costs for that segment of the utility's energy needs."[291] In other words, "where a state requires a utility to procure a certain percentage of energy from generators with certain characteristics, generators with those characteristics constitute the sources that are relevant to the determination of the utility's avoided cost for that procurement requirement."[292] FERC therefore concluded that, because California had in place an RPS that required California utilities to procure a percentage of their energy from renewable sources, the CalPUC could set avoided cost at a different rate for renewable generation sources—including CHP generators—than other types of generation sources.[293]

Although rooftop-solar units' exchanges of energy with Xcel's distribution grid are not wholesale sales of electricity subject to FERC jurisdiction[294] (and thus, the units do not need

288. *See id.* at 61,265–66.

289. *Id.* at 61,266.

290. *Id.* (emphasis added) (internal quotation marks omitted) (quoting SoCal Edison, 70 FERC ¶ 61,215, 61,677 (1995)).

291. *Id.* at 61,266–67.

292. *Id.* at 61,267.

293. *See id.*

294. *See* Sun Edison LLC, 129 FERC ¶ 61,146, 61,620–21 (2009) (declaratory order); MidAmerican Energy Co., 94 FERC ¶ 61,340, 62,263–64 (2001) (order denying request for declaratory order). Interestingly, FERC has maintained that its jurisdiction is not implicated only to the extent that "there is no net sale [from the customer to the utility] over the billing period." *Sun Edison*, 129 FERC at 61,620. Consequently, if a rooftop-solar unit's excess generation were to exceed its consumption during a given bill period, FERC's jurisdiction over the rates applicable to that transaction presumably would preempt the Commission's jurisdiction over such rates. *See id.* at 61,620–21. Then, the Commission could regain jurisdiction only if the rooftop units obtained QF status and adhered to an avoided-cost methodology. *See id.* at 61,620–21, 61,621 n.16 ("SunEdison's [retail,

to obtain QF status in order to be regulated by the Commission), FERC's line of reasoning in *CalPUC II* is nonetheless logically adaptable to Colorado's rooftop-solar pricing issue. Like the California utilities implicated there, Xcel, too, must produce or acquire a certain percentage of its energy from "eligible energy resources," as mandated by Colorado's RES.[295] Xcel uses the RECs associated with the rooftop-solar energy generated by its net-metered customers to comply with the RES's mandate.[296] Thus, the cost that Xcel would avoid in garnering energy alternative to that produced by its net-metered customers is more readily comparable to the cost of energy from other renewable resources than it is to the cheaper cost of energy produced by fossil fuel-fired sources.[297] The value of energy sent to the grid from rooftop-solar installations, then, could be monetized based on Xcel's "renewable avoided cost." This price would reflect Xcel's incremental cost of supplying alternative energy from the cheapest available qualifying "eligible energy resource," as defined by Colorado's RES,[298] because those resources are the only alternative energy sources relevant to complying with the RES's mandates.

To avoid solar being undercut by cheaper energy from wind,[299] the Commission could establish a tiered avoided-cost structure for different renewable sources like the structure approved of by FERC in *CalPUC II*.[300] Although Colorado's RES differs from the CalPUC's feed-in tariff policy,[301] and thus RES-born net-metering transactions do not face the same FERC jurisdictional hurdles, FERC's acceptance of a tiered avoided-cost structure there provides persuasive authority for

on-site solar] facilities would appear to be QFs if SunEdison makes the requisite self-certification filings."). In that scenario, it might become necessary for the Commission or the solar industry, in order to prevent excess generation valuation at fossil fuel-based avoided cost, to argue that the multi-tiered approach endorsed in *CalPUC II* is permissible in Colorado.

295. *See* COLO. REV. STAT. § 40-2-124(1)(c)(I) (2014).

296. *See* 4 COLO. CODE REGS. § 723-3-3658(b) (2014).

297. *See CalPUC II*, 133 FERC at 61,266–67.

298. COLO. REV. STAT. § 40-2-124(1)(a), (a)(VI)–(VII).

299. *See* Richard J. Pierce, Remark, *Legal Disputes Related to Climate Change Will Continue for a Century*, 41 ENVTL. L. 1257, 1260–61 (2012).

300. *See CalPUC II*, 133 FERC at 61,266–67.

301. *See generally* Felix Mormann, *Enhancing the Investor Appeal of Renewable Energy*, 42 ENVTL. L. 681 (2012) (discussing the differences between RPSs and feed-in tariffs).

an assumption that a similar rate structure in Colorado's net-metering context would satisfy the "just and reasonable" doctrine.[302] Thus, under this reasoning, the Commission could create a rate tier for solar-generated energy and credit excess rooftop-solar generation at that rate, which would be less than the current retail-rate credit but more than Xcel's gas, coal, or wind-based avoided cost under a traditional formulation.[303] In practice, this separate valuation could amount to a "dual-rate"[304] in which Xcel bills rooftop-solar customers' consumption at the retail rate, and then deducts from their bills the sum of their units of excess generation multiplied by the utility's "renewable avoided cost."

Quantifying excess rooftop-solar generation at "renewable avoided cost" could better serve the interests of both Xcel and the solar industry. Xcel would gain back a portion of its revenue currently negated by excess generation credited at retail price; the solar industry would remain protected from having to compete on a level, price-point basis with cheaper energy produced from fossil fuels and other non-solar renewables. Given the ferocity of the opposition to Xcel's proposed cutbacks and the solar industry's ability to rally public sympathy behind the guise of clean energy, Xcel would be prudent to endorse a middle-ground approach. And, given Xcel's likely ability to cut its Solar*Rewards program to minimum-compliance acquisition levels,[305] the solar industry, too, would be wise to compromise. Most importantly, though, a "renewable avoided cost" approach would ameliorate current overcompensation and thereby mitigate against the current cross-subsidization that threatens to render net-metering rates violative of the "just and reasonable" doctrine.

CONCLUSION

The rival sides of the net-metering debate in Colorado both have an enormous stake in the outcome of any Commission decision reached regarding the future of the state's net-metering policy. The solar industry risks losing an incentive

302. See *supra* Part I.C, for a brief overview of the "just and reasonable" doctrine.

303. *See* Pierce, *supra* note 299, at 1260–61.

304. *See* SEPA PRIMER, *supra* note 2, at 20.

305. *See* XCEL RES PLAN, *supra* note 51, § 5, at 9.

ostensibly responsible for convincing many Coloradans to install rooftop solar already and faces the bleak reality of moving closer to unsubsidized competition with cheaper energy sources. Xcel risks watching its own compelled programs undercut revenues and circumvent the monopoly franchise model to which it has become accustomed under traditional public utility law. These clashing industry interests may be responsible for bringing Colorado's net-metering debate to public light, but neither of their interests should carry the day.

Rather, the public interest must be brought to bear on the issue. Although "public interest" in a holistic sense may entail viewing our state's energy future from a societal perspective, consideration of the public interest as it relates to rate allocation between utility customers is legally confined to a cost-of-service, ratemaking perspective. As this Comment has demonstrated, Colorado's full retail-rate net-metering policy creates a cross-subsidy between ratepayers, whereby rooftop-solar customers' necessary grid use is funded to an escalating proportion by non-solar customers. Just because the current subsidy should not be sustained, however, does not mean that a tempered net-metering policy is impermissible. Instead of discarding net metering altogether or exposing the solar industry to competition unassisted, a compromise should be struck. This compromise, between the competing industry interests and among consumers, should reduce the current retail-rate net-metering credit, but not to its market value. Instead, the Commission should adopt—and the net-metering debate's participants should agree to—a "renewable avoided cost" approach that would credit excess rooftop-solar generation at the cost to Xcel of procuring solar elsewhere. Such a solution would protect the public interest by better maintaining intraclass ratepayer equity while simultaneously continuing to support Colorado's transition to a cleaner-energy future.