Planning for the Sun to Come Up: How Nevada and California Explain the Future of Net Metering

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I. INTRODUCTION

There once was a time when a rooftop solar panel was an oddity. A sun-powered home was the type of thing that you would point out to visitors and show off to your family and friends. That time has passed. Rooftop solar panels are no longer an oddity; in some neighborhoods, they are a required accessory.[1] The increasing popularity of rooftop solar can be attributed to net metering policies. Net metering policies allow consumers to receive credit for the electricity their rooftop solar panels transmit to the

1. Felicity Barringer, *With Help From Nature, a Town Aims to Be a Solar Capital*, N.Y. TIMES (Apr. 8, 2013), http://www.nytimes.com/2013/04/09/us/lancaster-calif-focuses-on-becoming-solar-capital-of-universe.html [https://perma.cc/Y5N7-SK6A]; Camila Domonoske, *San Francisco Requires New Buildings To Install Solar Panels*, NPR NEWS (Apr. 20, 2016), http://www.npr.org/sections/thetwo-way/2016/04/20/474969107/san-francisco-requires-new-buildings-to-install-solar-panels [https://perma.cc/6XD2-TM9M]; *see also* Kate Wheeling, *A California Bill Would Require Solar Panels on All New Buildings*, PS MAG (Jan. 10, 2017), https://psmag.com/a-california-bill-would-require-solar-panels-on-all-new-buildings-4fa471e6f7f8#.v635bih1a [https://perma.cc/JC3N-T5YQ].

grid when the sun is shining and apply those credits against the electricity they receive when the sun has gone away. The spread of rooftop solar power in the United States has transformed many homes into miniature power generators delivering energy to the electrical grid. This transformation contradicts the clearly defined role of the utility and the customer under the traditional utility business model. As the push for more renewable energy and fewer greenhouse gas emissions increases, this stress will only intensify. Customers are flocking to net metering programs to take control of their electric bills while simultaneously reducing their carbon footprint.

The success of net metering has not gone unnoticed by the electric utility sector. As more rooftop solar connects to the grid, solar customer's questions about fair compensation for utilities have grown from whispers into full-blown debates. Net metering debates have spread to state legislatures and public utility commissions where bills and dockets have sought to balance net metering policies with ratepayer equity. The results of these debates, bills, and dockets have not been consistent. Some states decided to terminate their net metering programs, while other states set up transition strategies to accommodate future demand. Nowhere have the results of this debate been more divergent than in the neighboring states of Nevada and California. Recent decisions from the Public Utilities Commission of Nevada (PUCN) and the California Public Utilities Commission (CPUC) have taken opposing positions on the future of net metering. The PUCN terminated its net metering tariff for future and existing customers—a decision that was later rolled back by court decisions and political action. The CPUC decided to grandfather current customers under the existing tariff and created a successor tariff for new customers, which relies heavily upon time-of-use rates.

This Article explores the growth of rooftop solar and the future of net metering through the debates and policies of Nevada and California. Part II details the recent, rapid growth and projected future growth of solar power in the United States. Part II also describes how Nevada and California are leading the nation in utilization of solar power and are already addressing issues that are likely to emerge in other areas of the country. Part III begins with a brief introduction to net metering and the national scope of net metering program reviews. Part III concludes with a summary of the most recent changes to each state's net metering laws. Part IV contains a comparative analysis of five key legislative and regulatory factors influencing how net metering will develop in the future. The

elements are the interaction between renewable portfolio standards and net metering programs, solar photovoltaic (PV) incentive programs, time-of-use rates, electricity sector decoupling, and comprehensive electric grid planning. Part V summarizes key findings from our research and provides lessons learned for other states considering evolving their net metering programs. Part VI concludes this article with a forward-looking assessment of the challenges facing net metering.

II. GROWTH OF SOLAR POWER

Renewable energy generation is booming across the country. Solar panels are springing up on roofs and solar farms are blooming all over the landscape. By late 2016, the U.S. had almost 36 GW of installed solar capacity, with the pace of installation accelerating.[2] Solar expansion is driven by decreasing installation costs, incentive programs, and tax credits.[3] Solar installation costs have dropped 63% since 2011 and 18% between 2015 and 2016.[4] The extension of the Federal Investment Tax Credit (ITC) through 2022[5] is expected to increase growth rates in the solar industry.[6]

A primary driver of current and future solar expansion is rooftop solar. In 1997, the federal government announced the "Million Solar Roofs Initiative."[7] In 2016, the one-millionth rooftop solar array was installed in the U.S.[8] The two millionth rooftop array is projected to be installed by

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2. *Solar Adds More Than 4 Gigawatts of Capacity in Q3, Marking its Largest Quarter in History*, N. AM. CLEAN ENERGY (Feb. 22, 2017), http://www.nacleanenergy.com/articles/25700/solar-adds-more-than-4-gigawatts-of-capacity-in-q3-marking-its-largest-quarter-in-history [https://perma.cc/RK32-WGMR].

3. *Solar Industry Data: Solar Industry Growing at a Record Pace*, SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/research-resources/solar-industry-data [https://perma.cc/M46U-5ZTX] (last visited Oct. 18, 2016).

4. *Id*.

5. *Business Energy Investment Tax Credit (ITC)*, U.S. DEP'T ENERGY, http://energy.gov/savings/business-energy-investment-tax-credit-itc [https://perma.cc/5V9Z-X7SR] (last visited Apr. 19, 2017).

6. *See id.*; Trieu Mai et al., *Impacts of Federal Tax Credit Extensions on Renewable Deployment and Power Sector Emissions*, NAT'L RENEWABLE ENERGY LAB. 16 (February 2016), http://www.nrel.gov/docs/fy16osti/65571.pdf

7. *Million Solar Roofs: Become One in a Million*, U.S. DEP'T ENERGY 1 (2003), http://www.nrel.gov/docs/fy04osti/34009.pdf [https://perma.cc/T8TJ-W3Z4]; *see also* G. Strahs, *Laying the Foundation for a Solar America: The Million Solar Roofs Initiative: Final Report October 2006*, U.S. DEP'T ENERGY (Oct. 2006), http://www.nrel.gov/docs/fy07osti/40483.pdf [https://perma.cc/TJ67-TVXK].

8. Julia Piper, *The U.S. Solar Market is Now 1 Million Installations Strong*, GREENTECH MEDIA (Apr. 21, 2016), http://www.greentechmedia.com/articles/read/The-U.S.-Solar-Market-Now-One-Million-Installations-Strong [https://perma.cc/U2P9-BXMG].

2018.[9] At the end of 2015, the capacity of small-scale distributed generation—which includes residential, commercial, and industrial rooftop arrays—topped 4 GW.[10] In 2016, it was estimated that an additional 3 GW of new residential and non-residential solar would be installed, in actuality more than 4 MW were installed.[11]

The continued growth of rooftop solar and net metering is expected to create serious financial losses for utilities and power producers. An ICF International report estimates that by 2019, rooftop solar could cause losses of up to $2 billion for power producers in the Northeast alone.[12] The pressures intensify for Nevada and California, as they are the two states leading the U.S. solar revolution. California has the most installed solar capacity in the U.S. with more than 13 GW.[13] Ranked fifth in the nation, Nevada has more than 1.2 GW of installed capacity.[14] In terms of installed capacity per capita, Nevada leads the nation with 429 watts per person, while California trails closely behind in third place with 338 watts per person.[15] In 2006, California implemented its own state "Million Solar Roofs Program,"[16] with a goal of installing one million solar energy systems on new and existing residential and commercial customer sites within the next decade, a total amount of solar rooftop generation capacity of 3,000 MW.[17] At the end of 2015, the total amount of installed solar in

9. Andrew Savage, *1 Million Solar Strong, and Growing*, SOLAR ENERGY INITIATIVES ASS'N (May 3, 2016), http://www.seia.org/blog/1-million-solar-strong-growing [https://perma.cc/5MWY-B4V5].

10. *See EIA electricity data now include estimated small-scale solar PV capacity and* generation, U.S. ENERGY INFO. ADMIN. (Dec. 2, 2015), http://www.eia.gov/todayinenergy/detail.php?id=23972 [https://perma.cc/AB2H-N4BQ].

11. *U.S. Solar Market Sets New Record, Installing 7.3 GW of Solar PV in 2015*, SOLAR ENERGY INITIATIVES ASS'N (Feb. 22, 2016), http://www.seia.org/news/us-solar-market-sets-new-record-installing-73-gw-solar-pv-2015 [https://perma.cc/56L5-DZKA]; SOLAR ENERGY INITIATIVES ASS'N (Mar. 7, 2017), *Solar Market Insight Report 2016 Year In Review*, http://www.seia.org/research-resources/solar-market-insight-report-2016-year-review.

12. Jonathan Crawford, *$2 Billion Loss for Generators as a Million U.S. Roofs Get Solar*, BLOOMBERG NEWS (Mar. 15, 2016), https://www.bloomberg.com/news/articles/2016-03-16/-2-billion-loss-for-generators-as-a-million-u-s-roofs-get-solar [https://perma.cc/58KK-E94A].

13. *Top 10 Solar States*, SOLAR ENERGY INITIATIVES ASS'N (Dec. 2015), http://www.seia.org/research-resources/top-10-solar-states [https://perma.cc/X2J5-65VV] (noting that total installed solar includes both utility-scale, residential, and commercial solar projects).

14. *Id.*

15. *Id.*

16. S.B. 1, 2005-2006 Reg. Sess. (Cal. 2006).

17. *Id.*

Nevada was 1,240 MW[18], placing the state as first in the nation for per capita installed solar with 421 watts per person.[19] During that same year, Nevada installed 409 additional MW of solar generation, marking a 17% growth increase from 2014.[20]

In 2016, California had more than 625,000 solar PV installations,[21] and Nevada had more than 30,000 solar PV installations.[22] Despite the advanced phase of each state's solar PV program, Nevada and California are just beginning to tap into the generation potential of their rooftops. A 2016 NREL study found that California's estimated technical potential for rooftop solar PV could provide 74.2% of its annual consumption.[23] Nevada's estimated technical potential could provide 39.6% of its annual consumption.[24]

III. NET METERING AND NET METERING SUCCESSOR TARIFFS

Net metering is a billing mechanism for electric customers who generate their own electricity. Net metering allows electric customers to send excess electricity to the grid in return for a credit that can be applied to offset the electricity they consume.[25] Currently, forty-three states, the District of Columbia, and four territories have mandatory net metering rules.[26] Almost all of the states with net metering programs are undergoing

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18. *Nevada Solar*, SOLAR ENERGY INITIATIVES ASS'N, http://www.seia.org/state-solar-policy/nevada [https://perma.cc/TC66-D5JK] (last visited Dec. 2, 2016) (noting that total installed solar includes both utility-scale, residential, and commercial solar projects).

19. Sean Whaley, *Nevada Led US in Solar Electricity Per Capita, Study Says*, LAS VEGAS REV. J. (July 21, 2016, 11:39 AM), http://www.reviewjournal.com/business/energy/nevada-led-us-solar-electricity-capita-study-says [https://perma.cc/XDF3-S7TK].

20. SOLAR ENERGY INITIATIVES ASS'N, *supra* note 18 (noting that total installed solar includes both utility-scale, residential, and commercial solar projects).

21. *The Open PV Project*, NAT'L RENEWABLE ENERGY LAB., https://openpv.nrel.gov/rankings [https://perma.cc/7BHE-3GCB] (last visited Oct. 19, 2016).

22. Snuller Price et al., *Nevada Net Energy Metering Impacts Evaluation 2016 Update*, PUB. UTIL. COMMISSION NEV. 2 (Aug. 2016), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2016-8/14264.pdf [https://perma.cc/AD7P-U3AD].

23. Pieter Gagnon et al., *Rooftop Solar Photovoltaic Technical Potential in the United States: A Detailed Assessment*, NAT'L RENEWABLE ENERGY LAB. 35 (Jan. 2016), http://www.nrel.gov/docs/fy16osti/65298.pdf [https://perma.cc/FWZ3-LE45].

24. *Id.*

25. *Glossary*, DSIRE—N.C. CLEAN ENERGY TECH. CTR., http://www.dsireusa.org/support/glossary/ [https://perma.cc/24JW-VBWK] (last visited Oct. 20, 2016) (defining "net metering.").

26. *Programs*, DSIRE—N.C. CLEAN ENERGY TECH. CTR. (last visited Apr. 19, 2017), http://programs.dsireusa.org/system/program [https://perma.cc/7B5Z-AK6M]; *see also Net Energy Metering*, HAW. ELECTRIC, https://www.hawaiianelectric.com/clean-energy-hawaii/producing-clean-energy/net-energy-metering [https://perma.cc/CM75-NFYZ] (last visited Apr. 19, 2017) (inferring that Hawaii terminated its net metering program in 2016).

some variation of programmatic review.[27] As of the first quarter of 2016, thirty-nine states had one-hundred actions occurring or under consideration for their net metering policies, rate design, and solar ownership.[28] Twenty-two states were looking to change their net metering program with respect to compensation for real-time excess generation, compensation for net-excess generation, aggregate net metering cap, and system size limits.[29]

Because this Article explores net metering policy in Nevada and California, it is best to present how each state interprets the term. As Part IV discusses in depth, Nevada and California have similar definitions of net metering. Nevada defines net metering as "measuring the difference between the electricity supplied by a utility and the electricity generated by a customer-generator which is fed back to the utility over the applicable billing period."[30] To be considered a "net metering system", an electricity generation facility must use renewable energy as its primary source of energy,[31] have a generating capacity of not more than one megawatt,[32] be located on the customer-generator's premises,[33] and be intended primarily to offset some or all of the customer-generator's electricity requirements.[34]

California defines "net energy metering" as measuring the "difference between the electricity supplied through the electrical grid and the electricity generated by an eligible customer-generator and feed back into the electrical grid over a 12-month period."[35] In California, an eligible customer generator is a residential, small commercial, commercial, industrial, or agricultural customer with a system under one MW on the customer's premise, which is primarily used to offset the customer's electricity consumption.[36]

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27. *See* Autumn Proudlove et al., *50 States of Solar: Q1 2016 Quarterly Report*, N.C. CLEAN ENERGY TECH. CTR. 9 (Apr. 2016), https://nccleantech.ncsu.edu/wp-content/uploads/50-SoS-Q1-2016_Final.pdf [https://perma.cc/ELM6-KRY9].
28. *Id*.
29. *Id*. at 12.
30. NEV. REV. STAT. § 704.769 (1997).
31. NEV. REV. STAT. § 704.771 1(a) (2001).
32. *Id.*
33. *Id.* § 704.771 1(a)(3).
34. *Id.* § 704.771 1(a).
35. CAL. PUB. UTIL. CODE § 2827(b)(6) (West, WestlawNext through ch. 4 of 2017 Reg. Sess).
36. *Id.* § 2827(b)(4).

A. Net Metering Successor Tariffs

Utilities are now pushing back against the popular net metering programs that turned their customers into electricity generators as the pace of net metering installations ramps up. Although both states are leading the rooftop solar boom, their approaches diverge greatly as to the future of their net metering programs. California adopted a whole-system view to integrating net metering into its electrical grid. Revising the net metering program is only a small part of a larger concerted effort to revamp how to encourage and integrate renewable energy technologies into the grid. The entire program is evolving through a series of legislative actions and CPUC orders on time-of-use rates, distributed resources plans, renewable portfolio standards, incentive programs, and more. California integrated its revised net metering program with other decisions meant to impact the overall grid function, helping the electricity sector meet the renewable portfolio standard of fifty percent by 2030.[37] Nevada chose a different path. On December 31, 2015, the PUCN implemented a new net metering tariff for both existing and future customers.[38] However, subsequent court, legislative, and administrative decisions restored the original net metering tariff for existing customers and some future customers.[39]

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37. S.B. 350, 2015-2016 Reg. Sess., (Cal. 2015); *see also* Julia Pyper, *California Passes a Bill Targeting 50% Renewables by 2030*, GREENTECH MEDIA (Sept. 12, 2015), http://www.greentechmedia.com/articles/read/california-bill-50-percent-renewables [https://perma.cc/C5HG-3U62].

38. Julia Pyper, *Nevada Regulators Restore Net Metering for Existing Solar Customers*, GREENTECH MEDIA (Sept. 16, 2016), http://www.greentechmedia.com/articles/read/nevada-regulators-restore-net-metering-for-existing-solar-customers [https://perma.cc/2K5J-KT9G].

39. *Vote Solar v. The Public Utilities Commission of Nevada*, No. 16 OC 00052 1B (Nev. Dist. Ct. Sept. 12, 2016), http://earthjustice.org/sites/default/files/files/NEM%20Appeal%20Decision_0.pdf [https://perma.cc/K8S4-2ZFD] (granting judicial review of the decision to alter the rate structure for existing net metering customers); Danielle Ola, *Grandfathering solar customers back on the cards in Nevada*, PV TECH. (July 4, 2016, 12:14 PM), http://www.pv-tech.org/news/grandfathering-solar-customers-back-on-the-cards-in-nevada [https://perma.cc/B3TM-B4DV]; *(Proposed Draft) Order Granting in Part and Denying in Part General Rate Application by Sierra Pacific Power*, *Application of Sierra Pacific Power Company d/b/a/ NV Energy for authority to adjust its annual revenue requirement for general rates charged to all classes of electric customers and for relief properly related thereto*, PUB. UTIL. COMMISSION NEV., No. 16-06006 (Dec. 20, 2016), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2016-6/17609.pdf [https://perma.cc/3V7H-VA8M] (restoring NEM-1 tariff for NEM-2 customers who connected after Jan. 2016, and also adding up to 6 MW of new installed capacity for new and existing NEM customers to connect under old NEM 1 rates).

B. Nevada-Net Metering Successor Tariff

In 2015, the Nevada state legislature passed S.B. 374, requiring the PUCN to develop a new compensation scheme for net energy metering ("NEM") customers. The legislature removed the three percent cumulative capacity limit on NEM customers to a flat cap of 235 MW installed NEM systems.[40] The legislature required utilities to develop and submit net metering successor tariffs ("NEM Successor Tariff") to the PUCN for approval.[41] After the utilities reach the 235 MW cap, they must offer the NEM Successor Tariff to future customers. The legislature listed several provisions that the PUCN could approve or require when evaluating the utilities' successor tariffs.[42] First, the PUCN may establish more than one rate class for NEM customers.[43] Second, the PUCN could limit participation under the NEM Successor Tariff based on certain terms and conditions.[44] Third, the PUCN could prohibit NEM Successor Tariff customers from receiving service under the previous NEM tariff.[45] Fourth, the PUCN may authorize a rate design that "avoid[s], reduce[s], or eliminate[s] an unreasonable shifting of costs" between NEM and non-NEM customers.[46] Fifth, the legislature prohibited the PUCN from accepting a tariff that results in an unreasonable cost shift among customers.[47] Lastly, the legislature left the issue of grandfathering current NEM customers up to the PUCN.[48]

After the Nevada legislature passed S.B. 374, requiring development of the NEM Successor Tariff by the end of 2015, 24,000 additional solar customers signed up under the existing NEM tariff.[49] The spike in applications was dramatic. As a comparison, between 1997 and June of 2015, Nevada's solar net metering program had only 6,000 participants.[50] With all the new

40. S.B. 374 § 2.95(1)(a), 2015 Leg., 78th Reg. Sess. (Nev. 2015).
41. *Id.* § 2.95(1)(b).
42. *Id.* § 2.3(2).
43. *Id.* § 2.3(2)(a).
44. *Id.* § 2.3(2)(b).
45. *Id.* § 2.3(2)(c).
46. *Id.* § 2.3(2)(d).
47. *Id.* § 2.3(2)(e).
48. *Id.* § 2.3(3).
49. Katie Fehrenbacher, *The Other Side of the Solar Firestorm in Nevada*, FORTUNE (Apr. 12, 2016), http://fortune.com/2016/04/12/solar-firestorm-nevada/ [https://perma.cc/4RDA-9NCY].
50. *Id.*

applications, NV Energy hit the 235 MW cap in August 2015.[51] In December of 2015, the PUCN adopted the new NEM Successor Tariff.[52] The NEM Successor Tariff ended retail rate compensation for all NEM customers and replaced it with avoided cost compensation.

The NEM Successor Tariff made several changes to the previous NEM tariff. The PUCN found NV Energy could create a separate rate class for NEM customers because of the different costs required to serve them based on their use of the distribution grid.[53] The PUCN subsequently found "that it is in the public interest to apply the same rates and tariffs to all NEM ratepayers," regardless of whether they were customers before the 235 MW cap was reached.[54] This ruling meant that existing NEM customers would be subject to the same tariff as new NEM customers. As discussed below, the PUCN later reversed itself and grandfathered existing NEM customers for 20 years under the previous NEM tariff.

The PUCN contemplated several options for rate design.[55] First, it rejected demand charges on ratepayer acceptance grounds.[56] Second, the PUCN accepted a basic service charge based on NV Energy's distribution and facility costs.[57] The PUCN pushed off deciding the percentage of distribution and transmission costs that would be included in the basic service charge, instead of a volumetric charge, until the first general rate case.[58] The PUCN reaffirmed that NV Energy could implement time-of-use ("TOU") rates for NEM customers.[59]

Controversially, the PUCN found that compensating NEM customers at the retail rate for their net excess energy was not just and reasonable "because the energy delivered by the NEM ratepayers is not the same as the energy delivered by NV Energy."[60] The PUCN approved compensation

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51. Davide Savenije, *NV Energy hits net metering cap ahead of schedule, adding fuel to solar debate*, UTIL. DIVE (Aug. 24, 2015), http://www.utilitydive.com/news/nv-energy-hits-net-metering-cap-ahead-of-schedule-adding-fuel-to-solar-deb/404468/ [https://perma.cc/LJ9R-NHPE]. *See also* NEV. REV. STAT. § 704.773 (2015).

52. Julia Pyper, *Does Nevada's Controversial Net Metering Decision Set a Precedent for the Nation?*, GREENTECH MEDIA (Feb. 4, 2016), https://www.greentechmedia.com/articles/read/nevada-net-metering-decision [https://perma.cc/6NN9-2APG]; *see also (Proposed) Order*, *Application of Nevada Power Company d/b/a NV Energy for approval of a cost-of-service study and net metering tariffs*, PUB. UTIL. COMMISSION NEV., No. 15-07041 (Dec. 23, 2015), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2015-7/8305.pdf [https://perma.cc/SJC7-J9W8].

53. PUB. UTIL. COMMISSION NEV., *supra* note 52, ¶ 90–93.

54. *Id.* ¶ 107–111.

55. *Id.* ¶ 89–97.

56. *Id.* ¶ 90.

57. *Id.* ¶ 91–92.

58. *Id.*

59. *Id.* ¶ 92–93.

60. *Id.* ¶ 93.

for surplus electricity generated by NEM customers at the "average annual long-term avoided energy cost."[61] The PUCN instituted a gradual transition over the next four years for NEM customers to familiarize and acquaint themselves with how their electricity bills may increase.[62]

The changes were met with immediate opposition from the solar industry and existing net metering customers. The solar industry began pulling resources from the state.[63] A petition for judicial review was filed by a non-profit organization seeking invalidation of the net metering order.[64] On September 12, 2016, a Nevada District Court granted the petition based on the PUCN's violation of existing-customer generator's due process rights for lack of sufficient information in the PUCN's original notices.[65] On September 16, 2016, the PUCN unanimously voted to restore retail-rate net metering compensation for existing NEM customers.[66] Thus, customers who applied for NEM before December 31, 2015, are now grandfathered for twenty years and will continue to receive service under the state's original NEM tariff.[67]

While the PUCN's grandfathering decision helped existing solar customers in the state, it did not change the rates for customers who applied for NEM for their solar systems after December 31, 2015. New NEM customers will face tripled fixed charges and net-metering credits reducing from $0.091 to $0.026 per kWh over the next twelve years.[68]

In response to continued backlash from these new NEM policies, in February 2016, Governor Sandoval issued an executive order reinstituting

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61. *Id*. ¶ 94.
62. *See id.* ¶ 95–97.
63. *See* Daniel Gross, *Why Solar Energy is Fleeing Nevada*, SLATE (Jan. 22, 2016), http://www.slate.com/articles/business/the_juice/2016/01/solarcity_and_vivint_pulled_out_of_nevada_is_solar_power_losing_at_the_state.html [https://perma.cc/3ZC5-VD43].
64. *See Vote Solar v. The Public Utilities Commission of Nevada*, No. 16 OC 00052 1B (Nev. Dist. Ct. Sept. 12, 2016), http://earthjustice.org/sites/default/files/files/NEM%20Appeal%20Decision_0.pdf [https://perma.cc/K8S4-2ZFD].
65. *See id.* at 12.
66. *See (Proposed) Order*, *Application of Nevada Power Company d/b/a/ NV Energy filed under Advice Letter No. 466 to revise Tariff No. 1-B to modify Net Metering Rider-A Schedule NMR-A to establish separate rates for grandfathered private generation customers*, PUB. UTIL. COMMISSION NEV., No. 15-07028 ¶ 1–4 (proposed Sept. 16, 2015), http://pucweb1.state.nv.us/PDF/AXImages/Agendas/17-16/6632.pdf [https://perma.cc/D9ER-PDKQ].
67. *See id.* ¶ 5.
68. *See* PUB. UTIL. COMMISSION NEV., *supra* note 52, ¶ 81, 88, 158–59; *see also* Pyper, *Nevada Regulators Restore Net Metering for Existing Solar Customers*, *supra* note 38.

the New Energy Industry Task Force.[69] The Task Force was charged with providing recommendations for the best energy policies for Nevada and specifically addressing methods to encourage renewable energy generation with a focus on rooftop solar and NEM.[70] The Task Force approved a draft recommendation for comprehensive energy reform, specifically calling on lawmakers to pass a bill reinstating retail rate NEM for solar customers.[71] This recommendation will put Nevada back in the same position it was before the PUCN's December 2015 order.

On December 22, 2016, the PUCN issued a Draft Order on a General Rate Application by Sierra Power Pacific—the utility serving Northern Nevada—opening 6 MW of additional capacity for NEM customers to connect under the prior NEM tariff that was in place before the 2015 PUCN Order.[72] After reviewing the impact of the additional capacity, the PUCN found that opening the 6 MW of capacity was "just, reasonable, and consistent with the public interest."[73] The PUCN concluded that the additional capacity would not impose an unreasonable cost shift to non-NEM customers because the new capacity would not impose a discernible cost increase on non-NEM customers and all ratepayers would experience a monthly bill decrease of $0.01.[74] Furthermore, the PUCN determined that it was not required to eliminate any cost-shift, thus allowing discussion on what is a reasonable cost-shift.[75] Moreover, the creation of additional capacity would align with the Legislature and Governor's goals to "[e]xpand and accelerate development of solar DG systems" and to establish an in-

69. *See Nevada Executive Order 2016-04*, NEV. EXECUTIVE DEP'T (Feb. 23, 2016), http://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/New%20Energy%20Industry%20Task%20Force%202016%20Reconvene%20Order.pdf [https://perma.cc/UL8S-XEEG].

70. *See id.*

71. *New Energy Industry Task Force Policy Recommendations*, NEV. OFF. ENERGY (Sept. 16, 2016), http://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/Work%20Session%20Document(2).pdf [https://perma.cc/6RCW-BD9B].

72. *See* PUB. UTIL. COMMISSION NEV., *supra* note 39, at 53–54. A petition for reconsideration of the Order was filed by NV Energy on Jan. 12, 2017 asserting that the Order was unreasonable and unlawful because it permitted cost-shifting between NEM and non-NEM customers which is barred by state law. *See Petition by Sierra Pacific Power Company d/b/a NV Energy Seeking Reconsideration of Section X and XI and Ordering Paragraphs 1 through 5 of the December 28, 2016 Order*, *Application of Sierra Pacific Power Company d/b/a/ NV Energy for authority to adjust its annual revenue requirement for general rates charged to all classes of electric customers and for relief properly related thereto*, PUB. UTIL. COMMISSION NEV., No. 16-06006 at 5–6 (Jan. 12, 2017), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2016-6/18007.pdf [https://perma.cc/8KSN-YMH9].

73. PUB. UTIL. COMMISSION NEV., *supra* note 39, at 2.

74. *See id*. at 52.

75. *See id.* at 51.

state solar energy industry in "which solar energy systems are a viable mainstream alternative for homes."[76]

C. California-Net Metering Successor Tariff

In 2013, due to the rapid growth and interest in renewable energy, the California Legislature passed A.B. 327, a comprehensive energy bill.[77] The bill required every large investor-owned electric utility ("IOU")[78] to offer a commission-developed standard NEM tariff to eligible customers after the utilities either reach their program limit or July 1, 2017, whichever comes first.[79]

On January 28, 2016, the CPUC issued its NEM Successor Tariff decision.[80] This decision made several changes to the Commission's NEM program in order, "to align the costs of NEM successor customers more closely with those of non-NEM customers."[81] The NEM Successor Tariff, which all IOUs must provide, requires: (1) time-of-use rates,[82] (2) a one-

76. *Id.* at 53 (quoting NEV. REV. STAT. § 701B.190 (2013)).

77. This bill was a comprehensive energy bill that made several changes. First, it repealed the utilities restriction on increasing residential rates. Second, the bill changed California's CARE program. Third, the legislature made several requirements and restrictions on time-of-use rates. Lastly, this bill allows the commission to require retail sellers of electricity to procure renewable electricity in excess of the specified amounts under California's RPS. *See* A.B. 327, 2013-14 Reg. Sess. (Cal. 2013) (enacted).

78. *See id*. (noting that large electrical corporations are electric utilities with over 100,000 customers).

79. A large utility's program limit as "when the combined total peak demand of all electricity used by eligible customer-generators served by all the electric utilities in the large electrical corporation's service area furnishing net energy metering to eligible customer-generators exceeds 5 percent of the aggregate customer peak demand of those electric utilities." CAL. PUB. UTIL. CODE § 2827(c)(4)(B) (West, WestlawNext through ch. 4 of 2017 Reg. Sess.). Aggregate customer peak demand is "the highest sum of the non[-]coincident peak demands of all of the large electrical corporation's customers that occurs in any calendar year." *Id.*; *see id.* § 2827.1 (West, WestlawNext through ch. 4 of 2017 Reg. Sess.) (providing legislatures directive regarding the new commission-developed net metering tariff).

80. *See Decision Adopting Successor to Net Energy Metering Tariff*, CAL. PUB. UTIL. COMMISSION (2016), http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M158/K181/158181678.pdf [https://perma.cc/C2KR-BN9F].

81. *Net Energy Metering (NEM) Successor Tariff*, CAL. PUB. UTIL. COMMISSION, http://www.cpuc.ca.gov/General.aspx?id=3934 [https://perma.cc/FZ8K-CW65] (last visited Oct. 17, 2016).

82. *See* CAL. PUB. UTIL. COMMISSION, *supra* note 80, at 91.

time interconnection fee for customers with systems under 1 MW,[83] and (3) payment of non-bypassable charges on each kilowatt-hour consumed.[84] Another important change was that all types of renewable energy generation facilities were eligible to receive service under the NEM Successor Tariff, regardless of size.[85] Notably, the Commission rejected proposals to require standby charges and a monthly true-up period.[86]

The CPUC's decision, implementing A.B. 327, significantly changed California's NEM program. Previously, California IOU's were only required to offer NEM to customers until these contracts reached 5% of their peak electricity demand, referred to by the CPUC as the IOUs "program limit." Now, California IOU's must provide the NEM Successor Tariff to all eligible customers after they reach their 5% program limit or July 1, 2017, whichever came first. In 2016, two of California's IOUs— Pacific Gas & Electric (PG&E) and San Diego Gas & Electric (SDG&E)—reached their program limits and started enrolling new NEM customers into the Successor Tariff.[87] Current NEM customers, including those who connect before the IOUs reach their program limit, may choose to continue receiving service under the existing NEM Tariff for up to twenty years after their date of interconnection.[88] Further, the decision changed the way NEM customers are compensated and billed for the electricity they consume and the electricity generated by their renewable energy systems. Previously, customers did not have to pay any fees, except those related to installing a two-way meter. Also, customers were compensated at the retail rate of electricity for any surplus electricity they generated. After 2018, NEM Successor Tariff customers will be compensated based on a time-of-use rate structure, will pay interconnection costs and non-bypassable charges.

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83. *See id.* at 87 (noting that the Commission estimates the interconnection fee will be $75 - $150). The Commission requires customers with systems over 1 MW to pay all interconnection fees and upgrade costs. CAL. PUB. UTIL. COMMISSION, *supra* note 81.

84. *See* CAL. PUB. UTIL. COMMISSION, *supra* note 80, at 88–89 (noting that the Commission estimates the non-bypassable charges will cost three to four cents per kWh). The Commission will use these charges to fund programs for low-income communities and efficiency. CAL. PUB. UTIL. COMMISSION, *supra* note 81.

85. *See* CAL. PUB. UTIL. COMMISSION, *supra* note 80, at 95.

86. *See id.* at 94–95.

87. *See NEM2 Program Introduction*, PACIFIC GAS & ELECTRIC, https://www.pge.com/en_US/residential/solar-and-vehicles/green-energy-incentives/solar-and-renewable-metering-and-billing/net-energy-metering-program-tracking/net-energy-metering-and-tracking-faq.page [https://perma.cc/ELG5-U524] (last visited Jan. 3, 2017). *See also Net Energy Metering Program*, SAN DIEGO GAS & ELECTRIC, http://www.sdge.com/clean-energy/overview/overview [https://perma.cc/5UH3-HA7D] (last visited Jan. 3, 2017).

88. Current customers may choose the 'receive service' under the Successor Tariff. *See* CAL. PUB. UTIL. COMMISSION, *supra* note 80, at 16.

On September 22, 2016, the CPUC denied requests for rehearing on the NEM Successor Tariff Order.[89] PG&E requested for rehearing arguing that the CPUC's Decision failed to adequately address the cost shift from NEM to non-NEM customers.[90] The Joint Utilities found the Decision: "(1) wrongly excluded transmission charges from the list of non-bypassable charges; (2) unlawfully approved a transition period for successor tariff customers; and (3) over-prioritized sustainable growth."[91] The CPUC concluded that cost shifting is "not inherently unlawful," and is a "tool[] sometimes used to encourage and support various State programs and objectives that are intended to provide desired environmental, social, and/or other economic benefits."[92] The CPUC recognized that the quantification of this cost shift is difficult and remains an ongoing "program consideration."[93]

Currently, the Commission's Energy Division staff is conducting a consumer protection workshop with the aim of producing information for customers seeking to receive electric service under the NEM Successor Tariff. Also, two of California's IOU—PG&E and SDG&E—have reached their 5% program limit and have made the switch over to their Successor Tariffs. SCE has not reached its program limit, thus it will move over to its NEM Successor Tariff either on July 1, 2017, or before if it reaches the NEM program limit.[94]

PG&E reached its 5% program limit of 2,409 MW of installed NEM capacity and started accepting applications under its NEM Successor Tariff.[95] The main changes in PG&E's NEM Successor Tariff are: (1) no renewable energy generator size limit, (2) customers with systems under

89. *See Order Modifying Decision (D.) 16-01-044 and Denying Rehearing, as Modified*, CAL. PUB. UTIL. COMMISSION (2016), http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M162/K043/162043082.PDF [https://perma.cc/U7MP-USZZ].

90. *See id.* at 3.

91. *Id.*

92. *Id.* at 5.

93. *Id.*

94. *See Net Energy Metering*, SOUTHERN CAL. EDISON, https://www.sce.com/wps/portal/home/residential/generating-your-own-power/net-energy-metering/!ut/p/b1/hc_NcoJAFAXgZ2nhMufoQFm7Ec3GQimjbDahYZNgTpglvX0WbaK_uzuX78C9RJCYiDK55DKpc1UmxT2L3sawPDbmEbhlUxfcRhiwOcPEMVuwbgG-DMO__oqIV-KNDAfcXxrRFA6igL6Bed-8A3ca2oYJy3yCgQd37IctWMwoOJ0hiBijQO8JfhzpEyELlT4eXrMypZYkosp2WZVV-rlq1_u6Pp6GGjQ0TaNLpWSR6Vt10PCpslenmsSvkhwPMXLeFem16dwACqNhQQ!!/dl4/d5/L2dBISEvZ0FBIS9nQSEh/?from=nem#accordionGrp1-3-hash [https://perma.cc/34LC-WMZS] (last visited Apr. 29, 2017).

95. *See* PACIFIC GAS & ELECTRIC, *supra* note 87.

1 MW will pay a one-time $145 interconnection fee,[96] (3) customers will pay certain non-bypassable charges,[97] (4) mandatory TOU rates, and (5) customers are guaranteed service under the NEM Successor Tariff for twenty years.[98]

SDG&E reached its program limit on June 29, 2016, and started accepting applications under its NEM Successor Tariff. Similar to PG&E SDG&E's NEM Successor Tariff includes: (1) a $132 one-time interconnection fee for customers with systems under 1 MW,[99] (2) customers will pay non-bypassable charges, (3) a default TOU rate, and (4) customers may continue to receive service under the NEM Successor Tariff for twenty years.[100]

IV. DIVERGENT LAWS, REGULATIONS, AND POLICIES

Our analysis of Nevada and California's recent net metering program changes reveal at least five areas of divergence in state laws, regulations, and policies that may explain why the states took different approaches in their net metering successor tariffs. Part IV analyses each state's laws, regulations, and policies in the following areas:

1. Interaction of Renewable Portfolio Standard and Net Metering
2. Solar PV Incentive Programs
3. Time-of-Use Rates
4. Electric Sector Decoupling
5. Comprehensive Resource Planning

A. Interaction of Renewable Portfolio Standards and Net Metering

The following sections detail the development and interaction of Nevada and California's Renewable Portfolio Standards (RPS) and NEM programs. The development of the programs is tracked up until the NEM Successor Tariffs orders were issued by the respective public utility commissions.

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96. While customers with systems over 1 MW pay for all interconnection fees associated with connecting their system to the grid. *Id.*

97. These include charges for the Public Purpose Program, Nuclear Decommissioning, DWR Bond Charge, and a Competition Transition Charge. *Id.*

98. *See id.*

99. Customers with systems over 1 MW are charged an $800 fee plus any fees required for system upgrades. *See* SAN DIEGO GAS & ELECTRIC, *supra* note 87.

100. *See id.*

1. Nevada

a. Renewable Portfolio Standard

In 1997, Nevada implemented its RPS[101] for each electric service provider.[102] RPS requires utilities to acquire a certain percentage of renewable electricity to meet their customers' demand. Nevada defines electric service provider as a "provider of new electric resources that is selling electricity to an eligible customer for consumption in state."[103] A number of entities are exempt from complying with Nevada's RPS including state agencies, rural electric co-ops, and mobile home park owners.[104] Currently, only two utilities submit RPS compliance reports: NV Energy and Shell Energy.[105]

Nevada has amended its RPS on almost an annual basis. In 1997, the RPS was set at 0.2% of the total electricity sold annually with a biannual increase 0.2% until the RPS reached a total of 1% of the total electricity sold annually.[106] To comply with the RPS, NV Energy[107] had to procure eligible renewable energy resources for the designated minimum percentage of their annual sales.[108] Compliance was measured using Portfolio Energy Credits (PECs),[109] which are equivalent to one kilowatt-hour (kWh) of renewable energy or one kWh of energy saved via an energy efficiency

101. A.B. 366, 69th Leg., Reg. Sess. (Nev. 1997); *see also* NEV. REV. STAT. § 704.7801 (1997).
102. NEV. REV. STAT. § 704.7821 (1997).
103. NEV. REV. STAT. § 704.7808 (1997).
104. *id*. § 704.7808 3(a-g).
105. *State RPS Annual Reports and Compliance Reports*, CLEAN ENERGY STATES ALLIANCE, http://cesa.org/projects/state-federal-rps-collaborative/state-rps-annual-reports-and-compliance-reports/ [https://perma.cc/5ZRZ-UWGZ] (last visited Jan. 9, 2017) (noting that NV Energy and Shell Energy are the only utilities filing the mandated RPS compliance reports. Shell Energy serves a small number of mining operations and has no apparent interaction with residential customers, thus the analysis in the rest of the Article will focus on NV Energy and its subsidiaries).
106. A.B. 366 § 52(1)(a)-(b), 69th Leg., Reg. Sess. (Nev. 1997).
107. NV Energy owns the two investor owned utilities in the state, Sierra Pacific Power Company and Nevada Power Company. *Regulatory Duties*, PUB. UTIL. COMMISSION NEV., http://puc.nv.gov/Utilities/Electric/ [https://perma.cc/5YP8-99ZE] (last visited Oct. 21, 2016).
108. *Id.*
109. *Renewable Portfolio Standard Annual Report: Compliance Year 2015*, NV ENERGY 7 (Apr. 1, 2016), https://www.nvenergy.com/renewablesenvironment/renewables/images/2015ComplianceReport.pdf [https://perma.cc/YM2G-4XXP].

program.[110] For accounting and measurement purposes, PECs are often aggregated into kPCs, which are equal to 1,000 PECs.[111]

In 2001, Nevada increased the RPS to 15% of total consumption by 2013.[112] Nevada created a phased-in structure requiring a gradual increase every two years from 2001 to 2013.[113] Importantly, Nevada required utilities to procure at least 5% of its total renewable energy resources from solar energy systems—referred to as a "solar carve out."[114] Further, certain solar PV systems were eligible to receive a credit multiplier, which boosted the PECs that a utility could claim per kWh of energy produced. To qualify, a solar PV system must be installed on the premises of a retail customer;[115] must utilize, on an annual basis, at least 50% of the energy the system generates; and must have been in operation on or before December 31, 2015. Generally, customer-sited rooftop solar PV systems meet these requirements. Under the credit multiplier, utilities can claim 2.4 kWh of renewable electricity for each 1.0 kWh of actual electricity acquired from the solar PV system.[116] Additionally, customers who own their systems, instead of leasing their system from a third-party, were entitled to an additional 0.05 multiplier.[117] Nevada's solar carve-out incentivized customers to participate in NEM due to the higher economic benefit, while utility-scale solar facilities did not receive the same benefit.

In 2005, Nevada again modified its RPS levels.[118] Nevada delayed the compliance deadlines for the biannual RPS increases, but increased the compliance goals for each period.[119] The Legislature also raised its RPS to 20% by 2015.[120] Additionally, utilities could meet up to 25% of their total RPS requirement with energy efficiency measures.[121] Qualifying energy efficiency measures must (1) be implemented after January 1, 2005, (2) be sited or implemented at a retail customer's location, (3) reduce the retail

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110. *Id.*
111. *Id.*
112. S.B. 372, 71st Leg., Reg. Sess. (Nev. 2001).
113. *Id.* (noting that for the years 2003 and 2004, the RPS was set at 5%; for the years 2005 and 2006, the RPS was set at 7%; for the years 2007 and 2008, the RPS was set at 8%; and so on increasing 2% every two years up until 2013 when the RPS was to reach 15%).
114. *Id.*
115. NEV. REV. STAT. § 704.7822 (2004).
116. *Id.*
117. *PEC Trading Program*, PUB. UTIL. COMMISSION. NEV., http://puc.nv.gov/Renewable_Energy/RPS/PEC_Trading_Program/ [https://perma.cc/E26J-723C] (last visited Dec. 3, 2016).
118. A.B. 3A, 2005, 22d Spec. Sess. (Nev. 2005).
119. *Id.* § 29(1)(a)-(f).
120. *Id.*
121. *Id.* § 29(2)(a).

customer's energy consumption, and (4) be either partially or fully subsidized by the electric utility.[122]

In 2009, Nevada established today's existing RPS. Nevada extended the 20% RPS requirement from 2015 to 2019.[123] From 2020 to 2024, the RPS increases to 22% and peaks at 25% by 2025.[124] Starting in 2016, Nevada required at least 6% of the utilities RPS to come from qualifying solar systems.[125]

In 2013, Nevada enacted S.B. 252, limiting a utility's option to use energy efficiency measures as a compliance option for RPS.[126] Nevada required that for 2013 and 2014, no more than 25% of the RPS may come from energy efficiency measures.[127] Then, from 2015 to 2019, this decreases to 20%; from 2020 to 2024 a decrease to 10%; and by 2025 no energy efficiency measures may count towards RPS requirements.[128]

Unlike California, whose RPS encourages utility-scale over distributed solar PV generation, Nevada specifically required utilities to procure solar for the purpose of meeting their RPS requirements. Nevada requires utilities procure at least 5% of their total electricity sales from solar renewable energy systems, with no requirements on whether the solar is distributed or utility-scale.[129] However, as discussed above, the PEC multiplier specifically incentivizes Nevada utilities to procure solar energy from distributed systems.[130]

b. Nevada Utility RPS Compliance

Nevada Power Company (NPC) and Sierra Pacific Power Company (SPPC), wholly owned subsidiaries of NV Energy, Inc., both successfully met the 2015 RPS.[131] To comply with the 2015 RPS, NPC had to acquire 4,333,195 kPCs.[132] Of this amount, NPC was required to acquire 216,660 kPCs from solar resources.[133] In 2015, NPC exceeded both requirements

122. *Id.* § 18.
123. S.B. 358 § 13.5(1)(f), 75th Leg., Reg. Sess. (Nev. 2009).
124. *Id.* § 13.5(1)(g)-(h).
125. *Id.* § 13.5(2)(a)(2).
126. S.B. 252 § 6(2)(b), 77th Leg., Reg. Sess. (Nev. 2013).
127. *Id.* § 6(2)(b)(1).
128. *Id.* § 6(2)(b)(2)-(4).
129. NEV. REV. STAT. § 704.7821 (2015).
130. *Supra* note 115.
131. NV ENERGY, *supra* note 109.
132. *Id.* at 9.
133. *Id.*

by acquiring a total of 4,602,215 kPCs, of which 1,344,190 kPCs were from solar.[134] The 2015 RPS required SPPC to acquire 1,649,235 kPCs; of which 82,462 kPCs were to be acquired from solar resources.[135] SPPC also exceeded these requirements by accumulating a total of 2,577,610 kPCs,[136] with solar accounting for 376,358 kPCs.[137]

Both Nevada utilities are significantly oversupplied for their RPS requirements and their solar RPS requirements. NPC had 6% more kPCs than required to comply with their RPS mandate and 6 times the number of solar kPCs required to comply with their solar RPS mandate. SPPC was similarly situated with 56% more kPCs than needed to meet their RPS mandate and more than 4.5 times the number of required solar kPCs.

c. Nevada-Net Metering Program

Nevada's NEM began in 1997 with the passage of S.B. 255.[138] The initiating legislation restricted the type of resources that could participate in the program as well as the number of total participants. S.B. 255 defined a NEM system as one that uses wind or solar energy as its primary source of fuel, has a generating capacity of 10 kW or less, is located on the customer's property, operates in parallel with utility's transmission and distribution facilities, and is intended to offset customer electricity requirements.[139] Utilities were required to offer NEM to only the first 100 customers it accepted into the program.[140]

In 2001, the legislature amended NEM for the first time with A.B. 661. This bill took out the "first 100 customers" requirement and replaced it with a general statement authorizing utilities to offer NEM to their customers.[141] Importantly, the 2001 amendment established that excess electricity fed back to the utility from a renewable energy system could count towards compliance with RPS requirements.[142] Then, in 2003, the legislature added "waterpower" and "qualified energy recovery process" to the list of renewable energy systems that qualified for both NEM and RPS programs.[143]

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134. *Id.*
135. *Id.*
136. *Id.*
137. *Id.*
138. S.B. 255, 69th Leg., Reg. Sess. (Nev. 1997).
139. *Id.* § 6.
140. *Id.* § 8.
141. A.B. 661 § 60, 71st Leg., Reg. Sess. (Nev. 2001).
142. *Id.* § 61 (2)(c)(2).
143. A.B. 429 §§ 6, 9, 72d Leg., Reg. Sess. (Nev. 2003) (defining qualified energy recovery process as a "system with a nameplate capacity of not more than 15 megawatts that converts the otherwise lost energy from: (a) The heat from exhaust stacks or pipes used for engines or manufacturing or industrial process; or (b) The reduction of high

In 2005, the legislature made several changes to the NEM program with A.B. 236.[144] This amendment changed the definition of NEM system to include systems with generating capacities of up to 150 kW.[145] Additionally, for NEM customers with capacities of 30 kW or less, the bill required utilities to provide customers with an energy meter to monitor their electricity input and output.[146] This bill also put a cap on the number of NEM customers a utility could serve. It established that utilities could offer NEM to customers in their service areas until "the cumulative capacity of all such net metering systems is equal to 1 percent of the utility's peak capacity."[147]

In 2007, Nevada increased the generating capacity for qualified NEM systems from 150 kW to 1 MW.[148] Also, Nevada narrowed the scope of qualified NEM systems by disqualifying those systems with a generating capacity greater than either the limit on the demand the customer may place on the utility or 150% of the peak demand for the customer.[149]

Most recently, in 2013, A.B. 428 directed the PUCN to evaluate the costs and benefits of net metering and recommend a method for allocating costs and benefits, which led the PUCN to recommend the establishment of a NEM Successor Tariff.[150] Also, Nevada mandated that each utility create a "Lower Income Solar Energy Pilot Program" with a combined capacity of at least one MW by January 1, 2017.[151] The purpose of this pilot program was to provide distributed generation systems to locations throughout the state to benefit low-income customers, including homeless shelters, low-income housing developments, and schools with large populations of low-income students.[152]

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pressure in water or gas pipelines before the distribution of the water or gas, to generate electricity if the system does not use additional fossil fuel or require a combustion process to generate such electricity.").

144. A.B. 236, 73rd Leg., Reg. Sess. (Nev. 2005).

145. *Id.* § 1(2).

146. *Id.* § 2(2). This was increased in 2007 to customers with generating capacities of 100 kilowatts or less. A.B. 178 § 2(3), 74th Leg., Reg. Sess. (Nev. 2007).

147. A.B. 236 § 2(1), 73rd Leg., Reg. Sess. (Nev. 2005).

148. A.B. 178 § 1.5(1)(b), 74th Leg., Reg. Sess. (Nev. 2007).

149. *Id.* § 1.5(2). This was decreased in 2011 to 100% of customer's annual requirements for electricity. A.B. 359 § 6(2)(b), 76th Leg., Reg. Sess. (Nev. 2011).

150. A.B. 428, 77th Leg., Reg. Sess. (Nev. 2013).

151. A.B. 428 § 21.3, 77th Leg., Reg. Sess. (Nev. 2013).

152. *Low Income Solar Energy Pilot Program Presented to Legislative Committee on Energy*, NV ENERGY (July 25, 2014), http://www.leg.state.nv.us/interim/77th2013/

2. California

a. Renewable Portfolio Standard

California initiated its RPS in 2002.[153] However, it was not until 2011 that the California Legislature addressed the crossover between its NEM and RPS programs. In 2011, California addressed whether utilities could count solar generation from NEM customers towards meeting their RPS requirement. In S.B. 2, the California Legislature added Section 399.16 to the California Public Utilities Code, and addressed the legislature's interest in having a balanced RPS portfolio by creating a tiered-structure to eligible resources.[154]

Under this structure, California required that all retail electric providers could not obtain more than 10% of "eligible renewable energy resource electricity product associated with contracts executed after June 1, 2010, [that] meet the product content requires of paragraph (3) of subdivision (b)."[155] This subdivision includes "eligible renewable energy resource electricity products, or any fraction of the electricity generated, including unbundled renewable energy credits, which do not qualify under the criteria of paragraph (1) or (2)."[156] NEM customers with solar PV systems fall under this category because they unbundle their energy by separating the electricity from the renewable energy credits.[157] Unbundled RECs are those where the customer can sell the physical electricity to one utility and sell the REC associated with that electricity to another.[158] Thus, an electric utility cannot obtain more than 10% of NEM solar for the purpose of meeting its RPS requirement. On the other hand, an electric utility must procure at

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Committee/StatCom/Energy/Other/25-July-2014/ItemVILowIncomePilotProgramJStokey.pdf [https://perma.cc/TFA7-ELV3].

153. S.B. 1078, 2001-02 Leg., Reg. Sess. (Cal. 2002).

154. S.B. 2, 2011-12 Leg., Reg. Sess. (Cal. 2011); CAL. PUB. UTIL. CODE § 399.16 (West, WestlawNext through ch. 4 of 2017 Reg. Sess.). Paragraph (3) is for all renewable energy sources that are neither: (1) connected to a California balancing authority or have an agreement to transfer electricity to a California balancing authority or (2) "firmed and shaped . . . electricity products providing incremental electricity and scheduled into a California balancing authority." *Id.* § 399.16(b)(1)-(3).

155. After December 31, 2016. *Id.* § 399.16(c)(2). An eligible renewable energy resource is one that meets the requirement of the Public Resources Code § 25741, which includes solar PV systems under 30 megawatts. CAL. PUB. UTIL. CODE § 399.12(e) (West, WestlawNext through ch. 4 of 2017 Reg. Sess.); *see* CAL. PUB. RES. CODE § 25741 (West, WestlawNext through ch. 4 of 2017 Reg. Sess.) (providing the full definition).

156. CAL. PUB. UTIL. CODE § 399.16(b)(1)(B)(3).

157. *Id*. § 399.16 (b).

158. Luke Hagedorn, *All RECs are Not Created Equal: Bundling and Geographic Sourcing*, RENEWABLE ENERGY L. INSIDER (Mar. 7, 2011), http://www.renewableenergylawinsider.com/2011/03/07/all-recs-are-not-created-equal-part-1-bundling-and-geographic-sourcing/ [https://perma.cc/36Y5-TX3G].

least 75% of eligible renewable energy resources that have either a "first point of interconnecting with a California balancing authority" or "an agreement to dynamically transfer electricity to a California balancing authority."[159] This section includes most utility-scale solar systems.

b. California-Net Metering

In 1996, in response to growing interest and investment in renewable energy sources, California legislature enacted S.B. 656[160]—requiring all privately and publically owned public utilities, municipally-owned utilities, and cooperatives to provide NEM to eligible customer generators.[161] At the time, the legislature defined "eligible customer generator" as:

> A residential customer of an electric utility, including any privately owned or public owned public utility, municipally owned utility, or electrical cooperative . . . who owns and operates a solar electrical generating facility with a capacity of not more than 10 kilowatts that is located on the customer's premises, operates in parallel with the utility's transmission and distribution facilities, and is intended primarily to offset part or all of the customer's own electrical requirements.[162]

California required all electric utilities to develop a NEM tariff that would be available to eligible customers on a first-come, first-serve basis.[163] Importantly, the legislature restricted the number of eligible customers who could sign up for net metering to 0.1% of the utility's peak electricity demand.[164] California's first NEM program required only that a utility would compensate a customer who generated more electricity than supplied by the utility at the "non-time-differentiated energy payment rate for other qualifying small power producers."[165]

Next, in 1998, California updated some definitions and imposed several conditions on a utility's NEM tariff. Notably, California kept the utility's cap of NEM customers at 0.1% of the utility's peak electricity demand.[166]

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159. CAL. PUB. UTIL. CODE § 399.16 (1)(A)-(B).
160. S.B. 656 § 1(a), 1995-96 Leg., Reg. Sess. (Cal. 1996).
161. S.B. 656 § 1(b), 1995-95 Leg., Reg. Sess. (Cal. 1996) (referring to residential customers who had solar systems under ten kilowatts on their property).
162. In other words, a residential customer who had solar systems under ten kilowatts on their property. S.B. 656 § 1(b), 1995-96 Leg., Reg. Sess. (Cal. 1996).
163. S.B. 656 § 1(d), 1995-96 Leg., Reg. Sess. (Cal. 1996).
164. *Id*. (stating that PG&E's cap was set at 17MW of net metering capacity and SCE had a 20MW cap).
165. *Id.* § 1(e)(2).
166. A.B. 1755 § 1(c)(1), 1997-98 Leg., Reg. Sess. (Cal. 1998).

California added small commercial customers and wind electric generators to the definition of "eligible customer generator," which previously only covered residential customers.[167] Also, California required that an electric utility measure the difference between electricity supplied to the customer and electricity generated by the customer over a 12-month period instead of monthly.[168] Then, an electric utility would bill the customer for the electricity consumed, which was in excess of the electricity generated, over that 12-month period.[169] On the other hand, if the customer produced more electricity than consumed, the electric utility would only compensate the customer if they entered into a power purchase agreement.[170]

In 1998, California expanded the NEM program requirements. First, California required customers have a two-way meter.[171] Second, every electric utility was required to submit the total generating capacity of NEM customers in its service territory on an annual basis to the commission.[172] Third, electric utilities must provide identical NEM tariffs to all eligible customer generators, regardless of customer class.[173] Importantly, the legislature added that "any new or additional demand charge, standby charge, customer charge, minimum monthly charge, interconnection charge, or other charge that would increase an eligible customer-generator's costs beyond those of other customers in the rate class" is contrary to the intent of the legislation, and therefore, forbidden.[174] This is important because recently California has changed its position on additional charges for NEM customers. Lastly, the legislature expanded the manner in which the electric utility should compensate customers by establishing an annualized calculation.[175] Under this calculation, a utility determines whether a NEM customer is either a net producer or net consumer of electricity over the 12-month period.[176] A net consumer owes the electric utility for the kWh

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167. *Id*. § 1(b)(2).
168. *Id*. § 1(e).
169. *Id*. § 1(e)(1). The customer is billed at "the average retail price per kilowatt hour for the eligible customer-generator's rate class over that same period." *Id*. § 1(e)(2).
170. *Id*. § 1(e)(3).
171. *Id*. § 1(b)(3). The legislature requires customers to pay the expense of a meter that measures two-way flow of electricity if their property did not already have one. However, the legislature stated that an electric utility could require another meter for other purposes, but at their own expense.
172. *Id*. § 1(c)(2). The legislature stated this information would be used to determine whether a utility has reached its cap. Further, the legislature concluded that a utility does not have to provide net metering to any new eligible customer generators when it reaches its cap. *Id*. § 1(c)(3).
173. *Id*. § 1(d).
174. *Id*.
175. *See id*. § (e).
176. *Id.* § (e)(1).

consumed at the average retail rate.[177] A net producer is only compensated for their surplus electricity if the utility enters into a power purchase agreement with the customer. Otherwise, the utility owns the customer's surplus electricity.[178]

In 2002, the California legislature passed A.B. 58, which added several new elements to the NEM program.[179] First, California directed the CPUC to provide a rebate program for eligible renewable technologies for affordable housing projects.[180] Second, California expanded the definition of "eligible customer generator" to include not only residential and small commercial customers, but also agriculture, commercial, and industrial customers who have solar or wind systems under 1 MW.[181] Third, California increased the cap on NEM customers to 0.5% of the utility's peak electricity demand.[182] Fourth, California required electric utilities to respond to a request for NEM or interconnection within 30 days.[183] Lastly, the legislature added rules regarding compensation for eligible customers receiving electric service under tariffs using baseline or time-of-use rates.[184]

In 2006, the California legislature increased the cap again to 2.5% of the electric utility's peak electricity demand.[185] Next, in 2009, California redefined electric utility to mean "an electrical corporation, a local publically owned electric utility, or an electrical cooperative."[186] Also, the legislature added new requirements for net surplus NEM customers.[187] Importantly, the legislature concluded that electric utilities can purchase the net surplus electricity from NEM customers and use it to count

177. *Id*. § (e)(2).
178. *Id*. § 1755(e)(3).
179. *See generally* A.B. 58, 2001-02 Leg., Reg. Sess. (Cal. 2002).
180. *Id.* § 1(a) (noting that the legislature determined the rebate should be based on the capacity of the system, but could not exceed 75% of the installed cost of the project).
181. *Id*. § 2 (b)(2). The legislature exempted publically owned electric utilities who serve more than 750,000 customers and provide water to its customers. *Id*. § 2(b)(1).
182. *Id*. § 2(c)(1). The legislature continued its policy on not requiring electric utilities top provide net-energy metering to additional eligible customers after the utility reaches its cap. *Id*. § 2(c)(3).
183. *Id*. § 2(e)(1)-(2).
184. *Id*. § 2 (h)(2)(A)-(B) (noting that the legislature found that these customers would receive compensation following their contract with the electric provider).
185. S.B. 1 § 6 (c)(1), 2005-06 Leg., Reg. Sess. (Cal. 2006).
186. A.B. 920 § 1 (b)(3), 2009-10 Leg., Reg. Sess. (Cal. 2009).
187. *Id*. §§ 1 (b)(6)-(8), (2)(A) (noting that a net surplus customer generator is one who "generates more electricity in a 12-month period than is supplied by the electric utility.").

towards the utility's RPS requirements.[188] Then, in 2010, California raised the cap to 5%.[189] In 2011, the legislature changed the definition of "eligible customer-generator" to allow any customer who uses a renewable electrical generation facility to qualify for NEM.[190] In 2012, the legislature created NEM aggregation.[191]

Most recently, in 2013, the California legislature passed A.B. 327, which updated its NEM statute due to the changing renewable energy atmosphere in California. Here, California changed the requirements for its three IOUs: PG&E, SDG&E, and Southern California Edison (SCE).[192] California removed the 5% cap restriction requiring all IOUs to provide a NEM Successor Tariff to all customers who seek electricity service under the NEM Tariff.[193] The legislature directed the CPUC to require every IOU to offer the NEM Successor Tariff to eligible customers until they either reach their program limit, 5% peak demand, or July 1, 2017, whichever comes first.[194] The IOUs must submit monthly reports to the commission on their progress towards meeting the cap.[195] PG&E and SDG&E have reached their caps and have moved over to providing their NEM Successor Tariff; which SCE will do once reaches its cap or starting July 1, 2017.[196]

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188. *Id*. § 1 (h)(5)(A)(B).

189. A.B. 510, 2009-2010 Leg., Reg. Sess. (Cal. 2010).

190. S.B. 489 § 1 (b)(4)-(5), 2011-12 Leg., Reg. Sess. (Cal. 2011) (noting that for purposes of this section of the public utility code, a renewable electrical generation facility is any facility listed in section 25741 of the Public Resources code).

191. S.B. 594 § 1 (h)(4)(A), 2011-12 Leg., Reg. Sess. (Cal. 2012).

192. *See* A.B. 327 § 9 (4)(B)(i)-(iii), 2013-14 Leg. Reg. Sess. (Cal. 2013).

193. *See id*. § 9 (c)(4)(A). The legislature defines a large utility's program limit as "when the combined total peak demand of all electricity used by eligible customer-generators served by all the electric utilities in the large electrical corporation's service area furnishing net energy metering to eligible customer-generators exceeds 5 percent of the aggregate customer peak demand of those electric utilities." *Id.*

194. *Id*. § 9 (c)(3)(B). The legislature finds that aggregate customer peak demand is "the highest sum of the non[-] coincident peak demands of all of the large electrical corporation's customers that occurs in any calendar year."). *Id*. § 9 (c)(4)(B).

195. *Id*. § 9 (c)(4)(C).

196. *Get a Read On Net Energy Metering*, SOUTHERN CAL. EDISON, https://www.sce.com/wps/portal/home/residential/generating-your-own-power/net-energy-metering/!ut/p/b1/hc_NCoJAFAXgZ2nhMufoQFm7Ec3GQimjbDahYZNgTpglvX0WbaK_uzuX78C9RJCYiDK55DKpc1UmxT2L3sawPDbmEbhlUxfcRhiwOcPEMVuwbgG-DMO__oqIV-KNDAfcXxrRFA6igL6Bed-8A3ca2oYJy3yCgQd37IctWMwoOJ0hiBijQO8JfhzpEyELlT4eXrMypZYkosp2WZVV-rlq1_u6Pp6GGjQ0TaNLpWSR6Vt10PcpslenmsSvkhwPMXLeFem16dwACqNhQQ!!/dl4/d5/L2dBISEvZ0FBIS9nQSEh/?from=nem#accordionGrp1-4-hash/accordionGrp1-1-hash [https://perma.cc/77J2-D5YP] (last visited Jan. 3, 2017).

3. California and Nevada-Net Metering and RPS Comparison

a. Eligible Customer Generators and Net Metering Systems

Over the years, both California and Nevada expanded who could participate in NEM and the types of eligible renewable facilities. In 1996, California permitted only residential customers with solar facilities under 10 kilowatts on their property used to offset their electricity needs to participate in NEM.[197] Next, the legislature added small commercial customers and wind electric generators.[198] Then, the legislature permitted agriculture, commercial, and industrial customers who have solar or wind systems under 1 MW to participate in net metering.[199] Lastly, the legislature opened up NEM to any customer who has a renewable electrical generation facility on their premises less than 1 MW and uses it to offset their electricity consumption.[200] Thus, California gradually allowed more customer classes of various types and sizes of renewable facilities to participate in NEM.

On the other hand, Nevada began its NEM program by allowing any customer class to participate in NEM if they use a qualified NEM system.[201] Nevada's definition of NEM system is similar to California's eligibility requirements for renewable facilities. In 1997, similar to California's first definition, Nevada defined a qualifying facility as a solar or wind system less than 10 kW located on the customer's property and was used to offset their electricity consumption.[202] Next, Nevada permitted any type of renewable system to qualify.[203] Then, Nevada increased the permitted generating capacity to 30 kW,[204] before increasing it to 150 kW two years later.[205] Five years before California, Nevada increased the allowed capacity to 1 MW,[206] but disqualified systems with a generating

197. S.B. 656 § 1 (b), 1995-96 Leg., Reg. Sess. (Cal. 1996) (noting that the customers systems must also "operate[] in parallel with the utility's transmission and distribution facilities.").
198. A.B. 1755 § 1(b)(2), 1997-98 Leg., Reg. Sess. (Cal. 1998).
199. A.B. 58 § 2 (b)(2), 2001-02 Leg., Reg. Sess. (Cal. 2002).
200. S.B. 489 § 1 (b)(4)-(5), 2011-12 Leg., Reg. Sess. (Cal. 2011) (noting that for purposes of this section of the public utility code, a renewable electrical generation facility is any facility listed in section 25741 of the Public Resources code).
201. S.B 255 § 6, 69th Leg., Reg. Sess. (Nev. 1997).
202. *Id*. (noting that just like California, the customers system must "operate[] in parallel with the utility's transmission and distribution facilities.").
203. A.B. 661 § 59, 71st Leg., Reg. Sess. (Nev. 2001).
204. A.B. 429 §§ 7, 2, 72d Leg., Reg. Sess. (Nev. 2003).
205. A.B. 236 § 1, 73rd Leg., Reg. Sess. (Nev. 2005).
206. A.B. 178 § 1.5(1)(b), 74th Leg., Reg. Sess. (Nev. 2007).

capacity greater than either the limit on the class of customers' demand that may be placed on the utilities system or 150% "of the peak demand of the customer."[207] Therefore, today, both California and Nevada allow any customer class with a renewable system up to 1 MW to qualify for NEM.

b. Compensation

Both California and Nevada substantially changed how utilities compensate NEM customers due to concerns that NEM customers were not paying their fair share in the utilities' cost to provide service.[208] Both California and Nevada require utilities to determine whether a customer is a net producer or net consumer of electricity.[209] In Nevada, if a customer uses more electricity than their NEM system generated, the utility will bill the customer for the amount supplied in excess of the amount generated during that month.[210] If a customer supplies more electricity to the utility than is provided by the utility, then neither the customer nor the utility owes the other for the electricity supplied during that month.[211] Nevada has never required a utility to pay for net surplus generation. However, the utility must carry forward the net surplus generation to the customers next billing cycle to be applied as a credit on the customer's consumption.[212] Nevada permits an indefinite carrying over of surplus generation, yet if the customer ceases to be a NEM customer the utility does not owe the customer for any excess credits.[213] A customer owns the renewable energy credits ("RECs") associated with their system if the customer purchased and installed the NEM system on his or her own.[214] However, the utility owns the RECS if it, in whole or in part, assisted in the purchasing and installation of the customer's NEM system.[215]

Similarly, California's IOUs determine whether a customer is a net consumer or a net supplier of electricity. However, unlike Nevada, California

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207. *Id*. § 1.5(2).
208. Jon Wellinghoff & James Tong, *Wellinghoff and Tong: A Common Confusion Over Net Metering is Undermining Utilities and the Grid*, UTIL. DIVE (Jan. 22, 2015), http://www.utilitydive.com/news/wellinghoff-and-tong-a-common-confusion-over-net-metering-is-undermining-u/355388/ [https://perma.cc/N9FW-4D3B].
209. NEV. REV. STAT. § 704.755(1)-(2)(a) (2017).
210. *Id.* § 704.755(2)(b).
211. NEV. REV. STAT. § 704.991(2017).
212. *Id*.
213. *Id*.
214. *Id*.
215. *Id*.

established a 12-month billing cycle.[216] Thereafter, a utility determines the appropriate compensation based on the customer's rate schedule. If a customer has "baseline" rates, a net consumer customer pays according to their tariff and a net surplus customer's electricity is valued at the retail rate of electricity.[217] If a customer receives service under a TOU rate, a net consumer customer pays according to their TOU rate tariff and a net surplus customer's surplus electricity is valued at the retail rate of electricity for "sales during that same time-of-use period."[218] In 2016, the CPUC mandated TOU rates for all NEM Successor Tariff customers.[219] Net consumer customers can carry forward the amount owed into the next billing cycle.[220] Net surplus customers must affirmatively elect to either be compensated by the electric utility for their surplus electricity or carry forward the surplus energy to be credited during the next billing cycle.[221] If an electric utility purchases the net surplus electricity, then the utility may count both the REC and the surplus electricity towards their RPS requirements.[222] The above compensation requirements are only for customers connected to an IOU. In addition, California has two different compensation requirements for when a customer is either part of net metering aggregation or is interconnected to a publically owned electric utility.[223]

c. Customer Charges

Both California and Nevada did not institute fixed charges for NEM customers until their most recent revisions. However, both California and Nevada began their NEM programs recognizing that NEM customers should not have any additional charges than non-NEM customers. In 1997, Nevada required that utilities "not charge a customer-generator any

216. CAL. PUB. UTIL. CODE § 2827(h)(1) (West, WestlawNext through ch. 4 of 2017 Reg. Sess.) (noting that the following compensation requirements apply only to residential and small commercial customers).
217. *Id.* § (h)(2)(A).
218. *Id.* § (h)(2)(B).
219. *Decision Adopting Successor to Net Energy Metering Tariff*, CAL. PUB. UTIL. COMMISSION 19 (Jan. 28, 2016), http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M158/K181/158181678.pdf [https://perma.cc/EVJ7-VW9C].
220. CAL. PUB. UTIL. CODE § 2827(h)(2)(C).
221. *Id.* § (h)(3) (providing that otherwise, the utility keeps the customers surplus electricity and need not compensate customers for such electricity).
222. *Id.* § (h)(6)(A)-(B).
223. *See generally id.*

fee or charge that would increase the customer-generator's monthly charge to an amount greater than that of other customers of the utility in the same rate case."[224] At the start of California's NEM program in 1996, the Legislature emphasized that "any new or additional demand charge, standby charge, customer charge, minimum monthly charge, interconnection charge, or other charge that would increase an eligible customer-generator's costs beyond those of other customers in the rate class" is contrary to the intent of the legislation, and therefore, is forbidden.[225]

Yet, in 2015, Nevada granted the PUCN authority to establish a separate class for NEM customers to be charged a higher monthly service charge and a lower per-kilowatt hour charge.[226] One of the reasons the PUCN provided for the creation of a separate rate class for NEM customers because it found they were not paying their fair share of the utilities' costs to provide service.[227] Thus, the PUCN established a basic service and volumetric charge in order to allow utilities to recover the "costs to serve net metering ratepayers."[228] Similarly, in 2016, the CPUC required utilities to include an interconnection fee and non-bypassable charges in their NEM Successor Tariffs.[229] The CPUC found these charges necessary so that NEM customers contribute equally with non-NEM customers to the IOUs' cost of providing service.[230]

d. Cap

Both California and Nevada capped the number of customers who could participate in NEM up until the most recent revisions of their respective NEM programs. California capped the number of customers who could participate in a utility's NEM program until 2013.[231] The cap applied to all NEM customers, regardless of customer class. California created this cap due to the "unknown impacts of increased customer-owned generation on

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224. S.B. 255 § 8 (c), 69th Leg., Reg. Sess. (Nev. 1997).
225. A.B. 1755 § 1 (d), 1997-98 Leg., Reg. Sess. (Cal. 1998).
226. S.B. 374 § 2.95(5)(c), 2015 Leg., 78th Reg. Sess. (Nev. 2015).
227. *See supra* Part III; *Modified Final Order*, *Application of Nevada Power Company d/b/a NV Energy for approval of a cost-of-service study and net metering tariffs*, PUB. UTIL. COMMISSION NEV., No. 15-07041 ¶ 89 – 93 (Feb. 12, 2016), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2015-7/9692.pdf [https://perma.cc/84VV-WPZS].
228. PUB. UTIL. COMMISSION NEV., *supra* note 227.
229. *Decision Adopting Successor to Net Energy Metering Tariff*, CAL. PUB. UTIL. COMMISSION § 2.14.1.1 – 2.14.1.2 (Jan. 28, 2016), http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M158/K181/158181678.pdf [https://perma.cc/8EH7-A5YV].
230. *Id.* § 2.14.1.
231. *See supra* Part IV (1)(b)(ii).

the grid."[232] Over the years, California increased its NEM customer cap from 0.1% to 5% of a utilities' aggregate customer peak demand.[233] For example, PG&E's cap was 5% of 48,177 MW; therefore, PG&E was required to accept NEM customer applications until the capacity from all the customer facilities reached 2,409 MW;[234] a point reached on December 15, 2016.[235] In 2013, the California legislature removed the cap stating that the new NEM program is based on the "cost and benefits received by nonparticipating customers and prevents a cost shift to non-NEM customers."[236]

Nevada began its NEM program by limiting enrollment in the program to the first 100 customers, regardless of customer class.[237] Nevada removed the 100-customer cap briefly[238] until instituting a NEM customer capacity cap of 1% of the utility's peak capacity.[239] Thus, California initially permitted more customers to participate in NEM than Nevada by having a higher cap. However, similar to California, Nevada removed its customer cap in 2015.[240] Nevada concluded that the cap was no longer necessary because it was instituted in the beginning to test the impact of the program over the years.[241] Now, Nevada requires utilities to provide the NEM Successor Tariff to customers after the utilities reach a 235 MW NEM customer cap.[242] The legislature concluded that the NEM Successor Tariff could align NEM customer costs and prevent cost shifting, and therefore,

232. *Update on the Cost and Benefits of California's Net Energy Metering Program*, CAL. PUB. UTIL. COMMISSION § 4.4 (2015), http://docs.cpuc.ca.gov/published/REPORT/45133.htm [https://perma.cc/3VHA-XJYL].

233. S.B. 656 § 1(d), 1995-96 Leg., Reg. Sess. (Cal. 1996) (regarding 0.1% net metering customer cap); A.B. 510, 2009-2010 Leg., Reg. Sess. (Cal. 2010) (regarding 5% net metering customer cap).

234. *Net Metering Program Tracking,* PACIFIC GAS & ELECTRIC, https://www.pge.com/en_US/residential/solar-and-vehicles/green-energy-incentives/solar-and-renewable-metering-and-billing/net-energy-metering-program-tracking/net-energy-metering-and-tracking-faq.page [https://perma.cc/3J4G-WTTH] (last visited Apr. 30, 2017).

235. *Id.*

236. *See* A.B. 327, 2013-14 Leg. Reg. Sess. (Cal. 2013).

237. S.B. 255 § 8, 69th Leg., Reg. Sess. (Nev. 1997).

238. A.B. 661 § 60, 71st Leg., Reg. Sess. (Nev. 2001).

239. A.B. 236 § 2(1)(b), 73rd Leg., Reg. Sess. (Nev. 2005).

240. S.B. 374 § 2.95(1)(a), 2015 Leg., 78th Reg. Sess. (Nev. 2015).

241. *Meeting Minutes of the Assemb. Comm. on Commerce & Labor*, 78th Session (Nev. May 20, 2015), https://www.leg.state.nv.us/Session/78th2015/Minutes/Assembly/CL/Final/1258.pdf [https://perma.cc/WK2Y-ZYNX] [hereinafter Meeting Minutes 78th Session].

242. S.B. 374 § 2.95(1)(b), 2015 Leg., 78th Reg. Sess. (Nev. 2015).

make the cap unnecessary.[243] Therefore, moving into their NEM Successor Tariffs, both California and Nevada removed restrictions on how many customers could participate.

e. Relationship to RPS

RPS and NEM are two programs developed by states to encourage development of renewable energy.[244] When developing NEM, states can decide whether the utility or the customer owns the RECs associated with any electricity that is supplied back to the utility's system.[245] This is important because utilities must obtain RECs in order to meet their RPS requirements. California's RPS incentivizes utility-scale renewable energy and places a burden on utilities to buy RECs from customers with distributed solar, who most likely are NEM customers.[246] On the other hand, Nevada's RPS specifically has a solar carve-out. Solar carve-outs encourage utilities to purchase electricity from distributed solar customers, and therefore, promote distributed solar-PV development.[247] It is important for state RPS and NEM programs to be compatible with one another in order to encourage the development of both distributed and utility scale renewable energy resources.[248]

Nevada's current RPS uses a graduated compliance year approach: by 2019, utilities must meet a 20% RPS; by 2024, utilities must meet a 22% RPS; and by 2025 and every year thereafter, utilities must meet a 25% RPS.[249] Nevada's definition for "renewable energy system" specifically includes "a net metering system used by a customer-generator."[250] Furthermore, up until the end of 2015, Nevada encouraged utilities to use NEM systems[251] to comply with their RPS by permitting the utility to claim 2.4 kWh of

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243. Meeting Minutes 78th Session, *supra* note 241.

244. *State Net Metering Policies*, NAT'L CONF. ST. LEGISLATURES (Nov. 3, 2016), http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx#sharedrenew [https://perma.cc/9CEF-W3ZX].

245. *Id.*

246. Greer Ryan, *Throwing Shade: 10 Sunny States Blocking Distributed Solar Development*, CTR. FOR BIOLOGICAL DIVERSITY 7 (2016), http://www.biologicaldiversity.org/programs/population_and_sustainability/energy/pdfs/ThrowingShade.pdf [https://perma.cc/2TME-UDZC].

247. *Id.*

248. *Recommended Principles and Best Practices for State Renewable Portfolio Standards*, CLEAN ENERGY STATES ALLIANCE 3 (2009), http://cesa.org/assets/Uploads/Resources-post-8-16/Principles-Best-Practices-RPS-2.pdf [https://perma.cc/3HQG-FM2Z].

249. NEV. REV. STAT. § 704.7821(1)(e)-(h) (2011).

250. NEV. REV. STAT. § 704.7815(3) (2011).

251. NEV. REV. STAT. § 704.7822(1)-(3) (2015) (requiring the system be on the customer's premise, been operating prior to December 31, 2015, and the customer uses at least "50[%] of the electricity generated by the system.").

renewable generation for every 1 kWh produced by these systems.[252] In fact, if a NEM customer received compensation from the SolarGenerations incentive program, the utility automatically assumed ownership of the PECs.[253] Also, unlike California, Nevada's only resource requirement is that after 2016, Nevada utilities acquire at least 6% of its RPS from "solar renewable energy systems."[254] Therefore, Nevada specifically includes incentives for utilities to use NEM generated electricity for the purpose of meeting the RPS. Due to these incentives, NV Energy counted 97,821 kWh of solar generation from NEM customers towards its RPS in 2014.[255]

California's RPS requires IOUs to procure 33% of their total retail electric sales from renewable generation by 2020 and 50% of their total retail electric sales by 2030.[256] Unlike Nevada, California does not incentivize utilities to purchase renewable electricity from NEM customers for the purpose of meeting their RPS. As discussed above,[257] California's RPS requires most renewable generation be procured from large systems that are directly connected to a California balancing authority or that produce firmed and shaped electricity.[258] Furthermore, California requires "RPS certified facility[ies]" to verify their renewable generation through the Western Renewable Energy Generation Information System (WREGIS) in order for utilities to count their generation towards its RPS obligation.[259] Net metering customers must take this extra step if the utility is to use their generation to count towards their RPS. Therefore, as shown in the

252. *Id*. § 704.7822.
253. NEV. REV. STAT. § 701B.290 (2007).
254. NEV. REV. STAT. § 704.7821(2)(b)(2) (1997). *But see* NEV. REV. STAT. § 704.7821(2)(b)(2) (2011) (requiring a gradual decrease in permitting energy efficiency measures from being counted towards a utilities' RPS).
255. *Portfolio Standard Annual Report Compliance Year 2014*, CLEAN ENERGY STATES ALLIANCE 17 (2015), http://cesa.org/assets/2015-Files/NV-Energy-2014-RPS-Compliance-Report.pdf [https://perma.cc/3QFE-QFFU].
256. CAL. PUB. UTIL. CODE § 399.11(a) (West, WestlawNext through ch. 4 of 2017 Reg. Sess.).
257. *See supra* Part IV(1).
258. CAL. PUB. UTIL. CODE § 399.16(b) (West, WestlawNext through ch. 4 of 2017 Reg. Sess.).
259. *Renewables Portfolio Standard (RPS) Verification*, CAL. ENERGY COMMISSION, http://www.energy.ca.gov/portfolio/documents/rps_verification.html [https://perma.cc/MT2V-8FZR] (last updated Aug. 2, 2016).

utilities filed compliance reports, California IOUs are not procuring renewable generation from NEM customers.[260]

B. Solar Incentive Programs

Both Nevada and California have incentive programs in place to encourage the development and use of solar energy. As described below, the programs are similar in the design and execution, but they differ in one important characteristic: length of the program.

1. Nevada

In 2003, the legislature created the SolarGenerations Rebate Program[261] and assigned regulatory authority to the PUCN.[262] The goal of the incentive program is to "expand and accelerate the development of solar distributed generation systems and to establish a sustainable and self-sufficient solar renewable energy industry in Nevada."[263] Ratepayers fund the program through the Renewable Energy Program Rate, a charge added to their bills each month.[264] Under this incentive program, NV Energy may grant a total of $255,270,000 in incentive funding from July 1, 2010 to June 30, 2021.[265]

Program participants are divided into four categories: (1) public entity, (2) low-income and nonprofit, (3) residential and small commercial, and (4) large commercial and industrial.[266] The maximum eligible incentive participants may receive is calculated during the application process and is determined based on the size of the proposed system.[267] For solar systems less than 25 kW, the calculation is done through an Expected Performance Based Buydown (EPBB).[268] The EPBB is a one-time payment determined based on the expected production of the solar system. For

260. *Southern California Edison Company's (U 338-E) 2014 Preliminary Annual 33% Renewables Portfolio Standard Compliance Report*, SOUTHERN CAL. EDISON A-4 (Feb. 26, 2014), http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/BBCDDE728A51A97288257EB600706A04/$FILE/R.15-02-020_RPS-SCE%202014%20Annual%2033%20Percent%20RPS%20Compliance%20Report_Public.pdf [https://perma.cc/T38Y-DYD5].

261. A.B. 431, Leg., 72nd Reg. Sess. (Nev. 2003).

262. *SolarGenerations Program Handbook*, NV ENERGY 3 (Apr. 6, 2016), https://www.nvenergy.com/renewablesenvironment/renewablegenerations/documents/handbooks/SolarGenerations-Handbook.pdf [https://perma.cc/R6KS-ZJ6E].

263. *Id.*

264. *Solar Energy Incentives Program*, PUB. UTIL. COMMISSION NEV. (2014), http://puc.nv.gov/Renewable_Energy/Renewable_Programs/Solar_Energy/ [https://perma.cc/2K9T-YGRZ].

265. *Id.*

266. NEV. ADMIN. CODE § 701B.150 (2016).

267. NV ENERGY, *supra* note 109, at 10.

268. *Id.*

residential, commercial, and industrial participants this payment will be based on a rate of $0.1475/W.[269] For low-income, nonprofit, and public entity participants the rate is $0.295/W.[270] For systems ranging from between 25 and 500 kW, the calculation is derived from a Performance Based Incentive (PBI). This incentive is determined by the amount of energy produced by the system and is paid in quarterly payments over time.[271] The PBI incentive for residential, commercial, or industrial participants is $0.0159/kWh and $0.0317/kWh for low-income, nonprofit, and public entity participants.[272]

Nevada's rebate program has a series of declining incentive steps that correspond to program years.[273] For example, from 2010 to 2011, during Step 1, the incentive rebate price for residential participants was $2.30/ installed watt.[274] Currently, Nevada is on its final step, Step 9, towards the goal of 250 megawatts of installed capacity for the program.[275] Public, low-income, and non-profits customers connecting under Step 9 receive an EPBB incentive of $0.2950/watt and residential, commercial, and industrial customers receive $0.1475/watt.[276] Meanwhile, the PBI incentive value for public, low-income, and non-profit customers is $0.0317 per kWh and for residential, commercial, and industrial customers is $0.0159 per kWh.[277]

A NEM customer participating in the Solar Generations does not have the option to retain the PECs generated by their system. Under NRS § 701B.290, all PECs become the property of the utility administering the solar incentive program.[278] Therefore, the credit multiplier given to energy from solar installations located on the premises of a retail customer benefits the utility and its RPS compliance efforts. This benefit was available until the legislature eliminated the credit multiplier at the end of 2015.[279]

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269. *Id.* at 11.
270. *Id.*
271. *Id.*
272. *Id.*
273. Scott Gordon, *Solar Rebates in Nevada, Update*, HELIO POWER (Feb. 25, 2010), http://heliopower.com/2010/02/25/solar-rebates-in-nevada-update/ [https://perma.cc/VH5S-KSWG].
274. *Id.*
275. *SolarGenerations Electric*, NV ENERGY, https://www.nvenergy.com/renewables environment/renewablegenerations/solargen/ [https://perma.cc/PSD6-J5SX] (last visited Dec. 2, 2016).
276. *Id.*
277. *Id.*
278. NEV. REV. STAT. § 701B.290 (2007).
279. NEV. REV. STAT. § 704.7822 (2004).

Additionally, the NEM Successor Tariff and the incentive program overlap. Customers connecting under the NEM Successor Tariff are still eligible to participate in the existing SolarGenerations incentive program so long as the incentive program cap is not yet reached.[280]

2. California

In 2006, the California legislature authorized the California Solar Initiative (CSI), scheduled to run from 2007 to 2016.[281] The CSI provided participants with cash back incentives for solar energy systems.[282] The CSI built off previous incentive programs in the state, including the Emerging Renewables Program and the Self-Generation Incentive Program, which had offered incentives to PV solar installations on the customer's premise since the late 1990s.[283] The legislature tasked the CPUC with supervising the CSI program and providing the incentives to customers of California's three IOUs: PG&E, SCE, and SDG&E.[284] The program shut down early when the rebates for customers of all three IOUs ran out in 2014.[285]

With a 10-year budget of $2,167 million, the program's goal was to reach 1,940 MW of installed solar capacity by 2016.[286] The program's goal included 1,750 MW from the General Market (GM) program as well as 190 megawatts from two low-income residential incentive programs, the Multifamily Affordable Housing (MASH) Program and the Single-family Affordable Solar Homes (SASH) Program.[287] The GM Program had a budget of $1.95 million to provide incentives for solar technologies in the general market[288] while the MASH and SASH programs received separate budget allotments of $108.3 million.[289]

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280. *SolarGenerations Electric - About The Program*, NV ENERGY, https://www.nvenergy.com/renewablesenvironment/renewablegenerations/solargen/index.cfm#Apply [https://perma.cc/6KPK-SZQ7] (last visited Jan. 6, 2017) (noting that as of Jan. 1, 2017, the Solar Generations program is still open and accepting applications).

281. S.B. 01, 2005-06 Leg., Reg. Sess. (Cal. 2006).

282. *California Solar Initiative Program Handbook*, CAL. PUB. UTIL. COMMISSION 1 (Feb. 2016), http://www.gosolarcalifornia.org/documents/CSI_HANDBOOK.PDF [https://perma.cc/9URW-7FWD].

283. S.B. 01, 2005-06 Leg., Reg. Sess. (Cal. 2006).

284. *About the California Solar Initiative*, CAL. PUB. UTIL. COMMISSION, http://www.cpuc.ca.gov/General.aspx?id=6133 [https://perma.cc/QF3X-8EWC] (last visited Nov. 30, 2016).

285. *The California Solar Initiative - CSI*, GO SOLAR CAL., http://www.gosolarcalifornia.ca.gov/csi/index.php [https://perma.cc/K8VZ-MWRW] (last visited Dec. 2, 2016).

286. CAL. PUB. UTIL. COMMISSION, *supra* note 284, at 1.

287. *Id.*

288. *Id.*

289. *Id.*

The additional funding given to the MASH and SASH programs allowed the programs to continue to provide incentives after the GM program funding expired. The MASH program is currently closed to new applicants as the program processes projects waitlisted under the original funding allocation.[290] However, the SASH program is continuing to accept new applicants.[291]

The CSI program was offered to different customer classes and it was designed to gradually lower incentive payments. All customers of the three participating IOUs were eligible for the CSI program.[292] The CSI program covered four different participant categories: (1) residential, (2) commercial, (3) government, and (4) non-profit.[293] For the GM Program, there were ten different incentive steps, each one targeted for different amounts of MW.[294] As the program progressed towards the reservation in any given step, it grew closer to triggering the next step.[295] Each progressive step corresponded with a lower incentive level, and these incentive levels reduced automatically over the duration of the program. The incentive levels differed between residential and non-residential program participants.[296]

California's incentive program was similar to the Nevada program in program design and operation. The CSI offered two types of incentives: EPBB and PBI. EPBB incentives were paid based on solar system characteristics including location, size, shading, and orientation.[297] Meanwhile, PBI was a simple flat per kWh payment based on the output from a solar energy system. The amount of both EPBB and PBI incentives depended upon the Reserve amount, reduced automatically over the CSI program.[298]

However, California's program did not offer the same combination of incentive program and RPS credit multiplier. There was no credit multiplier

290. *CSI Multifamily Affordable Solar Housing (MASH) Program*, CAL. PUB. UTIL. COMMISSION, http://www.cpuc.ca.gov/General.aspx?id=3752 [https://perma.cc/68AF-WWXV] (last visited Dec. 3, 2016).

291. *SASH Eligibility Requirements,* GRID ALTERNATIVES, http://www.gridalternatives.org/learn/sash/sash-eligibility-requirements [https://perma.cc/99XL-PX3Z] (last visited Dec. 3, 2016).

292. CAL. PUB. UTIL. COMMISSION, *supra* note 284, at 1.

293. *Id.*

294. *Id.* at 3–4.

295. *Id.* at 3.

296. *Id*. at 39.

297. *Id.* at 4.

298. *Id.*

applied to PV systems installed on a ratepayer's premises.[299] And as discussed in Part IV(b)(i), California's RPS compliance mechanism caps the amount of net metering renewable energy credits (RECs) that can be used by the utilities to demonstrate compliance with their RPS mandates.[300] Additionally, for other structural reasons, net metering RECs are not being used to demonstrate compliance.[301]

C. Time-of-Use Rates

A smart energy future requires the use of time-variant pricing.[302] Utilities must be able to send effective price signals to customers in order to shape their consumption "[b]ecause the underlying costs of providing electricity vary hourly and seasonally."[303] Two effective time variant rate designs are TOU and Time-of-Production (TOP) rates. These rate designs "offer some correlation between the temporally changing costs of providing energy and the customer's actual consumption of energy."[304]

TOU rates have been used across the United States for decades now;[305] however, only California has mandated default TOU residential rates. TOU rates define multi-hour peak and off-peak times, where the prices are higher during peak times.[306] TOU rates are generally confined to weekdays and may change based on the season due to changes in demand during different seasons.[307] Importantly, TOU rates not only encourage energy conservation and efficiency, but also load shifting.[308] TOU customers are encouraged to shift their demand to off-peak times, which both lowers the customers' electricity bill and shaves a utility's peak demand.[309] Moreover, TOU rates

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299. *See* CAL. PUB. UTIL. CODE § 399.16(c) (West, WestlawNext through ch. 4 of 2017 Reg. Sess.).

300. *Id.*

301. *See Renewables Portfolio Standard 2011-2013 Retail Sellers Procurement Verification*, CAL. ENERGY COMMISSION 10 (2016), http://www.energy.ca.gov/2016publications/CEC-300-2016-004/CEC-300-2016-004-CMF.pdf [https://perma.cc/5TN7-CLRB].

302. Jim Lazar & Wilson Gonzalez, *Smart Rate Design for a Smart Future*, REG. ASSISTANCE PROJECT 10 (July 2015), https://www.raponline.org/wp-content/uploads/2016/05/rap-lazar-gonzalez-smart-rate-design-july2015.pdf [https://perma.cc/3BJS-7Y76].

303. *Id.*

304. *Id.* at 44.

305. *Id.*

306. *Id.*

307. *Id.*

308. *See* Laurie Guevara-Stone, *California Flattens Rate Block, Rolls Out Default Time-of-Use Pricing*, RMI OUTLET (June 5, 2015), http://blog.rmi.org/blog_2015_06_05_california_flattens_rate_blocks_rolls_out_default_time_of_use_pricing [https://perma.cc/D49V-CN3G].

309. *See id.*

promote rooftop solar by encouraging customers to shift their load during times where their solar panels are producing output.[310]

A TOP rate design is when a utility compensates an electric generating facility based on the value of electricity at the time of electricity production.[311] TOP is important when discussing TOU rates for net metering customers because the utility will either credit or compensate the customer based on the time the customer produced electricity.[312] Thus, a customer receives a higher credit or compensation if he produced electricity during peak times as opposed to off-peak times.[313] Compensation based on the TOP is important for NEM customers with Solar PV because these systems are producing more during peak times than off-peak times.[314]

1. California

In 2012, the CPUC instituted a rulemaking on residential rate reform to see if time-variant pricing would better achieve its rate design principles than the inclining block rate.[315] A year later, in addition to reforming NEM, the California Legislature also encouraged residential rate reform by removing statutory limitations. The Legislature removed limitations placed on the CPUC's authority to increase residential rates after the 2000-2001 California energy crisis.[316] These limitations capped Tier 1 and

310. *See id.*

311. *See generally* Susan F. Tierney, *The Value of "DER" to "D": The Role of Distributed Energy Resources in Supporting Local Electric Distribution System Reliability*, ANALYSIS GROUP (Mar. 30, 2016), http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Divisions/Policy_and_Planning/Thought_Leaders_Events/Tierney%20White%20Paper%20-%20Value%20of%20DER%20to%20D%20-%203-30-2016%20FINAL.pdf [https://perma.cc/266J-4J9A]; *Net Metering*, NV ENERGY, https://www.nvenergy.com/renewablesenvironment/renewablegenerations/NetMetering.cfm [https://perma.cc/VY5M-WEYX] (last visited Apr. 25, 2016).

312. *See id.*

313. *See id.*

314. *See* Severin Borenstein, *Valuing the Time-Varying Electricity of Solar Photovoltaic Cells*, CTR. FOR STUDY ENERGY MKT. 6 (Mar. 2005), http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.160.4427&rep=rep1&type=pdf [https://perma.cc/NJ8H-86XW].

315. *See Order Instituting Rulemaking on the Commission's Own Motion to Conduct a Comprehensive Examination of Investor Owned Electric Utilities' Residential Rate Structures, the Transition to Time Varying and Dynamic Rates, and Other Statutory Obligations*, CAL. PUB. UTIL. COMMISSION 1 (June 21, 2012), http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/169782.PDF [https://perma.cc/6H2N-URJA].

316. A.B. 327 § 2, 2013–14 Reg. Sess. (Cal. 2013); *see also* CAL. PUB. UTIL. COMMISSION, *supra* note 315, at 4 (discussing the California energy crisis and resulting limitations on residential rates).

2 of the inclining block rate at 2001 levels and capped Tiers 3-5 at 130% of baseline prices.[317] Also, the legislature stated that the CPUC could authorize new or expanded fixed charges.[318] Lastly, the California legislature removed prohibitions from the CPUC's authority to require default TOU rates for residential customers, starting after January 1, 2018.[319] In 2015, the CPUC issued a decision on residential rate reform that required IOUs to have default TOU rates for all residential customers by 2019,[320] reduced the inclining block rate to two tiers,[321] and permitted IOUs to submit fixed charges based on the marginal cost to serve a residential customer.[322] The CPUC reasoned that default TOU rates would serve as an "incentive for residential customers to adjust their electricity use to minimize impacts on the electric grid at times of high demand."[323]

In 2016, the CPUC, in its Order on the Net Energy Metering Successor Tariff, also mandated TOU rates for all net metering customers with no option to opt-out unless the customer is choosing another time-differentiated rate.[324] Also, the CPUC decided to grandfather customers under the existing net metering tariff for 20 years, thus removing the requirement for existing net metering customers to switch to TOU rates unless they choose to.[325]

2. Nevada

Similarly, in 2015, the Nevada legislature removed prohibitions from an electric utility's authority to require time-variant pricing for NEM customers.[326] Unlike California, the PUCN did not mandate default TOU rates for NEM customers. Instead, the PUCN required that NV Energy recommend whether NEM customers should have "opt-in, opt-out, or mandatory [TOU rates] in the future."[327] However, the PUCN did recognize

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317. CAL. PUB. UTIL. COMMISSION, *supra* note 315, at 4–5 (discussing the California energy crisis and resulting limitations on residential rates).

318. *See* A.B. 327 § 2, 2013–14 Reg. Sess. (Cal. 2013).

319. *See id.* § 3.

320. *See Decision on Residential Rate Reform for Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company and Transition to Time-Of-Use Rates*, CAL. PUB. UTIL. COMMISSION 5 (July 31, 2015), http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M153/K110/153110321.PDF.

321. *See id.* at 106 (finding two tiers would be easier for customers to understand and would signal effective price signals to encourage conservation).

322. *See id.* at 216.

323. *Decision Adopting Successor to Net Energy Metering Tariff*, CAL. PUB. UTIL. COMMISSION 91–92 (Jan. 28, 2016), http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M158/K181/158181678.pdf [https://perma.cc/HN32-XHNB].

324. *Id.* at 91.

325. *See id.* at 100.

326. S.B. 374 § 2.5(1)-(2), 2015 Leg., 78th Reg. Sess. (Nev. 2015).

327. PUB. UTIL. COMMISSION NEV., *infra* note 350, ¶ 333.

that "time variant pricing [is] a viable and important element of future NEM rate design."[328] Thus, the PUCN stated that utilities may propose mandatory TOU rates for NEM customers in their next general rate cases.[329]

D. Decoupling

Decoupling is the separation of a utility's revenues from its volumetric sales of electricity.[330] In other words, after decoupling the utility's profit is no longer directly connected to the amount of electricity sold by the utility.[331] The practice of decoupling utility profits from utility sales began as a method for incentivizing utility-run energy efficiency programs.[332] Decoupling for electric and gas retail distribution utilities counteracts resistance to the adoption and full-scale implementation of energy efficiency programs.[333] Energy efficiency programs can slow—or even reverse—patterns of growth, thus reducing future and current revenue streams.[334] Without decoupling, utilities would be asked to undertake an activity that directly conflicts with the traditional utility business model of selling more electricity to make more profit.[335] The utility business model features utilities planning, constructing, and recouping the cost of system upgrades expansion over a period of decades.[336] Those investments are recovered through customer rates but over a multi-decade time period.[337] Reducing or reversing

328. *Id.*
329. *See id.*
330. Pamela Morgan, *A Decade of Decoupling for US Energy Utilities: Rate Impacts, Designs, and Observations*, AM. COUNCIL FOR AN ENERGY EFFICIENT ECON. 2 (Nov. 2012), http://aceee.org/files/pdf/collaborative-reports/decade-of-decoupling.pdf [https://perma.cc/M86K-GR45].
331. *See Decoupling*, PACIFIC GAS & ELECTRIC, https://www.pge.com/en_US/residential/rate-plans/how-rates-work/learn-how-rates-are-set/how-pge-makes-money/how-pge-makes-money.page [https://perma.cc/W32Z-3MR5] (last visited Mar. 5, 2016).
332. *See* Morgan, *supra* note 330.
333. *See id.*
334. *See* Janine Migden-Ostrander et al., *Decoupling Case Studies: Revenue Regulation Implementation in Six States*, REG. ASSISTANCE PROJECT 3 (2014), http://www.raponline.org/wp-content/uploads/2016/05/rap-watsonmigdenostranderlamont-implementingdecoupling-2014-jul.pdf [https://perma.cc/4KHE-DS9G].
335. *See id.*
336. *See* JONATHAN A. LESSER & LEONARDO R. GIACCHINO, FUNDAMENTALS OF ENERGY REGULATION 45–74 (2nd ed. 2013).
337. *See id.* at 207–68.

projected growth could leave the utility without sufficient revenue to meet its financial obligations.[338] Decoupling provides relief from that problem.

The impact of net metering on the utility business model is similar to that of energy efficiency programs[339] because the programs share a number of key characteristics.[340] Net metering reduces overall electrical load similar to energy efficiency. While energy efficiency reduces the amount of electricity needed to serve customer demand, net metering displaces generation from other resources.[341] In both cases, the impact is the same on the utility business model: declining electricity sales means less revenue and, consequently, less profit. Additionally, utilities are often mandated to offer net metering programs and to promote energy efficiency measures, encouraging the type of action that threatens their financial viability.

The impact of energy efficiency programs on utility revenues has greatly surpassed that of net metering, but change is coming. In the past two decades, energy efficiency measures have reduced U.S. retail electricity sales by almost 4.3%.[342] Net metering programs have only produced one-eighth of the impact as energy efficiency programs,[343] though the lesser impact of net metering does not mean that it will not cause future problems. As net metering penetration increases, so will its impact on utility revenues. As of 2016, only Hawaii has reached the point where net metering displaces more than 2% of total generation.[344] In fact, only the top ten states for distributed generation penetration have demonstrated a reduction of more than 0.4% in retail electricity sales.[345] As states add more distributed generation, the spread between the revenue reducing impact energy efficiency and net metering programs will tighten. To compare the impact

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338. *See id.* at 57.

339. *See* Migden-Ostrander et al., *supra* note 334.

340. *See id.*

341. *Table 7.6: Electricity End Use*, U.S. ENERGY INFO. ADMIN (2016), http://www.eia.gov/totalenergy/data/monthly/pdf/sec7_19.pdf [https://perma.cc/PZ49-B4GQ] (demonstrating flat-lined growth in total electric sales since 2005). Total electric sales in the United States have remained stable for the past decade even as the capacity of and production from net metering generation sources has grown dramatically. To accommodate these new generation sources, other generation sources are being displaced. *Table 4.10. Net Metering Customers and Capacity by Technology Type, by End Use Sector U.S. Energy Info. Admin.*, U.S. ENERGY INFO. ADMIN (2016), http://www.eia.gov/electricity/annual/html/epa_04_10.html [https://perma.cc/FT2Y-H76A] (detailing significant increase in net metering capacity since 2005).

342. Galen Barbose et al., *On the Path to SunShot: Utility Regulatory and Business Model Reforms for Addressing the Financial Impacts of Distributed Solar on Utilities*, LAWRENCE BERKELEY NAT'L LAB. 7 (2016), http://www.nrel.gov/docs/fy16osti/65670.pdf [https://perma.cc/5J8U-R86Y].

343. *Id.*

344. *Id.* at 6.

345. *Id.*

of net metering, one need only look to the many states that have annual mandated energy efficiency goals that exceed 1% of retail electric sales.[346]

The fears of revenue loss from net metering are not unfounded; rather, the fears just have yet to actualize. Projected growth in net metering will have a significant impact on retail electricity sales, especially in the states with the highest rates of penetration, like California and Nevada.[347] In the third quarter of 2016, the percentage of homes in California with rooftop solar hit 8%,[348] and the annual generation potential of Californian rooftops is 43.6% of total retail electric sales.[349] In Nevada, the number of homes with rooftop solar barely exceeded 30,000 as of June 2016 and they produced 3% of peak load.[350] The annual generation potential of Nevadan rooftops is 21.6% of total retail electric sales.[351] The total technical annual generation potential for all buildings in California is 74.2% of total retail electric sales and in Nevada it is 39.6%.[352]

The potential to disrupt the utility business model is far greater than the actual disruption to date. Presently, Nevada and California are at different levels of preparation for this future disruption. Although their actions were taken in response to energy efficiency goals, their decoupling decisions affect how the reduction in total retail electric sales caused by an increase in net metering generation disrupts the traditional utility business model.

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346. *State Energy Efficiency Resource Standards (EERS)*, AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON. (Jan. 2017), http://aceee.org/sites/default/files/state-eers-0117.pdf [https://perma.cc/4HGF-QNV9]; *see* D. Steinberg & O. Zinaman, *State Energy Efficiency Resource Standards: Design, Status, and Impacts*, NAT'L RENEWABLE ENERGY LAB. 11 (May 2014), http://www.nrel.gov/docs/fy14osti/61023.pdf [https://perma.cc/QSJ7-ZB7W].

347. *See* Steinberg & Zinaman, *supra* note 349, at 6.

348. *Solar Market Insight Report 2016 Q3*, SOLAR ENERGY INDUSTRIES ASS'N., http://www.seia.org/research-resources/solar-market-insight-report-2016-q3 [https://perma.cc/67JV-63LF] (last visited Nov. 30, 2016).

349. Pieter Gagnon et al., *Rooftop Solar Photovoltaic Technical Potential in the United States: A Detailed Assessment*, NAT'L RENEWABLE ENERGY LAB. 26 (Jan. 2016), http://www.nrel.gov/docs/fy16osti/65298.pdf [https://perma.cc/E2K7-T98E].

350. *Net Energy Metering Impacts Evaluation 2016 Update*, PUB. UTIL. COMMISSION NEV. 2 (Aug. 2016), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2016-8/14179.pdf [https://perma.cc/8L5Q-2733].

351. Gagnon et al., *supra* note 349, at 27.

352. *Id* at 35.

1. Nevada

Nevada's electricity sector is not fully decoupled.[353] The Nevada electric utilities are currently operating under a regime of partial decoupling,[354] which permits recovery of lost revenues resulting from demand-side management programs.[355] Under this partial decoupling regime, an electric utility can recover an amount based upon the measurable and verifiable effects of the implementation of its demand-side management, energy efficiency, and conservation programs.[356]

The move to decouple is recent and driven by energy efficiency goals. In 2009, the Nevada Legislature passed S.B. 358, which contains specific provisions to promote energy efficiency measures.[357] The bill directed the PUCN to adopt regulations authorizing an electric utility to recover the cost of implementing PUCN approved energy efficiency and conservation programs.[358] In response to S.B. 358, the PUCN instituted a rulemaking to adopt, amend, or repeal regulations regarding electric utility decoupling.[359] In 2010, the PUCN proposed a regulation to amend Chapter 704 of the Nevada Administrative Code to allow utilities to recover certain amounts of lost revenues based on the measurable and verifiable effects of the implementation of energy efficiency and conservation programs.[360] The

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353. *See Order*, *Application of Southwest Gas Corporation for Authority to Increase its Rates and Charges for Natural Gas Service for All Classes of Customers in Southern and Northern Nevada*, PUB. UTIL. COMMISSION. NEV., No. 09-04003, at 15 (Oct. 28, 2009), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2005_THRU_PRESENT/2009-4/32851.pdf [https://perma.cc/2WWM-FWFJ] (noting that Under Docket No. 09-04003, the PUCN fully decoupled Nevada's gas electricity using the authority given to it in S.B. 437 (2007) allowing gas utilities to propose decoupling their revenues from their sales once their energy efficiency programs were approved).

354. *See* NEV. ADMIN. CODE § 704.95225 (2015).

355. *Electric Utility Demand Side Management - Archive*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/electricity/data/eia861/dsm/index.html [https://perma.cc/CB5K-TTS7] (last visited Dec. 1, 2016) (noting that a demand-side management program encourages customers to modify their patterns of electricity usage to reduce peak loads. A demand-side management program can shift customer demand to reduce peak loading thus deferring investment in new generation resources or it can decrease overall consumption through energy efficiency measures).

356. NEV. ADMIN. CODE § 704.95225 (2015).

357. S.B. 358 § 1.19, 75th Leg., Reg. Sess. (Nev. 2009).

358. *Id*. § 11.3.

359. *Notice of Rulemaking and Requests for Comments and Proposed Regulations and Notice of Informal Workshop*, PUB. UTIL. COMMISSION. NEV. 1 (Sept. 9, 2009), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2005_THRU_PRESENT/2009-7/31569.pdf [https://perma.cc/32MB-KX68].

360. *Rulemaking to adopt, amend, or repeal regulations regarding electric utility decoupling and other related utility matters in accordance with Senate Bill 358 (Section 11.3) – Attachment*, PUB. UTIL. COMMISSION. NEV. (June 30, 2010), http://pucweb1.state.nv.

regulation defined energy efficiency as a "modification of energy use patterns which results in the greater productive use of energy or a reduction in the consumption of electric power."[361] Thus, a Nevada utility could recover portions of lost revenue due to more efficient use of electricity or a decrease in consumption that caused the overall total retail electric sales to drop.

The approved recovered method is only a partial decoupling because it does not fully sever the connection between utility revenues and its volumetric sales. S.B. 358 only provided a method for cost recovery of energy efficiency and conservation programs.[362] The Bill provided no cost recovery mechanism by which utilities could recover lost revenues from a drop-in retail electric sales caused by the increased adoption of net metering.

Nevada's legislature may consider further expanding electricity sector decoupling in 2017. Nevada's New Energy Industry Task Force recommended that the 2017 Legislature consider a bill to promote energy efficiency policies.[363] The Task Force's specific recommendation was that the legislature introduce a bill expressly giving the PUCN the authority to institute decoupling if found to be in the public interest.[364] Whether the decoupling would also cover lost revenues resulting from net metering was not considered in the recommendation.[365]

2. California

California has decoupled its energy markets for more than three decades. The gas sector was decoupled in 1978 and the electricity sector followed in 1982.[366] In 1982, CPUC adopted a decoupling mechanism known as

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us/PDF/AxImages/DOCKETS_2005_THRU_PRESENT/2009-7/35184.pdf [https://perma.cc/DE5J-DNEK].

361. NEV. ADMIN. CODE § 704.90605 (2010).

362. S.B. 358 § 11.3, 75th Leg., Reg. Sess. (Nev. 2009).

363. *New Energy Industry Task Force - Final Recommendations*, NEV. NEW ENERGY INDUS. TASK FORCE 3 (2016), http://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/NEITF%20Final%20Recommendations(1).pdf [https://perma.cc/CC39-4WL7].

364. *Id.*

365. *Id.*

366. *Case Study: USA – California*, WORLD ENERGY COUNCIL 21 (2013), https://www.wec-policies.enerdata.eu/Documents/cases-studies/US_Smart_billing.pdf [https://perma.cc/GLP3-QT5X] (discussing how electricity sector was decoupled in CPUC Decision 82-12-055 (1981)).

the Electric Revenue Adjustment Mechanism (ERAM).[367] The stated purpose of ERAM was "to adjust base rate (nonfuel) revenues for changes in revenues due to unexpected fluctuations in sales during the test period."[368] The ERAM allows for a revenue requirement to be established during a general rate case and for adjustments to be made in the years between cases.

In 1996, California briefly set aside its decoupling policy while restructuring its energy markets. In 2001, decoupling was reinstated after the passage of A.B. 29. A.B. 29 added Section 739.10 to the Public Utilities Code (PUC) requiring the Commission to "ensure that errors in estimates of demand elasticity of sales do not result in material over or under collections of the electrical corporations."[369] Each utility could propose its own decoupling mechanism in their subsequent general rate cases provided that the mechanism complied with balancing requirement outlined in Section 739.10.[370] Additionally, each utility must submit an annual review requirement as part of their compliance with PUC Section 913.1.[371] Section 913.1 requires each utility to file a report with the Commission with recommendations on measures to undertake to limit costs and rate increases.[372]

The combination of California's decoupling regulation, aggressive energy efficiency programs, and rooftop solar programs have resulted in a flattening out and gradual decrease in retail electricity sales. California's biannual energy forecasts, the California Energy Demand (CED), which is produced by the California Energy Commission, predicts a slowing growth rate in total energy consumption in each IOU for 2016-2026 and a decrease in peak energy consumption during the same time period.[373] Some IOUs are already dealing with a decrease in total sales that contradicts the CED

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367. Tory Weber et al., *Decoupling Mechanisms: Energy Efficiency Policy Impacts and Regulatory Implementation*, AM. COUNCIL FOR AN ENERGY EFFICIENT ECON. 5–339 (2006), http://aceee.org/files/proceedings/2006/data/papers/SS06_Panel5_Paper29.pdf [https://perma.cc/J5PH-E2LH].

368. Decision No. 82-12-055, CAL. PUB. UTIL. COMMISSION, 1982 WL 196701 (Dec. 13, 1982).

369. A.B. 29 § 10, (Cal. 2001); CAL. PUB. UTIL. CODE § 739.10 (2001) (West, WestlawNext through ch. 4 of 2017 Reg. Sess.).

370. Tory Weber et al., *supra* note 367, at 5-341-42.

371. S.B. 695 requires each utility to file an annual report to the CPUC recommending measures that can be taken to limit cost and rate increases. The Commission compiles the reports and submit a joint report to the Legislature. S.B. 695 (Cal. 2009).

372. CAL. PUB. UTIL. CODE § 913.1 (West, WestlawNext through ch. 4 of 2017 Reg. Sess.).

373. *California Energy Demand 2016-2026 Revised Electricity Demand Forecast, Volume 2: Electricity Demand by Utility Planning Area*, CAL. ENERGY COMMISSION 6–9, 29-32, 52-55 (Jan. 2016), http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-03/TN207438_20160115T152222_California_Energy_Demand_20162026_Revised_Electricity_Demand_Fo.pdf [https://perma.cc/BKV5-V4AA].

forecasts. Since 2012, PG&E sales decreased by about 0.05% per year despite a dramatic upswing in the overall economy.[374] A decrease attributed by PG&E to both efficiency gains and the proliferation of rooftop solar.[375] The role of decoupling in stabilizing the utility business model will become more important with both energy efficiency gains and self-generation or net metering predicted to grow during the same period.[376]

E. Comprehensive Resource Planning

Electric system planning is neither an easy nor a quick task. Planning a system that serves millions of customers, connected to a single entity by thousands of miles of distribution and transmission lines, is quite complicated. Traditional utility planning processes are built on three main goals: providing reliable and secure service, creating economic efficiencies, and ensuring equitable treatment of ratepayers.[377] Factors of other planning processes include compliance with government policies and protecting the environment.[378] These planning processes focused on how to meet future demand while providing reliable service at the least cost to the ratepayer.[379]

The planning processes produce a portfolio of resources that will meet projected demand and forecast future infrastructure investments needed to serve that demand. For most of the past half-century, the planning processes focused on the transmission grid and the large-scale generators connected to it because it was how power was produced and transmitted

374. *Pacific Gas And Electric Company 2016 Senate Bill 695 Compliance Report*, PACIFIC GAS & ELECTRIC 15 (2016), http://www.cpuc.ca.gov/assets/0/101/103/104/118/125/132/1094/1259/1fd02d0f-8ca5-4883-b1f4-41aa9910bac0.pdf [https://perma.cc/Y7EN-EHC8].

375. *Id.*

376. *California Energy Demand 2016-2026, Revised Electricity Forecast Volume 1: Statewide Electricity Demand And Energy Efficiency*, CAL. ENERGY COMMISSION 51–52, B21–22 (2016), http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-03/TN207439_20160115T152221_California_Energy_Demand_20162026_Revised_Electricity_Forecast.pdf [https://perma.cc/6NKS-H6HY].

377. *Integrated Resource Planning - May 2014*, AM. COUNCIL FOR AN ENERGY EFFICIENT ECON. 1 (2014), http://aceee.org/sites/default/files/pdf/policy-brief/irp-brief-0714.pdf [https://perma.cc/3FEP-67YA].

378. *Id*.

379. John Sterling et al., *Treatment of Solar Generation in Electric Utility Resource Planning*, NAT'L RENEWABLE ENERGY LAB. 1 (2013), http://www.nrel.gov/docs/fy14osti/60047.pdf [https://perma.cc/K7JT-VPDB].

to the end-user.[380] Integrating distributed energy resources (DERs), such as net metered solar array connecting to the distribution grid, pose a new set of challenges for planners. Connecting generation resources to the distribution grid is a new issue that planning processes need to consider. New modeling assumptions and methods are needed to predict the impact of integrating these resources; new measurement and verification procedures are required to test the models; and new techniques must be developed to discern the value of locating resources at specific points in the distribution systems.[381] As will be demonstrated, expanding the scope of what resources should be considered in the planning process, combined with the development of new assessment procedures, can have a significant impact on the continued integration of distributed energy resources into the distribution grid.

1. Nevada

Nevada's two IOUs serve the state's 1.2 million residents and 40 million annual tourists over a 46,000 square-mile service territory.[382] The PUCN's two main IOU planning processes, the Integrated Resource Plan and the Emissions Reduction and Capacity Replacement Plan, reinforce the state's overall commitment to large-scale renewable energy generation facilities. Neither of the two main planning processes provides significant consideration to how distributed generation resources can be incorporated into the electrical system. As Nevada plans its move away from carbon-intensive fossil fuel generation sources, its focused on replacing them with utility-scale renewable energy generation.

a. Integrated Resource Plan

Since 1983, the PUCN required utilities to submit triennial integrated resource plans to outlining how it will increase the supply of electricity for or decrease the demand for electricity on its system by its customers

380. Douglas C. Bauer & Joseph H. Eto, *Future Directions: Integrated Resource Planning*, AM. COUNCIL FOR AN ENERGY EFFICIENT ECON. (1992), http://aceee.org/files/proceedings/1992/data/papers/SS92_Panel8_Paper02.pdf [https://perma.cc/38J5-LP5H] (detailing the general structure of state integrated planning processes in 1992; a discussion focused on large utility and non-utility generation sources.); Rachel Wilson & Bruce Biewald, *Best Practices In Electric Utility Integrated Resource Planning: Examples Of State Regulations And Recent Utility Plans*, REG. ASSISTANCE PROJECT (2013), http://www.raponline.org/wp-content/uploads/2016/05/rapsynapse-wilsonbiewald-bestpracticesinirp-2013-jun-21.pdf [https://perma.cc/PA89-9G2Z] (providing examples of states that have recently integrated renewable energy into their resource planning statutes and regulations).

381. Sterling et al., *supra* note 379, at ix–x.

382. *2014 Power Facts*, NV ENERGY, https://www.nvenergy.com/brochures_arch/Power-Facts.pdf [https://perma.cc/Y6K4-328W] (last visited Dec. 2, 2016).

for the next 20 years.[383] The utilities must present evidence on a number of different electricity grid management issues. Foremost, the utilities must include 20-year growth forecasts for peak demand and annual electrical consumption.[384] The forecasts should include and exclude the impacts of energy efficiency and conservation programs.[385] Also, a summary of the demand side management plan must be included in the plan.[386] Another requirement the utilities must fulfill in their IRP is to show each planned addition to the system for the next 20 years and the projected capacity, cost, and date of initial service for those additions.[387] Additionally, the utilities must also produce a summary of existing contracts for renewable energy or for renewable energy credits showing how the utility will comply with the state renewable portfolio standard.[388]

A review of the utilities' current IRPs reveals how these directives continue to create a focus on large-scale generation resources and demand side management programs. The 2016 Sierra Pacific Power Company IRP forecasts that only 2 MW of small rooftop solar and less than 1 MW of installed capacity size will be installed in each year of the forecast as compared to 5 MW of large solar PV systems and more than 1 MW capacity.[389] The section on the utility's renewable energy plan demonstrates that the utility is exceeding its RPS mandate with only large-scale renewable energy generation resources.[390] Even when the utility does discuss providing solar PV to residential customers, it does so with a utility-scale solution. Within the IRP is a proposal by the utility to develop a subscription model to provide solar energy to its customers without requiring the customer to have on-site solar panels.[391] Instead, Sierra proposed using PECs from one of its large solar PV projects as the source of the programs PECs.[392] In sum, Sierra would strip the PECs from the project and used them to cover

383. NEV. REV. STAT. § 704.741 (1983); NEV. ADMIN. CODE § 704.9215 (2)(b) (1984).
384. NEV. ADMIN. CODE § 704.9215 (2)(b) (1984).
385. *Id.*
386. *Id*. § 704.9215 (2)(c).
387. *Id*. § 704.9215 (2)(d).
388. *Id*. § 704.9215 (2)(e).
389. *Summary*, *In re Application Of Sierra Pacific Power Company D/B/a NV Energy, Seeking Approval Of The 2017-2036 Integrated Resource Plan, Its Three Year Action Plan For 2017-2019, and Its Energy Supply Plan For 2017-2019*, PUB. UTIL. COMMISSION. NEV., No. 16-07001 (July 2016), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2016-7/13030.pdf [https://perma.cc/4JEQ-5PNP].
390. *Id.* at 19.
391. *Id.*
392. *Id.*

the sales of solar energy to program subscribers. On March 3, 2017, Sierra filed a draft proposal to implement the program.[393]

b. Emissions Reduction and Capacity Replacement Plans

In 2013, Nevada S.B. 123 created the utilities' other major planning requirement, the Emissions Reduction and Capacity Replacement (ERCR) plan.[394] The ERCR plan arose in tandem with the legislature's decision to retire and replace at least 800 MW of coal-fired generation over a five-year period starting in 2014.[395] The utility, Nevada Power, had to develop a plan for replacing the retired coal-fired generation. The legislation imposed an additional requirement on the utility to procure at least 350 MW of renewable energy generation over three years.[396] Nevada Power was required to issue three 100 MW RFPs for renewable energy on or before December 31, 2014, December 31, 2015, and December 31, 2016.[397] Also, Nevada Power must construct or acquire 50 MW of new renewable energy generation on or before December 31, 2017.[398]

Selected renewable energy generation facilities must pass a three-part test that favors larger facilities. Each proposal listed above is reviewed to identify the renewable energy facilities that provide: (1) the greatest economic benefit for the State;[399] (2) the greatest opportunity for the creation of new jobs in the State;[400] and (3) the best value to customers of the electric utility.[401] As demonstrated in Nevada Energy's Second Amendment to its ERCR, the test pushes the utilities to contract with or acquire large-scale renewable energy developments. The two requests for proposals reviewed in Nevada Energy's ERCR were respectively for 100 MW and 35 MW solar facilities.[402]

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393. *Advice Letter No. 592-E to Revise Electric Tariff No. 1 to establish Voluntary Subscription Solar Pricing Program Rider Schedule Solar #1Advice Letter*, PUB. UTIL. COMMISSION. NEV., No. 17-03010 (March 2017), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2017-3/19015.pdf.

394. S.B. 123, 77th Leg., Reg. Sess. (Nev. 2013).

395. NEV. REV. STAT § 704.7316 (2)(a) (2013).

396. NEV. ADMIN. CODE § 704.9543 (3)(a) (2014).

397. *Id.*

398. *Id*. § 704.9543 (3)(b).

399. *Id*. § 704.7316 (b)(4)(I).

400. *Id*. § 704.7316 (b)(4)(II).

401. NEV. REV. STAT. § 704.7316 (b)(4)(III) (2014).

402. *Application*, *In re Application Of Nevada Power Company, Seeking Approval of the Second Amendment to its Emission Reduction and Capacity Replacement Plan Seeking Approval of a 100 Mw Purchased Power Agreement with Techren Solar and The Retirement Of Reid Gardner Unit 4 On Or About February 28*, PUB. UTIL. COMMISSION. NEV. (Aug. 15, 2016), https://www.nvenergy.com/company/rates/filings/IRP/NPC_IRP/ERCR_NPC/NPC_Volume_1_ERCR_Amdmt.pdf [https://perma.cc/KZD7-BA8S].

c. Nevada New Energy Industry Task Force

Nevada is starting to return to small-scale distributed generation resources. In 2016, the Nevada Governor issued Executive Order 2016-04 reconvening the Nevada New Energy Industry Task Force and charging it to provide recommendations on "the best energy policies for Nevada's future."[403] The Task Force was specifically instructed to:

a. Encourage development of clean energy sources and integrate renewable energy technologies into Nevada's clean energy sector;
b. Foster the creation of a modern, resilient, and cost-effective energy grid; and
c. Support distributed generation and storage, with a specific focus on rooftop solar and net metering.[404]

The executive order is a significant move to directly support the expansion of distributed generation and net metering. Many of the issues linked to the expansion of distributed generation—in particular energy storage, storage procurement mandates, grid modernization, and distribution system planning—initiated after the PUCN's finalized its modified net metering order. The PUCN issued the modified net metering order on February 12, 2016[405] and the executive order on February 23, 2016.[406] In accordance with their mandate, the Energy Task Force sent a series of recommendations to the Nevada legislature on proposed legislation or other forms of government action.[407] Amongst the list were recommendations to grandfather existing net metering customers,[408] direct the PUCN to create a Value of Distributed Solar review that includes assessments of environmental costs and distribution capacity,[409] fund demonstration projects that integrate distributed energy resources into Nevada's electrical grid,[410] allow for community solar

403. NEV. EXECUTIVE DEP'T, *supra* note 69.
404. *Id.*
405. PUB. UTIL. COMMISSION NEV., *supra* note 350.
406. NEV. EXECUTIVE DEP'T, *supra* note 69.
407. *New Energy Industry Task Force Final Recommendations*, NEV. GOVERNOR'S OFF. ENERGY (Sept. 30, 2016) (to be codified in NEV. REV. STAT. § 704.766).
408. *Id*. at 1.
409. *Id*. at 12.
410. *Id*. at 6.

projects,[411] and to consolidate regulatory oversight of the development of distributed resources under a single agency or joint agencies.[412]

2. California

California's electrical grid is a complex engineering marvel with more than 30 million customers,[413] tens of thousands of miles of transmission power lines,[414] and hundreds of thousands of miles of distribution power lines.[415] The disruptive impact of distributed generation has forever changed the traditional utility planning model. Utility forecasting for electrical demand and electrical generation has expanded beyond the management of a small number of generation resources. Failure to plan for the next iteration of the electrical grid will create engineering and economic pressures.

California has an enhanced planning regime that covers all sectors of its electricity system. The complicated task of planning for the maintenance and growth of the electrical grid is spread between multiple state organizations and electric utilities and across different timelines. California's electrical sector planning processes independently cover generation, transmission, and distribution systems but are often integrated together. Key planning and information gathering processes in California include the Long Term Transmission Procurement Plan (LTPP), Integrated Resources Plan (IRP), Integrated Energy Policy Report (IEPR), biennial reports to the legislature on the impact of distributed generation, and Distributed Resource Plans (DRPs). Each of these processes evolved and developed over the course of many years in response to the rise of distributed generation resources.

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411. *Id*. at 14–5.

412. *Id*. at 11.

413. *Company Information and Facts*, CAL. INDEP. SYS. OPERATOR CORP. 1 (2013), https://www.caiso.com/Documents/CompanyInformation_Facts.pdf [https://perma.cc/X4VH-ATKW].

414. *Id*.

415. *See Company Profile*, PACIFIC GAS & ELECTRIC, https://www.pge.com/en_US/about-pge/company-information/profile/profile.page [https://perma.cc/C2BA-UY33] (last visited on Dec. 1, 2016); *see also Undergrounding electric utilities: SDG&E and the City of San Diego partner to enhance aesthetics and reliability*, SAN DIEGO GAS & ELECTRIC, http://www.sdge.com/newsroom/2014-07-20/undergrounding-electric-utilities-sdge-and-city-san-diego-partner [https://perma.cc/M2SZ-BCAB] (last visited Dec. 1, 2016); *Who We Are - By the Numbers: How We Do It*, SOUTHERN CAL. EDISON, https://www.sce.com/wps/portal/home/about-us/who-we-are/!ut/p/b1/hc89D4IwEAbg3-LASk8LiG4lEiiDSiABuhgwWEiAklLl7wuGxcSP297L8yZ3iKEUsS5_1DxXtejyZs7Muqxtj_g0AurFhgnU2Wyx51Acu-YEsgnAlyHwr58g9oscDGMBOw9cPzjNIMRAcQjHiBAMYC3gxw0ByrwRxeufjHQFtjlisryVspT6XU7rSql-2GugwTiOOheCN6V-Fa0GnyqVGBRK3yXq2xTqc5vYA1k9AQBQ4Vs!/dl4/d5/L2dBISEvZ0FBIS9nQSEh/ [https://perma.cc/VYC9-N54B] (last visited Dec. 1, 2016).

California's planning processes are considering elements and factors arising from the increasing penetration of net metering, which are not part of Nevada's planning program. California's planning processes incorporate current net metering penetration levels but also prepare for much higher levels of penetration.

a. Long Term Procurement Plan

In 2002, A.B. 57 added Section 454.5 to the Public Utilities Code. Section 454.5 requires each California three major IOUs[416] to biennially produce a 10-year procurement plan and have it approved by the CPUC.[417] The CPUC will assess the procurement plans and will also determine what changes should be made to the procurement rules. The CPUC will look at the system needs or the reliability needs of the overall electric system, the local needs or reliability needs of specific areas with transmission restrictions, and the flexibility needs of the system, such as resources required to integrate renewable generation sources.[418]

While the process focuses on planning for long-term contracts with larger generators, it does consider the impact of net metering. To assist the utilities in drafting their LTPPs, the CPUC, CEC, and California Independent System Operator (CAISO) produce a set of assumptions and scenarios for their use.[419] Those assumptions and scenarios produce a range of potential load profiles that can be used for planning purposes. The most recent planning assumptions were adopted for use in the CPUC's 2014 LTPP proceeding.[420] The planning assumptions draw upon

416. *Integrated Resource Plan and Long Term Procurement Plan*, CAL. PUB. UTIL. COMMISSION, http://www.cpuc.ca.gov/LTPP/ [https://perma.cc/2QG8-GK96] (last visited Dec. 1, 2016).

417. CAL. PUB. UTIL. CODE § 454.5 (West, WestlawNext through ch. 4 of 2017 Reg. Sess.).

418. CAL. PUB. UTIL. COMMISSION, *supra* note 416.

419. *Alignment of Key Infrastructure Planning Processes by CPUC, CEC and CAISO Staff*, CAL. INDEP. SYS. OPERATOR CORP. 1 (Dec. 23, 2014), https://www.caiso.com/Documents/TPP-LTPP-IEPR_AlignmentExplanatoryText.pdf [https://perma.cc/5GFL-BXCA].

420. *Attachment: Planning Assumptions Update and Scenarios for use in the CPUC Rulemaking R.13-12-010 (The 2014 Long-Term Procurement Plan Proceeding), and the CAISO 2015-16 Transmission Planning Process*, CAL. PUB. UTIL. COMMISSION (Oct. 28, 2015), file:///C:/Users/Cameron/Downloads/10-2015-AandS.pdf [https://perma.cc/manage/create]; *see also 2015-2016 Transmission Plan*, CAL. INDEP. SYS. OPERATOR CORP. 40 (Mar. 28, 2016), http://www.caiso.com/Documents/Board-Approved2015-2016TransmissionPlan.pdf [https://perma.cc/5H3R-F9U6].

the California Energy Commission's 2013 Integrated Energy Policy Report (IEPR) California Energy Demand (CED) forecasts which provide multiple baseload forecasts.[421] The CED forecasts are informed by the impact of incentive programs, net metering programs, and other retail rate design proceedings.[422]

b. Integrated Energy Policy Report (IEPR)

S.B. 1389 was the other major planning process that emerged from the 2002 California legislative session.[423] S.B. 1389 added Section 25301 to the Public Utilities Code requiring the California Energy Commission to conduct a biennial assessment and forecast "of all aspects of energy industry supply, production, transportation, delivery and distribution, demand and prices."[424] Updates to the biennial forecasts are provided in the off-years between reports.[425]

The IEPR covers the range of different policies and programs enacted in California to provide a more reliable electricity sector, to achieve greenhouse gas emissions reduction targets, and to proliferate utility-scale and distributed generation renewable resources.[426] As discussed previously, the IEPR produces the California Energy Demand Forecast and the Electricity Demand Forecast,[427] which are used to inform various proceedings including CPUC's LTPP process and CAISO's Transmission Planning Process (TPP).[428]

A key element of the Electricity Demand Forecasts is measuring the future impact of net metering or behind-the-meter generation on California's electricity load profile. For example, the 2016 Draft IEPR addresses the impact of installing 4,500 MW of solar generation on existing and new residential and commercial sites, of which approximately 2,000 MW were installed in 2014 and 2015.[429] Furthermore, the IEPR identifies that improved modeling of behind-the-meter PV is affecting forecasts of future demand

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421. CAL. PUB. UTIL. COMMISSION, *supra* note 420; CAL. INDEP. SYS. OPERATOR CORP., *supra* note 420, at 12.

422. *Id.*

423. CAL. INDEP. SYS. OPERATOR CORP., 420 note 424, at 1.

424. CAL. PUB. RES. CODE § 25301 (a) (West, WestlawNext through ch. 4 of 2017 Reg. Sess.).

425. CAL. PUB. RES. CODE § 25302 (d) (West, WestlawNext through ch. 4 of 2017 Reg. Sess.).

426. *Draft 2016 Integrated Energy Policy Report Update*, CAL. ENERGY COMMISSION 2 (Feb. 2017), http://docketpublic.energy.ca.gov/PublicDocuments/16-IEPR-01/TN216281_20170228T131538_Final_2016_Integrated_Energy_Policy_Report_Update_Complete_Repo.pdf [https://perma.cc/QZ35-6FHL].

427. *Id*. at 167.

428. *Id*.

429. *Id*. at 4.

and what time of day peak demand will occur.[430] This information feeds into efforts to integrate other resources, like energy storage, to mitigate the impact of variable PV production and to capture all of the value of distributed renewable generation resources.[431]

c. Biennial Report on Impacts of Distributed Generation

In 2008, A.B. 578 added Section 321.7 to the Public Utilities Code requiring the CPUC to, starting on or before January 1, 2010, biennially file a report with the Legislature and the Governor on the impacts of distributed generation on the state's distribution and transmission grid.[432] The CPUC was required to study (1) reliability and transmission issues relating to the connection of distributed generation resources onto local distribution networks and the regional grid;[433] (2) issues relating to grid reliability and operation including interconnection and federal and state regulatory positions on distributed energy accessibility;[434] (3) the effect on grid operations of different distributed generation resources;[435] (4) barriers impeding the connection of distributed generation resources to the grid;[436] (5) emerging distributed generation resources interconnection technologies;[437] (6) transmission and distribution interconnection issues;[438] and (7) the effect on peak electricity demand.[439] In developing the reports, the CPUC consulted with the California Independent System Operator (CAISO), the competitive market operator, and the State Energy Resources Conservation and Development Commission.[440]

The 2013 Biennial Report on Impacts of Distributed Generation identified a key barrier to distributed generation and net metering. The report stated that it is "difficult to develop quantitative measuring and monitoring protocols to systematically gauge whether DG [Distributed

430. *Id*. at 169.
431. *Id*. at 25.
432. CAL. PUB. UTIL. CODE § 913(a) (West, WestlawNext through ch. 4 of 2017 Reg. Sess.).
433. *Id*. § 913(a)(1).
434. *Id*. § 913(a)(2).
435. *Id*. § 913(a)(3).
436. *Id*. § 913(a)(4).
437. *Id*. § 913(a)(5).
438. *Id*. § 913(a)(6).
439. *Id*. § 913(a)(7).
440. *Id*. § 913(a).

Generation] is being deployed at the right place at the right time, and there has been no effort yet in California to do so."[441] This issue was subsequently taken up by the CPUC in its Distributed Resource Plan docket.

d. Distributed Resource Plans

A.B. 2013 (Perea) added Section 769 to Public Utilities Code creating a plan process focused on the distribution grid. Section 769 required "each electrical corporation shall submit to the commission a distribution resources plan proposal to identify optimal locations for the deployment of distributed resources" by July 2015.[442] Each of the California IOU's must submit a proposal to the CPUC covering five key elements:

1. an evaluation of "locational benefits and costs of distributed resources located on the distribution system";[443]
2. a proposal or identification of "standard tariffs, contracts, or other mechanisms for the deployment of cost-effective distributed resources that satisfy distribution planning objectives";[444]
3. propose cost-effective methods of effectively coordinating existing commission-approved programs, incentives, and tariffs to maximize the locational benefits and minimize the incremental costs of distributed resources.[445]
4. identify any additional utility spending necessary to integrate cost-effective distributed resources into distribution planning consistent with the goal of yielding net benefits to ratepayers.[446]
5. identify barriers to the deployment of distributed resources, including, but not limited to, safety standards related to technology or operation of the distribution circuit in a manner that ensures reliable service.[447]

The CPUC's Order Instituting Rulemaking, R.14-08-013, which opened the DRP docket, stated that "[t]he goal of these plans is to begin the process of moving the IOUs towards a more full integration of DERs into

441. *Biennial Report on Impacts of Distributed Generation*, CAL. PUB. UTIL. COMMISSION 1-5 (2013), file:///C:/Users/Cameron/Downloads/CPUC%20%E2%80%93%20Biennial%20Report%20on%20Impacts%20of%20Distributed%20Generation%20CPUCDGImpactReportFinal2013_05_23.pdf.

442. CAL. PUB. UTIL. CODE § 769(b) (West, WestlawNext through ch. 4 of 2017 Reg. Sess.).

443. *Id*. § 769 (b)(1).

444. *Id*. § 769 (b)(2).

445. *Id*. § 769 (b)(3).

446. *Id*. § 769 (b)(4).

447. *Id*. § 769(b)(5).

their distribution system planning, operations and investment."[448] A goal that picks up on the statement in the 2013 Biennial Report identifying an information gap on measuring the effect of DR deployment efforts.[449]

The CPUC is in the midst of a multi-year docket to examine each of the five above elements in depth.[450] Since 2014, the IOUs have and will continue developing analytical frameworks to understand the grid integration capacity of DERs, to quantify the locational value of DERs, and to forecast the future growth of DERs.[451] Each IOU is required to file an Integration Capacity Analysis (ICA) with their DRP, providing additional information on the capacity of their distribution systems to integrate distributed energy resources.[452] The IOUs were required to complete the ICA, or a representative ICA, for their initial DRP filings on July 1, 2015.[453] The information was then made available to the public and third-party providers as a means of directing development to areas where there is existing capacity and untapped value.[454]

The CPUC's Final Guidance on developing DRPs also directed the IOUs to develop a unified and consistent Locational Net Benefits Methodology for their DRP filing.[455] The locational analysis will provide insight into the value of DERs at specific points in the electrical grid, thus allowing for higher value areas to be targeted for additional resource deployment.[456] In performing the analysis, the IOUs were instructed to include certain value components to create a baseline level of uniformity between the

448. *Order Instituting Rulemaking Regarding Policies, Procedures and Rules For Development of Distribution Resources Plans Pursuant to* CAL PUB. UTIL. CODE § 769, CAL. PUB. UTIL. COMMISSION 5 (Feb. 6, 2015).

449. CAL. PUB. UTIL. COMMISSION, *supra* note 448, at 1–5.

450. *Attachment*, *Assigned Commissioner's Ruling on Guidance for Public Utilities Code Section 769—Distribution Resource Planning*, CAL. PUB. UTIL. COMMISSION Attachment-11 (Feb. 6, 2015), file:///C:/Users/Cameron/Downloads/Final%20Guidance%20Assigned%20Commissioner%20Ruling%20on%20Distribution%20Resource%20Plans%20146374514finalacr%20(1).pdf.

451. *Id*. at 3.

452. *Id*.

453. *See Application of Southern California Edison Company (U338-E) for Approval of Its Distribution Resources Plan*, CAL. PUB. UTIL. COMMISSION 18 (July 1, 2015), http://morethansmart.org/wp-content/uploads/2015/07/A.15-07-XXX_DRP-Application-SCE-Application-and-Distribution-Resources-Plan-.pdf [https://perma.cc/29NK-6PEK].

454. *Southern California Edison's Distributed Energy Resource Interconnection Map*, SOUTHERN CAL. EDISON, https://www.arcgis.com/home/item.html?id=e62dfa24128b4329bfc8b27c4526f6b7 [https://perma.cc/T7N9-HGCE] (last visited Nov. 28, 2016).

455. CAL. PUB. UTIL. COMMISSION, *supra* note 453, at 4.

456. *Id*. at 4–6.

different IOU assessments.[457] The value components list was a non-exhaustive list of avoided cost components that included various avoided sub-transmission costs, various avoided transmission costs, various avoided distribution costs, and any avoided societal costs that could be directly attributed to the deployment of DERs.[458]

The CPUC's Final Guidance on barriers lays the groundwork for higher levels of DER penetration. As the Final Guidance outlines, the barrier analysis should focus on three types of barriers: (1) barriers to integration and interconnection of DERSs onto the distribution grid; (2) barriers that restrict the ability of a DER to provide benefits; and (3) barriers related to distribution system operations and infrastructure capability to facilitate DERs.[459]

In the integrated capacity analysis, locational benefits analysis, and barrier identification assessment, the CPUC crafted a planning process that identifies current stressors on the electrical system arising from net metering and seeks solutions that will allow for even higher levels of penetration. When it began the DRP docket, the CPUC also acknowledged that the DRP proceedings are linked with other proceedings before the Commission on issues such as the net metering successor tariff, battery storage, distributed generation, residential rate reform, smart grid, long term procurement planning, and the renewable portfolio standard.[460] Linking together the dockets enables the Commission to conduct a more comprehensive evaluation of the electrical grid and how to modify it to integrate high levels of DERs.

Allowing utilities an avenue to plan for and recoup their investment in upgrading the distribution system to accommodate higher DER penetration provides an incentive for the utilities to fully engage in the process. Building on this concept, the DRP process is expected to inform and interface with utilities' general rate cases.[461] Using SCE as an example, the SCE DRP identifies how the "DRP process will influence SCE's investment in distribution infrastructure that it identifies in its GRC."[462] SCE plans on using the process to identify investments that may or may not be deferred through the strategic deployment of DER, plus investments that are necessary to smooth the integration of DERs into the distribution system.[463] Importantly, this information will feed into SCE's annual

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457. *Id*. at 4.
458. *Id*. at 4–5.
459. *Id*. at 10.
460. *Id*. at 10.
461. *Id.* at 11.
462. CAL. PUB. UTIL. COMMISSION, *supra* note 453, at 240.
463. *Id.* at 90.

Distribution Substation Plan (DSP) which identifies "distribution system requirements as they relate[] to serving projected customer load growth."[464] All of the plans will eventually feed into the utility's rate case and its application to recoup investments into its distribution system that enhance and facilitate DER integration.

California IOUs are on a three-year, two-phase general rate case cycle.[465] The DRP and DSP will help identify substation and feeder level investments for the rate case.[466] Those investments will both ease connection of DERs and increase the amount of DERs that can be connected. The planning processes will also show where maximum value can be extracted from a system upgrade.[467] Importantly, the rate case will also account for deferrals of investment in infrastructure resulting from optimizing the location of DER deployment, thus providing an additional opportunity to demonstrate DER value.[468]

California is in the middle of a lengthy process to revamp and modernize its electrical grid. The process is unfinished and many unknown obstacles may still arise. Nonetheless, the process has elevated the discussion of issues affecting distributed generation resources and created a forum for evaluating the costs and benefits of a continued decentralization of the electrical grid.

V. RECOMMENDATIONS

The comparison of the legislative, regulatory, and policy choices leading up to Nevada and California's net metering successor tariffs reveals five key elements for other states considering how to transition their net metering programs.

1. A state should ensure that its net metering and RPS programs are not in conflict with each other. The first step in that process is to recognize that rooftop solar and utility-scale solar are not the same. They may have similar generation profiles,

464. *Id.* at 241.
464. *What is a General Rate Case (GRC)?*, CAL. PUB. UTIL. COMMISSION, http://www.cpuc.ca.gov/General.aspx?id=10431 [https://perma.cc/KV55-XNBZ] (last visited Dec. 2, 2016).
465. *Id.*
466. CAL. PUB. UTIL. COMMISSION, *supra* note 453, at 240.
467. *Id.* at 95–96.
468. *Id.* at 241.

but they do not have the same cost structures. As such, they should not be treated the same in an RPS program. California limits the amount of net metering renewable energy certificates that can be used by utilities to comply with their RPS requirements.[469] California's three-tiered RPS compliance structure only permits up to 10% of the RPS compliance to be filled by net metering.[470] Although, as detailed above, California's IOUs do not rely upon net metering renewable energy credits to meet their RPS compliance obligations, the tiered construction of the program reduces the competition between utility scale solar and distributed generation net metering resources.[471] Nevada's RPS does not have the same separation, which puts utility scale solar and distributed generation resources in competition with each other for RPS compliance.[472]

Managing the interaction between the two resources is important because neither generation resource has a dominant position in the solar marketplace. The national average for a state's split between utility-scale solar[473] and distributed generation is 66.0% utility scale solar and 34.0% distributed generation.[474] California is very close to the national average with a split of 69.9% utility scale solar and 31.1% distributed generation.[475] Nevada's split between utility scale and distributed generation is much larger with 88% of its solar generation capacity coming from utility-scale installations.[476] Even though the numbers look competitive, the resource cost profiles are not, and thus, net metering resources should be treated differently than utility-scale generation resources.

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469. CAL. PUB. UTIL. CODE § 399.16 (West, WestlawNext through ch. 4 of 2017 Reg. Sess.).

470. *Id*. § 399.16 (c)(2).

471. CAL. ENERGY COMMISSION, *supra* note 301, at 29.

472. NEV. REV STAT. § 704.7821 (2015) (noting that no separation of net metering and utility scale solar; same treatment is provide to solar renewable energy systems).

473. Utility scale solar contains both solar PV and solar thermal electricity generating resources. *Utility-Scale Solar Power*, SOLAR ENERGY INDUSTRIES ASS'N, http://www.seia.org/policy/power-plant-development/utility-scale-solar-power [https://perma.cc/4RB5-W5LQ] (last visited Apr. 21, 2017).

474. *Electric Power Monthly (with Data for July 2016): Table 1.17.B. Net Generation from Solar Photovoltaic*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_1_17_b [https://perma.cc/5SLQ-8HAB] (last visited Apr. 21, 2017).

475. *Id.*

476. *Id.*

2. State incentive programs were a necessary component to spur net metering programs during their infancy. As net metering surged, the cost per installed watt dropped in the past decade by 70%.[477]Adding new incentive programs in advance of other program changes, like Nevada did in 2013, can create a spike in installations which piles additional disruptive economic pressure onto the utility.[478] A gradual sun-setting of existing incentive programs allows for customers to adapt to a new economic reality.

California ended its major incentive program, the California Solar Initiative, a full two years before releasing the successor net metering tariff.[479] Nevada's solar incentive program, SolarGenerations, continued right up until the PUCN issued the order to discontinue the existing net metering tariff.[480] Additionally, the federal Investment Tax Credit (ITC) has been extended for solar PV to cover facilities under construction before January 1, 2022.[481] The federal ITC should be the main source of future incentives as it is tied to the amount invested in a project and is not paid on a per watt basis; therefore, the ITC can fluctuate according to actual market conditions.

3. Time-of-use rates should be employed to allow for a proper comparison of the cost of consumption by net

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477. *Solar Industry Data - Solar Industry Growing at a Record Pace*, SOLAR ENERGY INDUSTRIES ASS'N, http://www.seia.org/research-resources/solar-industry-data [https://perma.cc/JV6H-ZWXD] (last visited Oct. 18, 2016).

478. As the Nevada Legislature debated and deliberated over S.B. 374, net metering customers were still able to apply for and receive SolarGenerations incentives. Peter Kind, *Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business*, EDISON ELECTRIC INST. 4–5 (Jan. 2013), http://www.eei.org/ourissues/finance/Documents/disruptivechallenges.pdf [https://perma.cc/HCZ6-Y4F9] (discussing how the concentration of distributed solar arrays in a small number of utilities can increase the financial risk to those utilities' revenue models. Factors accelerating the risk include the declining cost of PV panels, the continued payment of federal tax incentives, and the expansion of state incentive programs).

479. *California Solar Initiative - Statewide Trigger Tracker*, GO SOLAR CAL., http://csi-trigger.com/ [https://perma.cc/4WH9-8YZ3] (last visited Oct. 19, 2016); Stephen Lacey, *The End of a Solar Era: The Legacy of the California Solar Initiative*, GREENTECH MEDIA (Nov. 4, 2014), http://www.greentechmedia.com/articles/read/the-legacy-of-the-california-solar-initiative [https://perma.cc/M669-3A3H].

480. NV ENERGY, *supra* note 275.

481. 26 U.S.C.A. § 48 (6) (West, WestlawNext through P.L. 115-22).

metering customers and the value of generation from net metering solar rooftops. For net metering customers, who act as consumers and generators, time-of-use and time-of-production rates can reduce cross-subsidization from non-net metering customers to net metering customers.[482] The combination of rates may also encourage net metering customers to shift consumption to periods of generation.[483]

As part of its overall residential rate reform program, the California IOUs will implement default time-of-use rates for all customers starting in 2019.[484] For new net metering customers, time-of-use rates will occur sooner. Any customer connecting under the successor net metering tariff will be required to take service under the time-of-use rates. Nevada has voluntary time-of-use rates and has barred its IOUs from imposing default time-of-use rates on residential customers.[485] Electricity utilities can impose time-of-use rates on customer generators[486] but the decision to switch remains voluntary.[487] However, in 2016 and 2017, in NV Energy's next general rates cases, the utility must recommend whether time-of-use rates for net metering ratepayers should continue as opt-in, opt-out, or be mandatory.[488]

Whether a state develops a time-of-use tariff for all retail customers or just for net metering customers is not an opinion that this Article will offer. However, this Article recommends a fulsome consideration to mitigate the negative economic consequences of net metering using time-of-use rates.

4. Revenue decoupling can relieve pressure on utilities arising from a drop in overall electricity sales. While decoupling has traditionally been deployed to reduce the tension between

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482. *See* Barbose et al., *supra* note 342, at 19 (noting that the time of production and time use rates allow for customer-generators to be compensated for the value of the energy they produce and to pay for the value of the energy they consume. All energy generated and consumed is not given the same value thus brings customers closer to the actual costs of providing them with service).

483. Guevara-Stone, *supra* note 308.

484. *Fact Sheet – Residential Rate Reform*, CAL. PUB. UTIL. COMMISSION (Nov. 2015), http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Meetings_and_Events/ResidentialRateReformFactSheet.pdf [https://perma.cc/TM7P-RQN3].

485. NEV. REV STAT. § 704.085(1) (2013).

486. *Id.* § 704.085(2).

487. *Net Metering Rates & Rules*, PUB. UTIL. COMMISSION NEV. 2 (Mar. 2016), http://puc.nv.gov/uploadedFiles/pucnvgov/Content/Consumers/Be_Informed/Fact_Sheet_Net_Metering.pdf [https://perma.cc/426X-JUNM].

488. PUB. UTIL. COMMISSION NEV., *supra* note 350, at 149.

the utility revenue model and energy efficiency programs, it could provide similar relief for net metering program. This is because net metering, similar to energy efficiency, also reduces the overall volume of electric sales.[489]

States without decoupling would benefit in at least two ways by severing the link between their electric utilities' revenues and their sales of electricity. First, the decoupling would add extra incentives to state energy efficiency programs.[490] Second, the decoupling would also reduce utility reluctance to support net metering programs.[491] As documented, energy efficiency programs currently suppress total electric sales more than net metering programs.[492] Thus, the state would have the opportunity to test out its decoupling process on its energy efficiency programs in order to ensure that it has the capacity to measure and verify the impact of net metering on overall retail electricity sales.

5. Electric grid planning processes must address the integration of distributed energy resources with the distribution system. The electric grid is an ever-changing organism. The electrical grid and transmission and distribution systems is the most expensive and complex piece of infrastructure in the United States.[493] It is also a piece of infrastructure under tremendous pressure to incorporate distributed energy resources ranging from utility-scale generation resources to small rooftop solar system to battery storage systems and more.[494] Most

489. Migden-Ostrander et al., *supra* note 334, at 3.
490. Morgan, *supra* note 330, at 2.
491. Barbose et al., *supra* note 342, at 45–46.
492. *Id.* at n.4 – n.5.
493. *Present value cost of the U.S. electricity system*, ROCKY MTN. INST., http://www.rmi.org/RFGraph-present_value_cost_US_electricity [https://perma.cc/7LM7-SRDK] (last visited Jan. 5, 2017).
494. *Incorporating Renewables into the Electric Grid: Expanding Opportunities for Smart Markets and Energy Storage*, Executive OFF. PRESIDENT U.S. 5 (2016), https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160616_cea_renewables_electricgrid.pdf [https://perma.cc/8A7J-62HX] (describing future growth in renewable energy generation and impacts on current grid management practices.); *see also*, *Integrating Variable Renewable Energy into the Grid: Key Issues*, NAT'L RENEWABLE ENERGY LAB. (May 2015), http://www.nrel.gov/docs/fy15osti/63033.pdf [https://perma.cc/YY3B-QUV8] (describing key issues for electric grid planners and operators to integrate higher levels of renewable energy into the electric grid).

> traditional utility planning systems have focused on the procurement of energy from large generation facilities being connected to the transmission system.[495] The distribution system was not a place where generation resources connected. That has changed and the planning processes need to change too.

California's template for a comprehensive resource planning program is an example of a process to assist utilities in "identifying optimal locations for the deployment of distributed resources."[496] Furthermore, the CPUC's Distributed Resource Planning process covers a number of interconnected elements such as "distributed renewable energy generation resources, energy efficiency, energy storage, electric vehicles, and demand response technologies."[497] Additionally, the Distributed Resource Planning proceeding overlaps with other ongoing Commission activities including reviews of energy efficiency, net metering, rate reform, smart grid, and the renewable portfolio standard.[498] A range of activities that started as far back as 2008.[499]

A state undertaking a review of its net metering program must acknowledge that the net metering program does not operate in isolation. The program connects with other files and dockets and should be considered in tandem with them. Net metering also introduces new stresses on the distribution system that are not part of the normal planning process.[500] Planning processes must be reordered to manage those stresses while maximizing the value of the connecting resource and minimizing costs for the ratepayer.

Taking gradual steps to planning the future role of net metering can build an evidentiary record upon which to properly price the value of solar

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495. *Supra* Part IV(5)(a)(i).

496. CAL. PUB. UTIL. CODE § 769(b) (West, WestlawNext through ch. 4 of 2017 Reg. Sess.).

497. *Id*. § 769(a).

498. *Distributed Resources Plan (R. 14-08-013)*, CAL. PUB. UTIL. COMMISSION, http://www.cpuc.ca.gov/General.aspx?id=5071 [https://perma.cc/U8JD-S2UH] (last visited Oct. 19, 2016).

499. *Id.*

500. The distribution grid has traditionally flowed power in a single direction—from the transmission grid to the end-use customer. The uni-directional flow has simplified circuit design and management. Connecting generation resources to the distribution grid means that electricity flows are now bi-directional; in times of over-generation, electricity flows back onto the transmission grid and in times of low production, electricity flows in its traditional direction. For examples of the issues that can arise from connecting distributed generation resources to the distribution grid *see* Lucian Ioan Dulău et al., *Effects of distributed generation on electrical power systems*, 12 PROCEDIA TECH. 681 (2014), http://ac.els-cdn.com/S2212017313007342/1-s2.0-S2212017313007342-main.pdf?_tid=9211bc66-26d9-11e7-90a4-00000aab0f6c&acdnat=1492810335_63828634bd83413d6621175cebccec6d [https://perma.cc/6UR4-BV39].

energy from net metering generators. California recognized that some amount of cost-shifting between net metering and non-net metering customers is permissible in the pursuit of other state goals.[501] California also acknowledged that quantification of this cost-shift is difficult and remains an ongoing "program consideration."[502] Nevada, after a series of fits and starts in its legislative and administrative process, has begun an extended and expanded evaluation of the costs and benefits of net metering.[503]

VI. CONCLUSION

The future of net metering is uncertain. The programs cannot persist in their existing forms, but the untapped potential of American rooftops is an incredible renewable energy resource. As rooftop solar PV has moved from an oddity to a common-home accessory, the impact of the net metering programs on the distribution grid and utility business models has also shifted. Finding a new pathway for net metering will require a deep and broad re-evaluation of major utility business practices. This Article highlighted some of those practices and given examples of how they can alleviate stress and create opportunities for net metering to flourish.

501. CAL. PUB. UTIL. COMMISSION, *supra* note 89, at 5.
502. *Id.*
503. PUB. UTIL. COMMISSION NEV., *supra* note 39, at 45–49.