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BENEFICIAL DISRUPTION: VERMONT'S RENEWABLE ENERGY STANDARD AND THE NEED FOR INNOVATIVE UTILITY REGULATION IN THE 21ST CENTURY

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INTRODUCTION

Many in the utility industry nationwide are increasingly concerned about the concept of a "death spiral" whereby new technologies are changing the nature of the customer relationship with their local electric utility.[1] Such technologies include most prominently rooftop and community solar arrays, which can reduce, or in some cases in conjunction with battery storage technologies, eliminate the necessity for electric service.[2]

Industry commentators have compared the disruptive effects of this change to the telecommunications industry revolution when landlines gave way to cell phones, leaving stranded customers who did not make the switch with the burden of paying more for legacy and outdated infrastructure.[3] Appropriately, there is concern that if similar impacts were to take place in the electric utility industry, customers unable to access new technologies would be likewise stranded, paying for the costs of legacy transmission infrastructure such as poles and wires. Spreading the fixed costs of a legacy system over a shrinking number of customers and a declining load would mean higher bills for those left behind.[4]

This Article takes a different view of the disruption taking place, positing that utilities have an opportunity through new technologies to meet customer needs and environmental imperatives while also building a sustainable business model for the future. While much of the focus around emerging technologies is on those such as solar, which reduce the need for utility load, there should be an equal or greater focus by utilities

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[1] *See Future of Retail Rate Design*, EDISON ELEC. INST. 2, 8 (Eric Ackerman & Paul De Martini, eds., 2012) http://www.eei.org/issuesandpolicy/stateregulation/Documents/Future%20of%20Retail%20Rate%20Design%20v4%20021713%20eta%20-%20pjd2.pdf [https://perma.cc/F57B-99YY] (laying out the challenges faced by the investor-owned utility industry, as seen by the industry's own trade association).

[2] *Id.* at 3.

[3] *Id.* at 8.

[4] *See* Mark Chediak & Ken Wells, *Why the U.S. Power Grid's Days Are Numbered*, BLOOMBERG (Aug. 22, 2013, 7:11 PM), https://www.bloomberg.com/news/articles/2013-08-22/why-the-u-dot-s-dot-power-grids-days-are-numbered [https://perma.cc/35ZN-MP2E].

on technologies that build beneficial load such as electric and plug-in hybrid vehicles and air source heat pumps. Expanding the use of these types of technologies through strategic electrification of the heating and transportation sectors offers the potential in states like Vermont (with a relatively clean electric supply) to reduce greenhouse gas emissions while saving customers money.[5] Further, with careful planning and supportive but balanced policies, these technologies offer the utility an opportunity to provide new value to customers, and create a new purpose for utility regulation in helping to meet 21st century state and national greenhouse gas emission targets.

Part I of this Article provides a brief history of 20th century utility regulation, including the genesis of the so-called natural monopoly for electric utility service. Part II explores the disruption currently taking place in the electric utility sector, through increasing adoption of customer-sited technologies that reduce or affect electric load. These include solar and energy efficiency technologies. Part II also discusses the concept of the utility death spiral. Part III discusses the opportunity for a new way of thinking about the change and disruption, with a particular focus on the ability of utilities to build beneficial load and offer new services that address the loss of load from the death spiral. Part III also examines policies that enable utilities to build market share in the thermal and transportation sectors through new and disruptive technologies, focusing on Vermont's 2015 Renewable Energy Standard as an example. Finally, Part III proposes principles for utility-led energy transformation in the 21st century and discusses why electric utilities are the correct and in some ways indispensable entities to undertake this challenge.

I. BRIEF HISTORY OF ELECTRIC UTILITY REGULATION AND POLICY IN UNITED STATES

A. Electric Light

The 19th Century saw many discoveries and inventions, including major progress in using electricity. This followed on the research and experiments of many in the 18th Century, including, famously, Ben Franklin.[6]

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[5] *See* Brian Buckley, *Vermont Embarks Upon Landmark Strategic Electrification Program*, NE. ENERGY EFFICIENCY P'SHIPS (Dec. 18, 2015, 12:25 PM), http://www.neep.org/blog/vermont-embarks-upon-landmark-strategic-electrification-program [https://perma.cc/6B3B-PUNS].

[6] WALTER ISAACSON, BENJAMIN FRANKLIN: AN AMERICAN LIFE 141–43 (2003).

Many inventors and entrepreneurs in the late 19th Century sought to create a practical light bulb powered by electricity.[7] Thomas Edison, and his research team at Menlo Park, New Jersey, are often credited with making such an invention, although the author Ernest Freeberg states he should not be solely credited with such an invention.[8] In his book, Freeberg details the dangers of the early use of electricity, including electrocution, and the competition between gas lights (referred to as "town light") and electric light for street lighting.[9] Before they became widely adopted in homes, the electric lights made cities safer and more attractive in the evening, and offered the opportunity for factories to run a second or third shift to improve productivity of their capital investments.[10]

Edison, with coal brought to his power plant by horse-drawn wagon, used steam generators to light up a square mile of New York City in 1882.[11] Edison's initial advantage was dimmed by his reliance on direct current ("DC") power for his lights, whereby his competitor George Westinghouse (relying on patents from Nikola Tesla, who originally worked for Edison) used alternating current ("AC"), which became the industry standard.[12] Westinghouse, using Tesla's designs, was able to harness power from the Niagara Falls and generate hydroelectric energy.[13] Edison's work, however, spawned electric light utilities and led as well to the creation of the company that became General Electric.[14]

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[7] *See* ERNEST FREEBERG, AGE OF EDISON: ELECTRIC LIGHT AND THE INVENTION OF MODERN AMERICA 158–59 (2014).
[8] Brooke Berger, *Many Minds Produced The Light That Illuminated America,* U.S. NEWS & WORLD REPORT (Mar. 21, 2013, 8:00 AM), http://www.usnews.com/opinion/articles/2013/03/21/why-thomas-edison-isnt-the-inventor-of-the-light-bulb [https://perma.cc/QWL7-PEA4].
[9] FREEBERG, *supra* note 7, at 79–83.
[10] *See* Berger, *supra* note 8.
[11] *See* Emily S. Rueb, *How New York City Gets Its Electricity*, N.Y. TIMES (Feb. 10, 2017), https://www.nytimes.com/interactive/2017/02/10/nyregion/how-new-york-city-gets-its-electricity-power-grid.html?_r=0 [https://web.archive.org/web/20170916010933/https://www.nytimes.com/interactive/2017/02/10/nyregion/how-new-york-city-gets-its-electricity-power-grid.html?_r=0%20].
[12] Gilbert King, *Edison vs. Westinghouse: A Shocking Rivalry*, SMITHSONIAN (Oct. 11, 2011), http://www.smithsonianmag.com/history/edison-vs-westinghouse-a-shocking-rivalry-102146036/ [https://perma.cc/9DAY-NRZU].
[13] Rueb, *supra* note 11.
[14] *See* Richard D. Cudahy & William D. Henderson, *From Insull to Enron: Corporate (Re)Regulation After the Rise and Fall of Two Energy Icons,* 26 ENERGY L.J. 35, 39–41 (2005), *available at* http://online.wsj.com/public/resources/documents/insull.pdf [https://perma.cc/3DHC-W39V].

B. The Natural Monopoly

General Electric manufactured electric products, but one of Edison's top employees, Samuel Insull, decided that his future lay in the generation and distribution of electricity.[15] In 1892 he left General Electric to become head of Chicago Edison, a utility which he grew while adding more generating capacity and cutting rates to attract customers.[16] Insull was among the first to have the insight that by creating varying demands (through, for example, electric appliances that needed energy at different times of day than lights) he could, like the factory owner, essentially run a second or third shift on the grid and derive more revenue from the same fixed infrastructure.[17] Insull's other major contribution, both as head of Chicago Edison and as President of the National Electric Light Association (a predecessor organization to the current Edison Electric Institute), was pushing for a new business model for utilities.[18]

Insull argued as early as 1898 that the electric utility industry was paying a high price for capital and enduring harmful competition for redundant infrastructure, which meant customers did not receive the best price for the end product.[19] He advocated for monopoly franchises in geographic areas with protections for the consuming public and for investors.[20] Insull found the utility industry to be a natural monopoly, which should rely on economies of scale from one provider in a service territory, instead of competition among providers, to lower prices for consumers.[21] With regulation to ensure fair pricing and cost-recovery, the utility would be more efficient and provide a lower price when given a monopoly than competition could deliver in the same area.[22] The resulting rate of return regulation sought to ensure utility investment through a return on capital assets to investors/shareholders.[23]

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[15] *Id.* at 41.
[16] *Id.* at 41–44.
[17] *Id.* at 46–50.
[18] *Id.* at 46.
[19] *Id.*
[20] Cudahy & Henderson, *supra* note 14, at 46.
[21] *See* Steve Corneli & Steve Kihm, *Will distributed energy end the utility natural monopoly?,* ELEC. POL'Y 1, 2 (June 2016), https://emp.lbl.gov/sites/all/files/Corneli_29June2016.pdf [https://perma.cc/XYP3-WJFT].
[22] *Id.*
[23] *See, e.g.*, Kristin Ralff-Douglas & Marzia Zafar,, ELECTRIC UTILITY BUSINESS AND REGULATORY MODELS, CAL. PUB. UTIL. COMM'N 1, 6–7 (2015), http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Divisions/Policy_and_Planning/PPD_Work/PPDElectricUtilityBusinessModels.pdf [https://perma.cc/D2VX-MR3Q].

State commission regulation of utilities focused (and still does) on efforts to provide just and reasonable rates to consumers, and to ensure that in-service facilities be useful and prudently invested in before their costs can be passed on in rates to consumers known as ratepayers.[24] Regulation seeks to ensure prices reflect the cost of service.[25]

Insull built up a large utility sector interest through leveraged holding companies, but his holdings eventually collapsed.[26] He was accused of gouging consumers, drew negative publicity from contributing large cash payments to the U.S. Senate campaign of Illinois' top utility regulator, and he faced criminal charges following the stock market crash in the late 1920s and a financing crunch in the early 1930s.[27] New Deal reforms aimed at addressing political influence of the utility industry (drawing on findings from a Federal Trade Commission investigation) changed the holding company structure, created new public power authorities such as the Tennessee Valley Authority, introduced federal rate regulation of wholesale transactions, and supported rural electrification.[28]

C. The Modern Era of Utility Regulation

1. Nuclear Buildout

Insull's push for larger generation sources, more demand, and economies of scale played out as he would have expected, with nominal electric prices declining from 1925 to 1970.[29]

The utility industry saw relatively few major innovations during that time, but toward the end of that period there was an effort to build large, capital-intensive nuclear plants.[30] Initially marketed as being the next phase in the push for economy of scale, the nuclear buildout lost

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[24] *See, e.g.*, Paul L. Joskow, *Regulatory Failure, Regulatory Reform, and Structural Change in the Electrical Power Industry,* BROOKINGS PAPERS: MICROECONOMICS 125, 135 (1989), https://www.brookings.edu/wp-content/uploads/1989/01/1989_bpeamicro_joskow.pdf [https://perma.cc/YXC7-SXTY].

[25] *Id.*

[26] Cudahy & Henderson, *supra* note 14, at 56–57.

[27] *Id.* at 56–77. Following a Senate investigation on the campaign financing activities in the Illinois Senate race that prevented the utility regulator, Frank Smith, from taking his seat even after his election, U.S. Senator George Norris of Nebraska said Illinois was not being deprived of its votes in the Senate, but that it was "a question of Mr. Insull being deprived of his votes in the Senate." *Id.* at 61.

[28] *Id.* at 56–77.

[29] *See* Joskow, *supra* note 24, at 153.

[30] Cudahy & Henderson, *supra* note 14, at 78.

momentum midstream due in part to cost overruns and delays.[31] Dozens of plants were cancelled, and no new plants were ordered after 1978 until very recently.[32] Notably the Seabrook nuclear plant's cost increases in New Hampshire caused a bankruptcy for one of the utilities invested in it, the first significant public utility bankruptcy since the Great Depression.[33] The cost overruns and cancellations continue for the few new reactors ordered in the 21st century, with two reactors less than half built in South Carolina recently cancelled after utilities spent $9 billion on them (accounting for 18% of residential customer bills for one of the utilities involved).[34]

2. Federal Landscape for Efficiency and Renewable Energy

In addition to state regulation, and federal reforms during the New Deal era, the utility sector and energy sector have been affected by federal tax and spending decisions. Federal tax policy and federal energy funding and policies have long-favored fossil fuel development and nuclear energy development.[35] According to a non-partisan report prepared by the Congressional Research Service ("CRS"), "[h]istorically, federal energy

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[31] *Id.*

[32] Lee A. Daniels, *Bankruptcy Filed by Leading Utility in Seabrook Plant*, N.Y. TIMES (Jan. 29, 1988), http://www.nytimes.com/1988/01/29/business/bankruptcy-filed-by-leading-utility-in-seabrook-plant.html?pagewanted=all [https://web.archive.org/web/20160329153634/http://www.nytimes.com/1988/01/29/business/bankruptcy-filed-by-leading-utility-in-seabrook-plant.html?pagewanted=all].

[33] *Id.*

[34] Recently new nuclear plants were ordered in Georgia and South Carolina; however, consistent with the previous experience, cost overruns and delays have occurred. *See* Russell Grantham, *Who pays Vogtle's higher costs? Mostly you, Georgia regulator decides.*, ATLANTA J.-CONST. (Dec. 20, 2016), http://www.ajc.com/business/who-pays-vogtle-higher-costs-mostly-you-georgia-regulator-decides/DEIS6cSLQfS5De0MaWKbIJ/ [https://perma.cc/4PQX-M6UX]; Harriet McLeod, *South Carolina commission okays cost overruns for nuclear plants,* REUTERS (Sept. 2, 2015, 6:16 PM), http://www.reuters.com/article/us-energy-nuclear-south-carolina-idUSKCN0R22H020150902 [https://perma.cc/RF3H-Y9VJ]. Ultimately, the South Carolina plants were cancelled after costing the utilities involved $9 billion and reaching only 40% completion. *See* Brad Plumer, *U.S. Nuclear Comeback Stalls as Two Reactors Are Abandoned,* N.Y. TIMES (July 31, 2017), https://www.nytimes.com/2017/07/31/climate/nuclear-power-project-canceled-in-south-carolina.html [https://web.archive.org/web/20170827055556/https://www.nytimes.com/2017/07/31/climate/nuclear-power-project-canceled-in-south-carolina.html].

[35] SALVATORE LAZZARI, CONG. RESEARCH SERV., RL33578, ENERGY TAX POLICY: HISTORY & CURRENT ISSUES (2008), *available at* https://fas.org/sgp/crs/misc/RL33578.pdf [https://perma.cc/C99Z-RMLX], and FRED SISSINE, CONG. RESEARCH SERV., RS22858, RENEWABLE ENERGY R&D FUNDING HISTORY: A COMPARISON WITH FUNDING FOR NUCLEAR ENERGY, FOSSIL ENERGY, AND ENERGY EFFICIENCY R&D (2016), *available at* http://nationalaglawcenter.org/wp-content/uploads/assets/crs/RS22858.pdf [https://perma.cc/4YGW-4QT5].

tax policy was focused on increasing domestic oil and gas reserves and production; there were no tax incentives for energy conservation or for alternative fuels."[36] Likewise analysis by CRS shows that nearly 75% of all Department of Energy research and development funding since 1948 has gone to nuclear energy and fossil fuels, with just 10.3% for energy efficiency and only 12.3% for solar, wind, biomass, geothermal, and hydropower *combined*.[37] Nuclear plants receive subsidies throughout their lifespan and benefit from unique subsidies such as Price-Anderson insurance and decommissioning benefits.[38]

Over the latter third of the 20th Century and into the 21st Century, national and state energy policies began to consider distributed and renewable energy, as well as energy efficiency, to deal with emerging environmental issues and energy market concerns. Following the oil crises in the late 1960s and early 1970s, Congress enacted the Public Utilities Regulatory Policies Act ("PURPA").[39] PURPA opened the utility market to qualifying small generators including renewable sources as well as cogeneration plants.[40] PURPA has historically promoted renewable energy development, and in Vermont for example it helped support development of a number of small hydropower projects by independent producers in the 1980s.[41] While new avenues have opened to support merchant renewable energy projects, some developers continue to look to PURPA for access to power markets.[42]

More recently federal and state policies have begun to bring some balance to the playing field for energy efficiency technologies and renewable energy on tax policy and access to markets. It should be noted, however, that support for these technologies does not come close to the historical

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[36] LAZZARI, *supra* note 35.
[37] *Id.*
[38] Doug Koplow, *Nuclear Power: Still Not Viable without Subsidies*, UNION OF CONCERNED SCIENTISTS at 7, 77–78 (2011), http://www.ucsusa.org/sites/default/files/legacy/assets/documents/nuclear_power/nuclear_subsidies_report.pdf [https://perma.cc/S7DY-9KLG].
[39] Public Utilities Regulatory Policies Act of 1978, Pub. L. No. 95-617, 92 Stat. 3117 (codified at 16 U.S.C. § 2601 et seq. (1978)); *see also* Peter Maloney, *PURPA's puzzle: FERC Workshop Revisits 1978 Law, Embattled as Ever*, UTIL. DIVE (July 28, 2016), http://www.utilitydive.com/news/purpas-puzzle-ferc-workshop-revisits-1978-law-embattled-as-ever/423005/ [https://perma.cc/AF3G-2S52].
[40] Maloney, *supra* note 39.
[41] *See* VT. DEP'T OF PUB. SERV., ACT 165 REPORT: A BIENNIAL REPORT TO THE VERMONT GENERAL ASSEMBLY ON PROCEDURES FOR FACILITATING DEVELOPMENT OF SMALL AND MICRO HYDROELECTRIC PROJECTS at 2 (2016), http://legislature.vermont.gov/assets/Legislative-Reports/Act-165-Legislative-Report-Final-011516.pdf [https://perma.cc/BDM4-762N] (noting Vermont saw forty-one PURPA hydro projects developed).
[42] Maloney, *supra* note 39.

support provided for their incumbent competitors in fossil fuels and nuclear, or provide full parity today even as concerns regarding climate change have focused greater attention on the need for clean technologies.[43] With that said, several policies have promoted efficiency and renewable energy and contributed to a changed utility landscape.

Federal incentives passed in the late 1970s and early 1980s began to offer support for energy efficient technologies, alternative fuels, and solar and wind.[44]

In 1992 the federal production tax credit for wind and certain biomass systems came into effect.[45] That tax credit, while effective in spurring wind energy installations, has been allowed to expire multiple times and in the years it expired installations dropped between 73% and 93%.[46] This contrasts sharply with certain oil and gas tax benefits which date back to the early 20th Century and remain in effect today.[47] Currently the production tax credit for wind is on a phase down and is set to expire.[48] Another important federal incentive is the Investment Tax Credit, which has particularly supported the buildout of solar photovoltaic systems.[49] That credit is also now on a phase down.[50]

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[43] *See* Nancy Pfund & Ben Healey, *What Would Jefferson Do?*, DLB INVESTORS 1, 6 (Sept. 2011), http://www.dblpartners.vc/wp-content/uploads/2012/09/What-Would-Jefferson-Do-2.4.pdf?597435&48d1ff [https://perma.cc/G28B-Y33Y]; *see also* SISSINE, *supra* note 35, at 3.

[44] LAZZARI, *supra* note 35.

[45] *Id. See also* Energy Policy Act of 1992, Pub. L. No. 102-486, 106 Stat. 2776 (codified in relevant part at 26 U.S.C. § 45).

[46] Stephen Lacey, *Another Boom-Bust Cycle? Wind Installations Surge In Anticipation of Tax Credit Expiration*, THINK PROGRESS (Sept. 27, 2011, 4:11 PM), https://thinkprogress.org/another-boom-bust-cycle-wind-installations-surge-in-anticipation-of-tax-credit-expiration-c9e9fb7f1356#.5ruw9ejv4 [https://perma.cc/4B66-BKZE].

[47] *Timeline History of Natural Gas and Oil Tax Provisions,* Indep. Petroleum Assoc. of Am. (2009), http://www.ipaa.org/wp-content/uploads/downloads/2012/01/2009-04-TimelineHistoryofNaturalGasandOilTaxProvisions.pdf [https://web.archive.org/web/20140805063914/http://www.ipaa.org/wp-content/uploads/downloads/2012/01/2009-04-TimelineHistoryofNaturalGasandOilTaxProvisions.pdf]; Alex Park et al., *Triumph of the Drill: How Big Oil Clings to Billions in Government Giveaways*, MOTHER JONES (Apr. 14, 2014, 10:00 AM), http://www.motherjones.com/politics/2014/04/oil-subsidies-renewable-energy-tax-breaks [https://perma.cc/Z32R-MWY9].

[48] *See* Julia Pyper, *Treasury Nominee Backs Existing Phaseout of the Wind Energy Tax Credit,* GREENTECH MEDIA (Jan. 24, 2017) (noting current administration's support for phase out of production tax credit).

[49] Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (codified as amended at 26 U.S.C. § 48).

[50] Gavin Bade, *Congress strikes deal to extend wind, solar tax credits and lift oil export ban*, UTILITY DIVE (Dec. 16, 2015), http://www.utilitydive.com/news/congress-strikes-deal-to-extend-wind-solar-tax-credits-and-lift-oil-export/410947/ [https://perma.cc/EB76-9ELY].

Energy efficiency tax credits have likewise appeared and disappeared from the federal tax code.[51] However, certain federal standards for energy efficiency, such as new lighting standards and new fuel economy standards for automobiles authorized in energy legislation from 2007, have been very impactful in reducing energy use.[52] There are also currently incentives for plug-in and electric vehicles from the federal government that expire as automakers use up their allotment.[53] Finally it should be noted that many Obama administration regulatory initiatives to reduce greenhouse gas emissions are being rolled back by the Trump administration, which also withdrew the United States from the global Paris Agreement regarding emissions reduction.[54] Nevertheless, development of renewable energy and increased use of natural gas has significantly reduced the amount of coal used to generate electricity in the United States and contributed to a cleaner grid.[55]

3. State Utility Policies and Deregulation

In the late 1990s and early 21st century there was a push to deregulate utilities and create separation between entities that deliver power to customers and entities that generate and transmit power to

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[51] *See* MARGOT L. CRANDALL-HOLLICK & MOLLY F. SHERLOCK, CONG. RESEARCH SERV. R42089, RESIDENTIAL ENERGY TAX CREDITS: OVERVIEW AND ANALYSIS (2016), *available at* https://fas.org/sgp/crs/misc/R42089.pdf [https://perma.cc/2HMG-JY48] (noting residential energy tax credits from the 1970s expired in 1985).

[52] *See* Colleen L.S. Kantner et al., *Impact of the EISA 2007 Energy Efficiency Standard on General Service Lamps*, LAWRENCE BERKELEY NAT'L LAB. (2017), https://eta.lbl.gov/sites/all/files/publications/lbnl_1007090rev.pdf [https://perma.cc/72HY-PAVD] (finding that federal lighting efficiency standards are projected to reduce energy consumptions by twenty-seven quads and save consumers a net present value of $120 billion). *See also A Brief History of U.S. Fuel Efficiency Standards*, UNION OF CONCERNED SCIENTISTS (2017), http://www.ucsusa.org/clean-vehicles/fuel-efficiency/fuel-economy-basics.html#.WJ4u4VUrJhE [https://perma.cc/25LT-AK43].

[53] Kristy Hartman, *State Efforts to Promote Hybrid and Electric Vehicles*, NAT'L CONF. OF STATE LEG. (Dec. 3, 2015), http://www.ncsl.org/research/energy/state-electric-vehicle-incentives-state-chart.aspx [https://perma.cc/9M4E-2QZN].

[54] Somini Sengupta et al., *As Trump Exits Paris Agreement, Other Nations Are Defiant,* N.Y. TIMES (June 1, 2017), https://www.nytimes.com/2017/06/01/world/europe/climate-paris-agreement-trump-china.html [https://perma.cc/5S6M-3B6D]; Richard Valdmanis, *States Challenge Trump over Clean Power Plan*, REUTERS (Apr. 6, 2017), https://www.scientificamerican.com/article/states-challenge-trump-over-clean-power-plan/ [https://perma.cc/U4A7-YVKU].

[55] U.S. ENERGY INFO. ADMIN., ENERGY-RELATED CO2 EMISSIONS FOR FIRST SIX MONTHS OF 2016 ARE LOWEST SINCE 1991 (Oct. 12, 2016), https://www.eia.gov/todayinenergy/detail.php?id=28312 [https://perma.cc/TPN7-ECXF].

markets. While traditionally states regulated vertically integrated utilities which owned generation, transmission, and distribution while offering retail service to customers, deregulation changed that in some states in the 1990s.[56] Reforms at the federal level based on changes in the natural gas industry, enabled some states to separate retail and distribution service from generation and transmission to promote choice and competition.[57] However, the California energy crisis and the Enron bankruptcy (which was compared by some to Insull's failures decades earlier) slowed the move toward deregulation, leaving some states fully vertically integrated (such as Vermont) and others in various stages of deregulation.[58]

State policies have supported renewable energy through incentives and funding, but also more crucially through net metering and renewable portfolio standards ("RPS"). An RPS is, according to the National Renewable Energy Laboratory, "a mandate to increase the use of wind, solar, biomass, and other alternatives to fossil and nuclear electric generation."[59] Twenty-nine states have mandatory RPS policies, while another eight have goals around renewable electric generation.[60] These vary greatly, with some states putting a premium or specific requirement on certain renewable resources. In Texas, wind has dominated the RPS, so there is a premium for non-wind resources.[61] In Massachusetts there is a premium on solar.[62]

States have similar policies to RPS in some cases for energy efficiency, requiring a certain amount of efficiency investment or savings in a given year.[63]

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[56] Cudahy & Henderson, *supra* note 14, at 81–83.
[57] *Id.*
[58] *Id.* at 108–09. *See also* U.S. ENERGY INFO. ADMIN., STATE ELECTRIC RETAIL CHOICE PROGRAMS ARE POPULAR WITH COMMERCIAL AND INDUSTRIAL CUSTOMERS (May 14, 2012), https://www.eia.gov/todayinenergy/detail.php?id=6250 [https://perma.cc/7B5N-5XQH].
[59] David Hurlbut, *State Clean Energy Practices: Renewable Portfolio Standards*, NAT'L RENEWABLE ENERGY LAB. (2008), http://www.nrel.gov/tech_deployment/state_local_governments/pdfs/43512.pdf [https://perma.cc/6RP8-3EUE].
[60] *See* Jocelyn Durkay, *State Renewable Portfolio Standards and Goals*, NAT'L CONF. OF STATE LEG. (Dec. 28, 2016), http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx [https://perma.cc/N2QZ-VF3P].
[61] *Renewable Generation Requirement,* DSIRE: N.C. CLEAN ENERGY TECH. CENTER (Apr. 29, 2016), http://programs.dsireusa.org/system/program/detail/182 [https://perma.cc/7BGE-6PR3].
[62] *Solar Renewable Energy Certificates (SREC-II),* U.S. DEP'T OF ENERGY (last visited Oct. 23, 2017), https://energy.gov/savings/solar-renewable-energy-certificates-srec-ii [https://perma.cc/6SEP-EDG4].
[63] *See Energy Efficiency Resource Standards (EERS)*, AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY (last visited Oct. 23, 2017), http://aceee.org/topics/energy-efficiency-resource-standard-eers [https://perma.cc/6T7B-D6WB].

Many states also offer net metering programs, which allow customers to site renewable energy on their property using the energy on-site and feeding excess back to the grid.[64]

II. DISRUPTION

A. Death of the Old Model

The regulatory model of the natural monopoly envisioned by Insull is finally coming undone in the 21st Century. Today competing technologies offered by third-party vendors provide customers the opportunity to reduce their electric use or even disconnect from the grid in some instances, and as the Edison Electric Institute ("EEI") points out, load growth projections are essentially flat.[65]

The Insull model for utility regulation and economies of scale rested on ever larger demand and ever larger power plants. Energy efficiency and distributed generation resources (such as customer-sited solar net metering projects) have destroyed the notion of an ever growing demand.[66] This is a relatively new phenomena. As recently as 2001, Vice President Dick Cheney's energy task force projected significant demand growth for electricity consumption and the Vice President recommended building 1,300 to 1,900 new central electric generation power plants over a twenty-year period to avoid reliability issues.[67] Cheney derided the role

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[64] *State Net Metering Policies,* NAT'L CONF. OF STATE LEG. (Nov. 3, 2016), http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx [https://perma.cc/B8P3-W8PJ].

[65] *Future of Retail Rate Design*, *supra* note 1, at 2 (noting load growth through 2035 at approximate projection of less than 1% annually). *See also* Dave Gram, *Solar power and batteries may keep Vermont charged for climate change,* PORTLAND PRESS HERALD (Dec. 25, 2016), http://www.pressherald.com/2016/12/25/solar-power-and-batteries-may-keep-vermont-charged-for-climate-change/ [https://perma.cc/F7S6-2PVQ].

[66] *See Future of Retail Rate Design*, *supra* note 1, at 2 (citing customer efficiency, demand management, and on-site generation contributing to flat load growth projections).

[67] *See* Dick Cheney, U.S. Vice President, Remarks by the Vice President at the Annual Meeting of the Associated Press (Apr. 30, 2001), https://georgewbush-whitehouse.archives.gov/vicepresident/news-speeches/speeches/text/vp20010430.html [https://perma.cc/9R77-MM2W] (recommending construction of one new power plant on average, every week, for twenty years); Don Van Natta, Jr. & Neela Banerjee, *Top G.O.P. Donors in Energy Industry Met Cheney Panel,* N.Y. TIMES (Mar. 1, 2002), http://www.nytimes.com/2002/03/01/us/top-gop-donors-in-energy-industry-met-cheney-panel.html [https://perma.cc/G3GZ-H6PP] (noting the Cheney Energy Task Force recommendation of building 1,300 to 1,900 electric plants to meet demand over the next two decades).

of efficiency and conservation, saying "[c]onservation may be a sign of personal virtue, but it is not a sufficient basis all by itself for sound, comprehensive energy policy."[68]

Following the Cheney recommendations, 200 coal plants were proposed by utilities, but efforts such as the Beyond Coal campaign of the Sierra Club, along with new environmental regulations and cheap natural gas prices, helped block the vast majority of those proposed plants, while sending approximately one-third of the existing coal fleet into retirement.[69]

Efficiency and conservation, it turns out, have had a major impact on the need to build those 1,300 to 1,900 new power plants the Cheney task force recommended. Total retail electricity sales in 2015 were lower than in 2007, an accomplishment linked to utility investment in efficiency increasing fourfold during that time period.[70] From building energy codes to appliance standards to demand side management programs, efficiency is credited for up to 75% of the increase in energy productivity (energy inputs to Gross Domestic Product) since the year 1970.[71]

B. Stranded Costs and the Death Spiral

If utilities do not have an ever growing demand to satisfy with new power plant investments, they do, argues Edison Electric, have a need to invest in infrastructure to accommodate the new intermittent distributed energy resources such as solar and wind.[72] According to EEI investor-owned utilities are spending $21 billion a year for grid upgrades.[73]

Indeed, wind, solar, and other renewables provided twenty-four gigawatts of new generating capacity to the U.S. grid in 2016 alone, and renewables have comprised more than half of all new power plant capacity

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[68] Cheney, *supra* note 67.
[69] *See* Michael Grunwald, *Inside the war on coal,* POLITICO (May 26, 2015, 11:45 PM), http://www.politico.com/agenda/story/2015/05/inside-war-on-coal-000002 [https://perma.cc/R8AL-3PDJ].
[70] *See* Joe Romm, *U.S. Electricity Sales Dropped In 2015 For Fifth Time In 8 Years*, THINKPROGRESS (Mar. 15, 2016, 6:08 PM), https://thinkprogress.org/u-s-electricity-sales-dropped-in-2015-for-fifth-time-in-8-years-ac1050d3b800 [https://perma.cc/K72X-ER37] (citing Energy Information Administration data that demonstrates a first-ever decoupling between positive gross domestic product growth and flat or declining electricity demand).
[71] ALL. COMM'N ON NAT'L ENERGY EFFICIENCY POL'Y, THE HISTORY OF ENERGY EFFICIENCY 1, 4 (2013), https://www.ase.org/sites/ase.org/files/resources/Media%20browser/ee_commission_history_report_2-1-13.pdf [https://perma.cc/CQ2H-WEA8].
[72] *Future of Retail Rate Design*, *supra* note 1, at 2.
[73] *Id.*

for three years running.[74] Investor-owned utilities are regulated to have a total revenue requirement, which includes the cost of pass-through expenses such as fuel and taxes as well as a rate of return on capital investments.[75] EEI argues that adoption of new distributed energy technologies requires capital investments to improve the grid at a time utilities as a whole have lower credit ratings and stagnant sales.[76] However, if the only meaningful change to utilities as a result of moving to distributed renewable energy was a shift from power plant investment to distribution infrastructure investment that would probably not cause the concern about the so-called death spiral.[77]

The concern EEI has is greater than a spending shift between capital assets. It is, as it relates to distributed generation ("DG"), that "current retail rate designs allow DG customers to avoid their fair share of the fixed network costs, effectively shifting these costs to non-DG customers through higher rates."[78] In other words, given EEI's view that there is "potential for widespread DER adoption" EEI is concerned that utilities will lose not only sales, but eventually *customers*.[79] Their fear is that as more customers adopt solar and other technologies that reduce or eliminate their reliance on the utility, this "in turn, may cause rates to rise and improve the cost effectiveness of DG which causes more to adopt and absent rate reform, could lead to unsustainable economic conditions."[80] It is also true that third-party providers account for a significant portion of solar installations, making capital investments on which utilities cannot earn a rate of return, and also changing the relationship between utilities and their customers.[81]

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[74] *Renewable generation capacity expected to account for most 2016 capacity additions*, U.S. ENERGY INFO. ADMIN. (Jan. 10, 2017), http://www.eia.gov/todayinenergy/detail.php?id=29492 [https://perma.cc/YV8L-8UTP].

[75] *See* Karl McDermott, *Cost of Service Regulation in the Investor-Owned Electric Utility Industry: A History of Adaptation*, EDISON ELECTRIC INST. at 8–9 (2012), http://www.eei.org/issuesandpolicy/stateregulation/documents/cosr_history_final.pdf [https://perma.cc/D6AN-NLL8].

[76] *Future of Retail Rate Design*, *supra* note 1, at 2, 9.

[77] *Id.* at 5–6.

[78] *Id.*

[79] *Id.* at 2, 8. "DER" refers to distributed energy resources.

[80] *Id. at 7. See also David Roberts, Utilities Fighting Against Rooftop Solar are Only Hastening Their Own Doom,* VOX (July 7, 2017), https://www.vox.com/energy-and-environment/2017/7/7/15927250/utilities-rooftop-solar-batteries [https://perma.cc/8GG5-87UK] (arguing that solar combined with battery storage represents a major threat to utilities due to economic opportunities for customers to partly or fully disconnect from the grid in the next decade).

[81] *See About 30% of distributed solar capacity is owned by third parties,* ENERGY INFO.

EEI compares their situation to that of the death spiral in the landline telephone industry, and compares the disruption of wireless phones to distributed resources in the energy space today.[82] EEI struggles to acknowledge or quantify any value to the utility or ratepayers from third-party or customer investment in distributed resources except the energy value; it proposes that rooftop solar, for example, has little or no value in mitigating the need for utility distribution and transmission investment.[83] That is an incomplete picture at best, as studies of the value of solar/distributed generation in Vermont, Nevada, Mississippi, Minnesota, and Maine have found it can have a benefit in reducing peak demands and related infrastructure needs, offering positive cost-benefit outcomes in many scenarios.[84]

Some utilities' solution to the disruption is to fight it, by attempting to impose new fixed-cost based charges to net metering customers (under the guise of rate reform) that make solar economics less attractive and stall the momentum toward distributed generation.[85] This rearguard action has played out differently across the country, with utilities in Arizona pressing (partly successfully) for changes to rates for solar customers, and utilities in Nevada temporarily succeeding in imposing punitive charges that "all but crushed the rooftop solar industry in northern Nevada."[86] In Florida, utilities failed in pushing a ballot initiative to raise fees on solar customers and create a monopoly to keep out third-party solar providers.[87] Many state regulators continue to fine tune

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ADMIN. (Dec. 7, 2016), http://www.eia.gov/todayinenergy/detail.php?id=29052 [https://perma.cc/ZR5S-H5EL].

[82] *Future of Retail Rate Design*, *supra* note 1, at 8.

[83] *See id.* at 6 (finding distribution system costs potentially increase due to distributed generation resources, without a corresponding value for its potential to decrease infrastructure needs through peak reduction, for example).

[84] *See* Mark Muro & Devashree Saha, *Rooftop solar: Net metering is a net benefit*, THE BROOKINGS INST. (May 23, 2016), https://www.brookings.edu/research/rooftop-solar-net-metering-is-a-net-benefit/ [https://perma.cc/9YGF-W5DS].

[85] *See id.* (noting utilities have "sought to persuade state regulators to roll back net-metering provisions"); *Future of Retail Rate Design*, *supra* note 1, at 7–9 (suggesting new rate structures including new grid access fees).

[86] Julia Pyper, *Arizona Vote Puts an End to Net Metering for Solar Customers*, GREENTECH MEDIA (Dec. 21, 2016), https://www.greentechmedia.com/articles/read/Arizona-Vote-Puts-an-End-to-Net-Metering-for-Solar-Customers [https://perma.cc/2Z7B-C5MS]; Julia Pyper, *Nevada Regulators Restore Retail-Rate Net Metering in Sierra Pacific Territory*, GREENTECH MEDIA (Dec. 22, 2016), https://www.greentechmedia.com/articles/read/nevada-regulators-retore-retail-rate-net-metering-in-sierra-pacific-territo [https://perma.cc/HSR4-S8E4].

[87] Mary Ellen Klas, *Florida voters say no to misleading solar amendment,* MIAMI HERALD

and tweak rate formulas seeking to achieve equity for all ratepayers while keeping solar accessible to net metering customers.[88]

Acknowledging EEI's comparison with landline phones and wireless, it is suggested that if the landline phone business had kept wireless under its wing (and regulatory model), the landline phone companies would not be struggling with stranded costs and declining revenues for their product.[89] This Article will not seek to further examine how or whether utilities should adopt this line of thinking as it relates to distributed generation.[90] Rather, this Article stipulates that distributed generation will likely continue to become more popular among consumers and will likely continue to spur the rate questions and death spiral concerns EEI raises. This Article now turns to the question of how utilities could better address these concerns in a way that benefits ratepayers and reduces emissions, instead of fighting rearguard actions.

III. A NEW PURPOSE FOR UTILITY REGULATION IN THE 21ST CENTURY

A. The Opportunity

The challenges utilities face in the 21st Century are twofold: relatively flat sales projections coupled with the revenue erosion from increasing customer-sited solar, and increasing pressure for utilities to play a significant role in greenhouse gas emissions reductions. However, there is a solution to both challenges through a new opportunity: strategic electrification of the heating and transportation sectors.

(Nov. 8, 2016, 8:39 PM), http://www.miamiherald.com/news/politics-government/election/article113449438.html [https://perma.cc/85YZ-FFLR].

[88] *See Public Utilities Commission Amendments to Net Energy Billing Rule (Chapter 313)*, Order Adopting Rule and Statement of Factual and Policy Basis, No. 2016-00222, Order (Me. P.U.C. Mar. 1, 2017) (changing gradually over time the amount of transmission and distribution cost a customer can offset through net metering while grandfathering in existing customers for fifteen years).

[89] *Future of Retail Rate Design*, *supra* note 1, at 8.

[90] There are some utilities that seek to promote solar and do what EEI suggests in a sense, by offering their own solar products. *See, e.g.*, Julia Pyper, *Georgia Power's Rooftop Solar Program Signs up Only 5 Customers,* GREENTECH MEDIA (June 17, 2016), https://www.greentechmedia.com/articles/read/Georgia-Powers-Rooftop-Solar-Program-Signs-Up-Only-Five-Customers [https://perma.cc/WHC2-SAG6]. In addition, while this Article focuses extensively on EEI's position representing investor-owned utilities, it should be noted that while they may not have exactly the same concerns, public power utilities are also grappling with the changes in the industry. *See* Paul Ciampoli & Jessica Porter, *The Future by Design*, PUBLICPOWER (May 1, 2017), http://www.publicpower.org/Media/magazine/ArticleDetail.cfm?ItemNumber=48022 [https://perma.cc/5GTT-57PW].

Strategic electrification of the heating and transportation sectors would bring utilities full circle in a sense, because electricity has been used in automobiles since the late 1800s, and the all-electric home featuring conventional electric heat was marketed heavily in the 1950s and 1960s.[91]

However, natural gas and other fossil fuels are now the dominant source of space heating for homes.[92] Likewise, the gasoline-powered automobile out-competed the electric vehicle in the early 20th Century, thanks in part to the cheap price of the Model T.[93] In fact the oil industry and automobile coalition helped push for federal highway funding so consumers could use their products instead of competitors such as trolleys and rail.[94] There was even a successful though ineffective federal antitrust action against National City Lines, a company that bought up local street car and trolley systems around the country and converted them to bus systems, funded by automakers, oil companies, and tire manufacturers who stood to gain from the conversions.[95]

Today, that dominance of fossil fuel for transportation and heating has begun to change.[96] New technologies have reinvigorated the electric transportation and heating markets.[97] Cold-climate and other heat pumps can offer significant greenhouse gas emissions reductions and consumer savings over fossil fuel heating, and electric and plug-in vehicles in states with clean power grids offer the same.[98] Progress is coming quickly in

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[91] *The History of the Electric Car,* U.S. DEP'T OF ENERGY (Sept. 15, 2014), https://energy.gov/articles/history-electric-car [https://perma.cc/BPW8-WGMU]; Diane Wedner, *The All-Consuming Bills of an All-Electric Home*, L.A. TIMES (Aug. 13, 2001), http://articles.latimes.com/2001/aug/13/news/mn-33663 [https://perma.cc/7PLM-TQGQ].

[92] *See Everywhere but Northeast, fewer homes choose natural gas as heating fuel,* ENERGY INFO. ADMIN. (Sept. 25, 2014), https://www.eia.gov/todayinenergy/detail.php?id=18131 [https://perma.cc/U4KD-37KN] (stating "[o]n a national basis, natural gas has long been the dominant choice for primary heating fuel in the residential sector").

[93] *See* U.S. DEP'T OF ENERGY, *supra* note 91.

[94] DANIEL YERGIN, THE PRIZE: THE EPIC QUEST FOR OIL, MONEY & POWER 553 (1990).

[95] Brian N. Briglin, *The Streetcar Dilemma: Preventing Incurable Harm Through Timely Enforcement of the Antitrust Laws,* 65 RUTGERS L. REV. 38, 44–51 (2013), http://www.rutgerslawreview.com/wp-content/uploads/archive/commentaries/2013/Biglin_StreetcarDilemma.pdf [https://perma.cc/R6CV-RANC].

[96] *See Fossil fuels still dominate U.S. energy consumption despite recent market share decline*, U.S. ENERGY INFO. ADMIN. (July 1, 2016), https://www.eia.gov/todayinenergy/detail.php?id=26912 [https://perma.cc/YSC7-ZE4A].

[97] *See* Bosco Astarloa et al., *The Future of Electricity: New Technologies Transforming the Grid Edge*, WORLD ECON. FORUM 1,6–8 (Mar. 2017), http://www3.weforum.org/docs/WEF_Future_of_Electricity_2017.pdf [https://perma.cc/4G4M-ZMPA].

[98] *See* Steve Nadel, *Should we promote heat pumps to save energy and reduce greenhouse gas emissions?,* AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON. (May 4, 2016, 10:00 AM), http://aceee.org/blog/2016/05/should-we-promote-heat-pumps-save [https://perma.cc/U3

some places. In Norway today over 42% of new cars sold are plug-in electric, and Norway, India, Britain, and France have all announced phase outs of fossil fuel vehicle sales between 2025 and 2040.[99] Navigant projects more than 37 million electric vehicles to be in use globally by 2025.[100]

A new report from the Brattle Group lays out the full case for strategic electrification that takes advantage of these new technologies and trends. It notes that the U.S. Energy Information Administration estimates net electric sales annual growth rates of 0.6% through 2040, and that could easily decline further depending on the increase in solar and other disruptive technologies.[101] The report provides analysis of a

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KF-9PPX]; DON ANAIR & AMINE MAHMASSANI, STATE OF CHARGE: ELECTRIC VEHICLES' GLOBAL WARMING EMISSIONS AND FUEL-COST SAVINGS ACROSS THE UNITED STATES, UNION OF CONCERNED SCIENTISTS (2012), http://www.ucsusa.org/sites/default/files/legacy/assets/documents/clean_vehicles/electric-car-global-warming-emissions-report.pdf [https://perma.cc/RFS6-4C34] (finding that regardless of which state an electric vehicle is charged in, it offers some greenhouse gas emission reduction benefit compared to an average internal combustion engine vehicle, although finding most efficient conventional vehicles best electric vehicles charged in coal-dependent regions); Jack Newsham, *As electricity costs rise, markets for heat pumps takes off,* BOSTON GLOBE (Oct. 6, 2014), https://www.bostonglobe.com/business/2014/10/05/new-heat-pump-technology-can-warm-homes-even-cold-new-england-winters/JgABf7wNFqRcYI6YVN6nsI/story.html [https://web.archive.org/web/20170312041602/http://www.bostonglobe.com:80/business/2014/10/05/new-heat-pump-technology-can-warm-homes-even-cold-new-england-winters/JgABf7wNFqRcYI6YVN6nsI/story.html].

[99] Stephen Castle, *Britain to Ban New Diesel and Gas Cars by 2040,* N.Y. TIMES (July 26, 2017), https://www.nytimes.com/2017/07/26/world/europe/uk-diesel-petrol-emissions.html [https://web.archive.org/web/20170915063239/https://www.nytimes.com/2017/07/26/world/europe/uk-diesel-petrol-emissions.html]; Fred Lambert, *Electric cars reach record 42% of Norway's total new car sales with boost from Tesla Model X,* ELECTREK (July 4, 2017, 7:34 AM), https://electrek.co/2017/07/04/electric-car-norway-tesla-model-x/ [https://perma.cc/82KB-Z68C]. China has also recently announced plans to end the sale of fossil fuel vehicles at an undetermined date in the future. *See* David Roberts, *The world's largest car market just announced an imminent end to gas and diesel cars*, VOX (Sep. 3, 2017), https://www.vox.com/energy-and-environment/2017/9/13/16293258/ev-revolution [https://perma.cc/D23B-ZR2W]. One indication of how seriously the fossil fuel industry takes the threat of electric vehicles and their potential to gain market share is that fossil fuel industry-backed organizations are now explicitly targeting electric vehicles in negative advertisements. *See* Samantha Page, *A Koch front group is putting out misleading attack ads on electric vehicles,* THINKPROGRESS (July 28, 2017, 4:38 PM), https://thinkprogress.org/fueling-us-backward-f50bc6ea4dd2 [https://perma.cc/Z2KA-JDGS].

[100] *See* Scott Shepard & Sam Abuelsamid, *Executive Summary: Market Data: Electric Vehicle Market Forecasts*, NAVIGANT RESEARCH at 3 (2016), https://www.navigantresearch.com/wp-content/uploads/2013/12/EVMF-4Q13-Executive-Summary.pdf [https://perma.cc/4DB6-NLCT].

[101] Jurgen Weiss et al., *Electrification: Emerging Opportunities for Utility Growth*, THE BRATTLE GROUP at 7 (2017), http://www.brattle.com/system/news/pdfs/000/001/174/original

scenario involving a greater utility sector effort to provide a clean electric supply, and then leverage that supply with greater sales through strategic electrification of transportation and heating (such as by plug-in vehicles and heat pumps).[102]

Brattle Group analysis shows that a massive effort to electrify the heating and transportation sectors, coupled with a 100% electric power supply, could reduce greenhouse gas emissions by more than 70% compared to 2015 levels, putting the U.S. on a path to meet 2050 emission reduction goals with complementary efforts.[103] This level of strategic electrification would increase electricity demand by 3,560 terawatt-hours in 2050, producing a 75% increase in electric sales in 2050 relative to the base case.[104] Achieving, or even getting directionally close to the results laid out in the report would clearly allow utilities to play an integral role in emission reduction and address the concern about revenue and sales erosion from distributed resources.

Achieving this type of scenario would be a major undertaking, with many attendant challenges, and the Brattle Group points out "full or even significant electrification of the transport and heating systems is far from a foregone conclusion."[105] They cite competition from conventional fuel interests, and note "[t]he positive outlook outlined in this Paper is not likely to occur without utilities playing a leading role to set the path forward in modernizing and decarbonizing sectors in which it has not traditionally been involved, including deploying assets and providing access to electric power infrastructure."[106] Among the factors Brattle Group cites for success are regulatory outreach, rate reform, adoption of financial incentives, pilot projects, and deployment of new charging infrastructure.[107]

B. Current Utility Regulation Ill-Suited to the Opportunity

Despite the clear greenhouse gas emission benefits and clear capacity for strategic electrification of the heating and transportation sectors

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/Electrification_Whitepaper_Final_Single_Pages.pdf?1485532518 [https://perma.cc/3TKW-686T].

[102] *Id.* at 15–17.

[103] *Id.* at 1, 8.

[104] *Id.* at 6–7.

[105] *Id.* at 13.

[106] *Id.* at 15.

[107] Weiss et al., *supra* note 101, at 15.

to counter the death spiral and spur new sales for electric utilities, the transformation the Brattle Group report envisions is not yet widely underway. Further, electric utility regulation as currently envisioned may be ill-suited to the task of moving utilities in this direction.

For example, when a utility does take the initiative to realize the vision in the Brattle Group report and push for strategic electrification, it can still be told by the regulator, such as in the case of Kansas City Power & Light, that these types of investments are not going to be allowed in rates.[108]

Kansas City Power & Light, an investor-owned utility in the Midwest, sought to invest $20 million to install 1000 electric vehicle charging stations, to interest its more than 800,000 customers in using electricity to fuel their transportation needs.[109] The utility planned this to sell more electricity at off-peak times, which would improve the load factor of its grid (recalling Insull's insight about factories able to run a second or third shift with the same capital infrastructure to increase productivity) and allow per-unit costs to come down—lowering rates for all utility customers.[110] This proposal would be a win for the environment by moving to cleaner electric transportation (the area grid is powered roughly half by renewables and nuclear), a win for all utility customers in the form of a more efficient grid and lower rates, and a win for the utility and its investors as a means of countering the revenue death spiral and continuing to be relevant to its customers.[111] The upshot: regulators refused to allow the utility to rate base this investment, saying the utility failed to prove a need for the charging stations or to prove why the utility should take the lead on installing them.[112]

In its decision, the State Corporation Commission of the State of Kansas found several concerns with the proposal by Kansas City Power & Light. They were concerned about cross-subsidization whereby one class of customers shoulders costs for the benefit of another class.[113] The

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[108] Robert Siegel & Andrea Hsu, *In America's Heartland, A Power Company Leads Charge For Electric Cars,* NPR (Feb. 14, 2017, 4:42 PM), http://www.npr.org/sections/alltechconsidered/2017/02/14/514517425/in-americas-heartland-a-power-company-leads-charge-for-electric-cars [https://perma.cc/NRB3-6CTR].

[109] *Id.*

[110] *Id.*

[111] *Id.*

[112] *Id.*

[113] Order Denying KCP&L's Application for Approval of its Clean Charge Network Project and Electric Vehicle Charging Tariff at 14–15, In the Matter of Kansas City Power & Light's Application to Deploy and Operate its Proposed Clean Charge Network (2016)

Commission found customer demand speculative, was concerned charging stations would be obsolete before their intended lifespan was complete, and that customers who did charge would prefer to do so at home.[114] It found the private sector in the form of landlords and private businesses were a better fit to install charging stations than the utility.[115] Ultimately, the Commission concluded that while electric vehicle deployment is "a laudable goal," it was not within the utility's scope of service and that "[p]romoting EV ownership and usage is better left to the automobile industry."[116]

While some in the auto industry are moving aggressively toward electrification strategies, the industry as a whole is still actively opposing federal fuel efficiency and emissions standards that have helped jumpstart electric vehicle deployment.[117]

Complementing the point made by the rejection of the Kansas City Power & Light example, a proposal by Ameren Missouri to install electric charging stations in its service territory in Missouri, caused the Public Service Commission there to find that such charging stations were not appropriately in their regulatory jurisdiction, and therefore to reject their inclusion in the utility rate-base.[118]

(No. 16-KCPE-160-MIS), http://estar.kcc.ks.gov/estar/ViewFile.aspx/20160913110134.pdf?Id=4b0556f3-425d-4469-8eb1-a105109511ec [https://perma.cc/ABY7-G2X2] [hereinafter Kansas City Power]. This concern has been raised in the context of solar net metering as well, although as some commentators point out, cross-subsidization occurs in many contexts, *see, e.g.*, William Pentland, W*hy the net metering fight is a red herring for utilities,* UTILITY DIVE (Sept. 11, 2014), http://www.utilitydive.com/news/why-the-net-metering-fight-is-a-red-herring-for-utilities/307061/ [https://perma.cc/XG7B-W7ND].

[114] Kansas City Power, *supra* note 113, at 12–14.

[115] *Id.* at 8.

[116] *Id.* at 7.

[117] *See* Neal E. Boudette, *Automakers Call on E.P.A. Chief to Ease Fuel-Efficiency Standards,* N.Y. TIMES (Feb. 22, 2017), https://www.nytimes.com/2017/02/22/business/energy-environment/automakers-pruitt-mileage-rules.html [https://web.archive.org/web/20170329101610/https://www.nytimes.com/2017/02/22/business/energy-environment/automakers-pruitt-mileage-rules.html]; Alex Davies, *How GM Beat Tesla to the First True Mass-Market Electric Car,* WIRED (Feb. 2016), https://www.wired.com/2016/01/gm-electric-car-chevy-bolt-mary-barra/ [https://perma.cc/B3VX-GE9V]; Jack Ewing, *Volvo, Betting on Electric, Moves to Phase Out Conventional Engines,* N.Y. TIMES (July 5, 2017), https://www.nytimes.com/2017/07/05/business/energy-environment/volvo-hybrid-electric-car.html [https://web.archive.org/web/20170915044214/https://www.nytimes.com/2017/07/05/business/energy-environment/volvo-hybrid-electric-car.html].

[118] Report and Order at 12, In the Matter of the Application of Union Electric Company d/b/a Ameren Missouri for Approval of a Tariff Setting a Rate for Electric Vehicle Charging Stations (File No. ET-2016-0246) (before the Pub. Serv. Comm'n of the State

As the Brattle Group report makes clear, policy and regulatory reform are essential to help the transformation take place and to seize the opportunity for utility leadership.[119] Would Kansas and Missouri regulators have made a different decision, or at least had different considerations, if Kansas and Missouri utilities were operating under a law similar to Vermont's Renewable Energy Standard? That law offers an example of what such reforms could look like.

C. The Vermont Renewable Energy Standard

1. Context for Change

Vermont's initial foray into renewable energy development policy looked different than many states that had adopted renewable portfolio standards (which typically require ownership and retention of a certain quantity of renewable energy certificates demonstrating a percentage of supply is met with qualifying renewable energy).[120] In Vermont, under a law passed in 2005, utilities were required to have a collective percentage of Sustainably Priced Energy Enterprise Development ("SPEED") resources.[121] This promoted the construction of in-state renewable energy projects, and helped provide support for them through long-term utility contracts with the SPEED resource target of 20% of the state's total electric sales by 2017.[122] However, as part of the program, Vermont utilities were able to sell renewable energy certificates ("RECs") associated with the generation.[123] All other New England states had moved to a renewable portfolio standard ("RPS") approach that required ownership/retention of RECs to meet state goals and targets.[124] The Vermont Public Service Board (now called the Vermont Public Utility Commission) was directed

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of Mo.) (Apr. 19, 2017), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2016-0246&attach_id=2017016053 [https://web.archive.org/save/https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2016-0246&attach_id=2017016053].

[119] Weiss et al., *supra* note 101, at 15.

[120] *See* Jan Hamrin, *REC Definitions and Tracking Mechanisms Used by State RPS Programs*, CLEAN ENERGY STATES ALL. (2014), http://www.cesa.org/assets/2014-Files/RECs-Attribute-Definitions-Hamrin-June-2014.pdf [https://perma.cc/8ATQ-EQ49].

[121] 2005 Vt. Acts & Resolves No. 61.

[122] *See* VT. PUB. SERV. BOARD, BIENNIAL REPORT TO THE VERMONT GENERAL ASSEMBLY PURSUANT TO 30 V.S.A. § 8004(F), at 2 (2014), http://www.leg.state.vt.us/reports/2014ExternalReports/300575.pdf [https://perma.cc/4KQ5-UKDJ].

[123] *Id.* at 4.

[124] *Id.*

by the Vermont Legislature to issue a study in 2011 examining whether to continue with an updated SPEED program (initial program goals were set for 2012 and met by Vermont utilities) or an RPS for Vermont.[125] The Board recommended an RPS that would result in 75% of total electric load being met with renewable electricity (with REC ownership/retention similar to the other five New England states) by 2033.[126] The Board critiqued the SPEED program in terms of how much environmental and emission reduction benefit it offered.[127] In 2012 the Vermont Legislature took up various proposals looking at an RPS, with debate over the appropriate goal and REC ownership/retention.[128] Tied in with that discussion was the future of the Vermont Standard Offer Program, a renewable procurement program for smaller-scale projects 2.2 megawatts or less in size.[129]

Ultimately an RPS did not pass in Vermont in 2012, and instead legislation updating the SPEED and Standard Offer programs did.[130]

The RPS discussion in Vermont was effectively tabled until net metering legislation was moving through the legislature in 2014. As a part of that bill, another study was required on whether to move to an RPS, this time by the Public Service Department (a part of the executive branch) as opposed to the Public Service Board (an independent quasi-judicial body).[131] In the summer of 2014, new legislation in Connecticut, one of the markets where Vermont utilities sell RECs, called into question whether Vermont's SPEED program constituted double-counting of environmental attributes.[132] Connecticut Public Act 303 (2013) stated that:

> [O]n and after January 1, 2014, any megawatt hours of electricity from a renewable energy source described under this subparagraph that are claimed or counted by a

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[125] *See* VT. PUB. SERV. BOARD, STUDY ON RENEWABLE ELECTRICITY REQUIREMENTS at 3–4 (2011), http://www.leg.state.vt.us/reports/2011ExternalReports/271962.pdf [https://perma.cc/C93W-EDKC] [hereinafter RENEWABLE ELECTRICITY REQUIREMENTS].
[126] *Id.* at 32.
[127] *Id.* at 9.
[128] *See* Alan Panebaker, *Administration produces renewable portfolio standard proposal,* VTDIGGER (Mar. 1, 2012, 7:21 PM), https://vtdigger.org/2012/03/01/administration-produces-renewable-portfolio-standard-proposal/#.WZ3t2zOZM0o [https://perma.cc/A4VM-U4SV].
[129] *Id.*
[130] 2012 Vt. Acts & Resolves No. 170, *available at* http://legislature.vermont.gov/assets/Documents/2012/Docs/ACTS/ACT170/ACT170%20As%20Enacted.pdf [https://perma.cc/7PYV-AA4E].
[131] 2014 Vt. Acts & Resolves No. 99, § 9(b), *available at* http://www.leg.state.vt.us/DOCS/2014/ACTS/ACT099.PDF [https://perma.cc/NRM8-LYFV].
[132] 2013 Conn. Pub. Acts No. 303 (amending Conn. Gen. Stat. § 16-1(a)(20)).

> load-serving entity, province or state toward compliance with renewable portfolio standards or renewable energy policy goals in another province or state, other than the State of Connecticut, shall not be eligible for compliance with the renewable portfolio standards established pursuant to section 16-245a, as amended by this act.[133]

Vermont's SPEED goal was a retail sales goal not an REC retention program, but the Connecticut law called into question whether Vermont RECs would nonetheless be ineligible for compliance in Connecticut, leading NextEra Energy to state it would no longer trade Vermont RECs due to the uncertainty.[134] The report called for in Act 99 in Vermont in 2014, was completed by the Public Service Department in December of 2014.[135] It followed Public Service Board studies on the same subject in 2011 and 2013, and it rejected the approach of simply requiring all SPEED project RECs to be retained, rather than traded, as not being cost-effective for Vermont.[136] However, the Department report did propose a transition from SPEED to a new renewable energy policy that was more in-line with other states and could drive energy innovation.[137] Specifically, the report recognized that "roughly half of Vermont greenhouse gas emissions are due to transportation, and approximately another 1/3 are due to fuels used for heat and industrial process."[138] The report called not only for a renewable energy policy for electricity supply, but also for such a policy to "facilitate action to increase use of renewables and lower greenhouse gas emissions in other sectors," and to "encourage development and deployment of innovative energy technologies that reduce our dependence on fossil fuels."[139]

At the time (and still today) that approach is fairly unique for considering incorporating policies into an RPS that include the heating and transportation sectors, although some states such as Massachusetts

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[133] *Id.*
[134] *See* John Herrick, *Electricity Supplier won't buy Vermont renewable energy credits,* VTDIGGER (May 19, 2014), https://vtdigger.org/2014/05/19/electricity-supplier-wont-buy-vermont-renewable-energy-credits/#.WZ37JDOZM0o [https://perma.cc/VJJ4-GCYW].
[135] *See* VT. PUB. SERV. DEP'T, REPORT TO THE VERMONT LEGISLATURE ON SPEED AND RENEWABLE PORTFOLIO STANDARDS at 1 (2014), http://www.revermont.org/wp-content/uploads/PSD-RPS-study-12.15.2014.pdf [https://perma.cc/JV3W-Z8HH].
[136] *Id.* at 2.
[137] *Id.* at 4.
[138] *Id.*
[139] *Id.*

and New Hampshire had recognized renewable thermal technologies as being allowed to count towards compliance.[140]

As a final note on the context for consideration of the 2015 Vermont RPS, the rate impacts of such a policy changed greatly due to the uncertainty around Connecticut's double-counting legislation. In the Public Service Board's 2011 report, the cost estimate to implement a new RPS (which would necessarily require foregoing some REC sales that were contributing to utility revenue and instead retain a quantity of RECs for compliance) ranged from a 1% cost increase to a 16% cost increase compared to business as usual.[141] In 2014, however, the potential rate impact of *doing nothing* and seeing an adverse impact in the REC markets was projected at a 6% rate hike statewide, and up to 20% for some utilities depending on how much of their revenue was derived from REC sales under the SPEED program.[142]

Analysis of the initial proposal from the Public Service Department showed a proposed 2015 RPS bill would instead have a rate impact of 1% initially, rising to just under 4% by 2032, lower than the policy risk of losing access to REC markets.[143] However, by further expanding the reach of the policy to include a major strategic electrification component with cold-climate heat pumps and electric vehicles, the rate impact of the

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[140] *See Alternative Energy Portfolio Standard,* DSIRE N.C. CLEAN ENERGY TECHNOLOGY CENTER (Dec. 1, 2015), http://programs.dsireusa.org/system/program/detail/4624 [https://perma.cc/55YN-PZ8A]; *Renewable Portfolio Standard,* DSIRE NC CLEAN ENERGY TECHNOLOGY CENTER (Mar. 28, 2017), http://programs.dsireusa.org/system/program/detail/2523 [https://perma.cc/GEL4-9AAT].

[141] *See* RENEWABLE ELECTRICITY REQUIREMENTS, *supra* note 125, at 13.

[142] Memorandum from Darren Springer, Deputy Commissioner, Vermont Public Service Department, to Members of the Vermont House Committee on Natural Resources and Energy (Feb. 9, 2015), http://legislature.vermont.gov/assets/Documents/2016/WorkGroups/House%20Ways%20and%20Means/Bills/H.40/H.40~Darren%20Springer~SPEED%20Program-%20H.40%20Briefing%20Paper~2-20-2015.pdf [https://perma.cc/8Y8F-5SUV]; *H 40 Renewable Energy Standard and Energy Transformation (RESET), Hearing Before the H. Comm. On Nat. Res. and Energy,* 2015–2016 Sess. (Vt. 2015) (statement of Patty Richards, Washington Electric Cooperative), http://legislature.vermont.gov/assets/Documents/2016/WorkGroups/House%20Natural%20Resources/Bills/H.40/Witness%20Testimony/H.40~Patty%20Richards~Washington%20Electric%20Cooperative,%20H.40%20Renewable%20Energy%20Standard%20and%20Energy%20Transformation%20(RESET)~1-29-2015.pdf [https://perma.cc/9EQX-E94P].

[143] *See Energy Innovation Program, Hearing Before the H. Comm. On Nat. Res. and Energy,* 2015–2016 Sess. (Vt. 2015) (statement of Darren Springer, Vermont Public Service Department), http://legislature.vermont.gov/assets/Documents/2016/WorkGroups/House%20Natural%20Resources/Bills/H.40/Witness%20Testimony/H.40~Darren%20Springer~Energy%20Innovation%20Program~1-23-2015.pdf [https://perma.cc/E96N-WR53].

entire policy fell to a 0.4% initial impact, decreasing to a *negative* 0.6 % impact by 2032.[144] This projection is made possible again by referring back to Insull's factory running a third shift to increase productivity of an existing capital asset.[145] In other words, the Vermont policy of increasing electric use primarily during cheap off-peak hours for heat pumps and electric vehicles, would allow more units of electricity to be sold without dramatically increasing capital expenses for the grid, thus lowering the per unit rate for customers.[146]

2. The Vermont RES Design

Act 56 of 2015, an act relating to establishing a renewable energy standard (Vermont RES) was signed into law in Vermont by Governor Peter Shumlin on June 11, 2015.[147]

It had several interlinked components, including a repeal of the SPEED program and its associated goals.[148] By repealing the SPEED program, the Vermont RES eliminated any concerns around double-counting resources toward SPEED and also toward other state RPS programs, thereby removing the near-term rate risk utilities would face if they lost access to sell RECs in the New England market. In the midst of consideration of the legislation that ultimately became the Vermont RES, the Connecticut Public Utilities Regulatory Authority ("PURA") issued a proposed declaratory ruling finding the 2017 SPEED goals could raise a claim under Conn. Gen. Stat. § 16-1(a)(20), but noted that no final determination would be made at that time because Vermont had a process underway to change the program via legislation.[149] Weeks later

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[144] *Id.*

[145] Cudahy & Henderson, *supra* note 14, at 39–41.

[146] *See H. 40 Q&A, Hearing Before the S. Comm. On Finance,* 2015–2016 Sess. (Vt. 2015) (statement of Darren Springer, Vermont Public Service Department), http://legislature.vermont.gov/assets/Documents/2016/WorkGroups/Senate%20Finance/Bills/H.40/Witness%20Testimony/W~Darren%20Springer~H.40%20Q%20and%20A~4-14-2015.pdf [https://perma.cc/LG89-PZKZ] [hereinafter *H. 40 Q&A*].

[147] Dave Gram, *Shumlin signs renewable energy bill,* BURLINGTON FREE PRESS (June 11, 2015, 8:48 PM), http://www.burlingtonfreepress.com/story/news/local/2015/06/11/shumlin-signs-renewable-energy-bill/71098150/ [https://perma.cc/GBV3-9XDL].

[148] *See* 2015 Vt. Acts & Resolves No. 56, *available at* http://legislature.vermont.gov/assets/Documents/2016/Docs/ACTS/ACT056/ACT056%20As%20Enacted.pdf [https://perma.cc/Q3FP-5HW8] (deleting all references to the SPEED program).

[149] Proposed Final Decision at 11, Declaratory Ruling Regarding Conn. Gen. Stat. § 16-1(a)(20), As Amended by PA 13-303, Concerning the Possible Double Counting of RECS (No. 15-01-03) (Connecticut Public Utilities Regulatory Authority, Mar. 11, 2015), http://

PURA issued a final decision confirming that "[p]roposed legislation in Vermont, if enacted, would provide more certainty today that SPEED 2017 goals would be administered in a way that is entirely compatible with other state RPS programs."[150]

The Vermont RES also established what looks more or less like a conventional RPS with a Tier I and Tier II.[151] Tier I made the previously established goals of 55% renewable electricity in 2017, rising to 75% by 2032, a mandatory REC retention program.[152] Tier I allowed all renewable resources, old or new, large or small, to qualify provided they were capable of delivery to the New England market.[153] Tier II established a subset goal (again with REC retention for compliance) that 1% of all electricity in 2017, rising to 10% by 2032, would come from new five megawatt or less distributed renewable generation.[154] There were some flexibilities built into Tier I and Tier II to accommodate utilities that were already 100% Tier I renewable (Burlington Electric Department and Washington Electric Cooperative).[155]

Finally (and for purposes here most importantly) the legislation established a Tier III that required electric distribution utilities to meet 2% of retail sales equivalent in 2017 with "energy transformation" projects.[156] That requirement would rise to 12% by 2032.[157] Energy transformation projects are defined in the statute as measures that "shall result in a net reduction in fossil fuel consumed by the provider's customers and in the emission of greenhouse gases attributable to that consumption, whether or not the fuel is supplied by the provider."[158] Such projects are required in the law to undergo some life-cycle environmental and economic cost analysis.[159] The annual requirement is determined by converting the "net reduction in fossil fuel consumption resulting from the energy transformation project to a MWH equivalent of electric energy," using a formula

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legislature.vermont.gov/assets/Documents/2016/WorkGroups/Senate%20Finance/Bills/H.40/Witness%20Testimony/W~Darren%20Springer~Connecticut%20Ruling%20on%20Renewable%20Energy%20Certificates~4-14-2015.pdf [https://perma.cc/MB4B-YK6B].

[150] *Id.*

[151] *See* VT. STAT. ANN. tit. 30 § 8005 (a)(1–2) (2017).

[152] *Id.* § 8005 (a)(1).

[153] *Id.* § 8005 (a)(1)(A).

[154] *Id.* § 8005 (a)(2).

[155] *Id.* § 8005 (b).

[156] *Id.* (a)(3).

[157] VT. STAT. ANN. tit. 30 § 8005 (a)(3).

[158] *Id.* § 8005 (a)(3)(C)(ii).

[159] *Id.* § 8005 (a)(3)(C)(iii).

specified.[160] It is in this requirement that Vermont law uniquely states to its electric utilities that they must help their customers install technologies that reduce fossil fuel use in the heating and transportation sectors.

Tier III includes several additional unique features. While requiring cost-effectiveness screening (similar to Vermont's existing energy efficiency programs), the law provided for "prior approval" of technology categories as opposed to individual project by project review.[161] The law requires annual verification of provider claims regarding projects, but changes to the Tier III credit value of a project category resulting from such verification would be applied going forward, with no penalty retroactively that could punish a utility from meeting compliance through good faith efforts.[162] Tier III allows unlimited banking of credits for compliance in future years.[163] Tier III also has language seeking equitable distribution of benefits among rate classes and ratepayers of various income levels, and language intended to ensure best practices for demand management where electrification technologies are used so as to not exacerbate peak demands on the grid.[164]

Updated modeling from the Vermont Public Service Department as the bill that became the Vermont RES progressed in the Senate showed a range of net state savings from $150 million to $904 million, depending largely on the price of oil.[165] Those savings included projected customer-side savings from participants who would under Tier III receive some type of incentive or assistance to reduce their fossil fuel use, such as purchasing an electric vehicle or weatherizing a home.[166] Analysis

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[160] *Id.* § 8005 (a)(3)(D); *see also A Sample Calculation of Net Fossil Fuel BTU Savings, Converted to MWh, Hearing Before the H. Comm. On Natural Resources and Energy,* 2015–2016 session (Vt. 2015) (statement of Asa Hopkins, Vermont Public Service Department), http://legislature.vermont.gov/assets/Documents/2016/WorkGroups/House%20Natural%20Resources/Bills/H.40/Witness%20Testimony/W~Asa%20Hopkins~A%20sample%20calculation%20of%20net%20fossil%20fuel%20BTU%20savings,%20converted%20to%20MWh~1-29-2015.pdf [https://perma.cc/RNT9-7Q6R].

[161] VT. STAT. ANN. tit. 30 § 8005 (a)(3)(F)(ii).

[162] *Id.* § 8005 (a)(3)(F)(v).

[163] *Id.* § 8005 (a)(3)(F)(iv) (2017).

[164] *Id.* § 8005 (a)(3)(F)(vi–viii).

[165] Memorandum from Asa Hopkins, Director of Energy Policy and Planning, Vermont Public Service Department, to Members of the Vermont Senate Committee on Natural Resources and Energy (Apr. 21, 2015), http://legislature.vermont.gov/assets/Documents/2016/WorkGroups/Senate%20Natural%20Resources/Bills/H.40/Testimony/H.40~Department%20of%20Public%20Service~Memo%20Updating%20the%20PSD's%20model%20of%20H.40%20to%20incorporate%20the%202015%20Annual%20Energy%20Outlook%20forecast%20of%20oil%20prices~4-22-2015.pdf [https://perma.cc/9NXP-EZJ9].

[166] *Id. See also Energy Innovation Program, supra* note 143.

from the Department suggested Tier III could, over its lifetime, support weatherization or the addition of cold-climate heat pumps in over 85,000 homes and businesses.[167] As a whole, the law is projected by the Department to reduce greenhouse gas emissions in Vermont by 15 million tons by 2032, enough to put the state on a path to achieving a quarter of its 2050 emissions goal.[168] Independent analysis from the Legislature's Joint Fiscal Office found the legislation offered "significant net potential economic and environmental benefits from the program, subject to fuel price and other program performance assumptions."[169]

To realize those projections, the program would have to be implemented with care. The Vermont Public Service Board's order in Docket No. 8550 made a number of program decisions based on flexibility provided to the Board by the Vermont RES. In particular, related to Tier III, the Board found measures would receive credit based on a prospective review by an existing body, the Technical Advisory Group.[170] The Board's decision on cost-effectiveness screening included a requirement that, consistent with the Vermont RES, energy transformation projects must be below the applicable alternative compliance cost and that utilities submit annual plans for energy transformation projects.[171] As the law provided, utilities did not need to pursue electrification projects to meet Tier III; biomass heating, weatherization, and many other measures qualify.[172] However, clearly the projected ratepayer benefits depend on consideration of strategic electrification projects that improve the load factor of the grid, even though the law required special consideration of the impacts of increased electric use (which makes sense after years of effort to reduce electric demand through efficiency programs in Vermont).[173]

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[167] *See Energy Innovation Program, supra* note 143.

[168] VT. PUB. SERV. DEP'T, COMPREHENSIVE ENERGY PLAN 2016, 12 (2016), https://outside.vermont.gov/sov/webservices/Shared%20Documents/2016CEP_Final.pdf [https://perma.cc/LX79-NEA2].

[169] Memorandum from Tom Kavet and Aiden Davis, Legislative Joint Fiscal Office, to Steve Klein, Legislative Joint Fiscal Office (Feb. 23, 2015), http://legislature.vermont.gov/assets/Documents/2016/WorkGroups/Senate%20Natural%20Resources/Bills/H.40/Testimony/H.40~Department%20of%20Public%20Service~H.40%20-%20Preliminary%20Economic%20and%20Fiscal%20Review%20to%20Date~4-16-2015.pdf [https://perma.cc/37YM-V7U9].

[170] Order Implementing the Renewable Energy Standard at 20, Investigation re: Establishment of the Renewable Energy Standard Program, Vt. Pub. Serv. Board (No. 8550) (June 28, 2016), http://psb.vermont.gov/sites/psbnew/files/doc_library/8550-final-order.pdf [https://perma.cc/ST75-MD9G].

[171] *Id.* at 24–25.

[172] *Id.* at 2, 45.

[173] VT. STAT. ANN. tit. 30 § 8005 (a)(3)(F)(viii).

Initial utility plans for meeting Tier III are now underway for the first compliance year in 2017. Vermont utilities are offering programs for installation of cold-climate heat pumps, heat pump hot water heaters, whole home efficiency retrofits (including some programs specifically designed for low-income customers), electric vehicle incentives and electric charging stations, electric bus deployment, and discounted line extensions and service upgrades for customers (including maple syrup producers) using fossil fuel generators.[174] Notably, the utilities in Vermont that all filed Tier III plans, whether investor-owned (Green Mountain Power) or municipal (Burlington Electric Department) or cooperative (Vermont Electric Cooperative and Washington Electric Cooperative), all featured major strategic electrification components to displace fossil fuel use.[175] As an example of the potential of Tier III to achieve some of the aims laid out in the Brattle Group report, Burlington Electric Department estimates that its programs to reduce fossil fuel use in the heating and transportation sectors through strategic electrification could increase energy sales by 9.6% (compared to base case) over the next two decades, while limiting the impact on peak demand and increasing load factor from 60% to 65%.[176]

D. Other Examples of Utility-Led Energy Transformation

While the Vermont RES may be one of the most comprehensive policies pushing utilities toward leading the energy transformation and realizing the economic and environmental benefits outlined in the Brattle Group report, there are other promising examples of reforms around the nation.

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[174] GREEN MOUNTAIN POWER, 2017 RENEWABLE ENERGY STANDARD TIER III ANNUAL PLAN (2017), http://www.neep.org/sites/default/files/resources/GMP%20Tier%20III%20Annual%20Plan%20(2017).pdf [https://perma.cc/L8MD-WRUP]; CITY OF BURLINGTON ELECTRIC DEP'T, 2017 ANNUAL ENERGY TRANSFORMATION PROGRAM PLAN (2016), http://www.neep.org/sites/default/files/resources/BED%20Tier%20III%20plan_Final.pdf [https://perma.cc/XET4-ZWXC]; VT. ELEC. COOP., 2017 TIER III PLAN (2016), http://www.neep.org/sites/default/files/resources/VEC%202017%20Tier%20III%20Plan.pdf [https://perma.cc/V65B-JCB5]; Wash. Elec. Coop., *Act 56, and WEC's 'Energy Transformation' Plan for 2017,* WEC CO-OP CURRENTS (Dec. 2016), http://www.washingtonelectric.coop/wp-content/uploads/2016/01/Dec2016.pdf [https://perma.cc/JUD5-JH27] [hereinafter *Tier III Plans*].

[175] *Id.*

[176] 2016 INTEGRATED RESOURCE PLAN at 9, CITY OF BURLINGTON ELEC. DEP'T (2017), https://www.burlingtonelectric.com/sites/default/files/inline-files/0.%20Executive%20Summary_FINAL.pdf [https://perma.cc/C7RD-5JXV]. Load factor is a measure of the efficiency of a utility's use of the grid comparing average load to peak load. *Id.*

In 2015, Washington enacted HB 1853 into law, which made clear that utilities could rate-base their investments in electric charging stations similar to the way they would rate-base a power plant or transmission line, and receive an incentive rate of return for electric charging station investments.[177] As reported by Greentech Media, John Gartner of Navigant Research said the following in relation to the passage of the Washington legislation:

> Utilities have a vested interest in the operation of EV charging stations as they can increase revenue, and when smartly managed, complement rather than complicate grid operations. State regulators are slowly catching on that for vehicle electrification to have its intended benefit of emissions reductions, utilities should be permitted and encourage[d] to play a central role.[178]

California reversed course, after initially barring utilities from building electric charging infrastructure over market impact concerns, and saw an initial proposal to spend over $1 billion on over 60,000 charging stations from three large utilities.[179] Those proposals were pared down significantly, but ultimately utilities in California received approval to spend tens of millions of dollars on thousands of charging stations.[180]

In Michigan, however, an initial proposal by Consumers Energy to install 810 fast-charge stations for $15 million was criticized by regulators and stakeholders, and ultimately withdrawn.[181]

The Michigan example as well as the earlier discussion of Kansas Power and Light's proposal and Missouri's reluctance to assert regulatory jurisdiction over charging station infrastructure point to tensions in

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[177] WASH. REV. CODE § 80.28.360 (2016).

[178] Julia Pyper, *Utilities in Washington State Get the Green Light to Rate-Base EV Charging Stations,* GREENTECH MEDIA (May 14, 2015), https://www.greentechmedia.com/articles/read/utilities-in-washington-state-get-the-green-light-to-rate-base-ev-charging [https://perma.cc/XD34-WPPN].

[179] *See id. See also Utility Involvement in Electric Vehicle Charging Infrastructure: California at the Vanguard,* CTR. FOR STRATEGIC AND INT'L STUDIES (Apr. 6, 2016), https://www.csis.org/analysis/utility-involvement-electric-vehicle-charging-infrastructure-california-vanguard [https://perma.cc/Y5D5-342N].

[180] *Id.*

[181] *See* Andy Balaskovitz, *Michigan utility withdraws plans for electric vehicle charging network,* MIDWEST ENERGY NEWS (Feb. 17, 2017), http://midwestenergynews.com/2017/02/17/michigan-utility-withdraws-plans-for-electric-vehicle-charging-network/ [https://perma.cc/E4KH-E253].

the regulatory environment. Should utilities be allowed to participate in the electric vehicle infrastructure market and rate-base their investments, or should these initiatives be left to third parties?

These tensions were also raised in the Vermont RES, as well as California's regulatory proceedings around electric vehicle infrastructure investments, but were resolved in favor of scoping an appropriate role for utilities making investments, while seeking to protect independent third parties offering similar products or services.[182] The California Public Utilities Commission ("CPUC") set aside a previous requirement that utilities demonstrate a market failure before being able to invest in this infrastructure, in favor of a new balancing test allowing utilities to invest with certain scrutiny (such as examining level of competitiveness in the market and mitigating unfair advantages a utility would have).[183]

The Vermont RES provides clear opportunities for utilities to pursue strategic electrification through incentives or programs authorized by law, although Tier III incentives were intended to be treated similar to power supply costs that are passed through in rates but not treated as capital investments that earn a rate of return.[184] However, some Tier III investments, such as ownership of an electric vehicle charging station or cold-climate heat pump, could be treated as a capital investment that earns a rate of return.[185] In Vermont, utility programs directly offering products such as heat pumps or heat pump water heaters to customers have been permitted in a pilot phase, but regulators have not definitively weighed in on the role of the utility in this market relative to third-party businesses.[186]

In another intriguing example of seeking to resolve the tension in the role of third-party provider and utility, Eversource Energy in Massachusetts proposed making a significant rate-based investment in what

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[182] *See* Phase 1 Decision Establishing Policy to Expand the Utilities' Role in Development of Electric Vehicle Infrastructure at 2, 3, Application of SAN DIEGO GAS & ELECTRIC COMPANY (U902E) for Approval of its Electric Vehicle—Grid Integration Pilot Program (Decision 14-12-079, Rulemaking 13-11-007) (Pub. Util. Comm'n of the State of Cal., Dec. 18, 2014), http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M143/K682/143682372.PDF [https://perma.cc/B2TT-CQPZ] [hereinafter California PUC]; VT. STAT. ANN. tit. 30 § 8005 (a)(3)(E) (2017).

[183] *See* California PUC, *supra* note 182, at 2, 8–9.

[184] *See H. 40 Q&A, supra* note 146, at 4.

[185] *Id.*

[186] *See*, *e.g.*, Procedural Order Closing Docket at *1–2, *In re*: Tariff filing of Green Mountain Power Corporation requesting approval of innovative products tariff riders, to take effect on a service-rendered basis September 4, 2016, 2017 WL 1373943 (No. 8794) (Vt. Public Serv. Board, Feb. 9, 2017).

it terms "make-ready" infrastructure for electric vehicles (such as the distribution network and transformer and utility meter), while leaving the actual vehicle charger investment and installation to third parties.[187]

It should be noted that while Vermont remains fully regulated, with utility-led energy transformation proposals coming in states as varied as California, Michigan, Massachusetts, Missouri, and Kansas, it is clear that whether a state retains full utility regulation or some level of deregulation (as California, Michigan, and Massachusetts do with retail choice), there remains a viable business case for utilities to invest in strategic electrification.[188]

E. The Game Change of Utility-Led Energy Transformation

1. Seizing the Opportunity

EEI, which raised the concerns about the utility death spiral, recognizes the need for utility-led energy transformation. In a 2014 report, it stated that "bringing electricity to the transportation sector is a huge, albeit long-term opportunity for load growth."[189] It explicitly targets the market share of the 93% of transportation that uses petroleum.[190] It further stated that "[l]eading the charge on electrification will help the electric utility industry control its own destiny and meet future regulations on its terms."[191] The report goes on to recognize that strategic

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[187] *See* Direct Testimony of Craig A. Hallstrom, Penelope M. Conner, Paul R. Renaud, Jennifer A. Schilling, Samuel G. Eaton at 91, Petition of NSTAR Electric Company and Western Massachusetts Electric Company each d/b/a Eversource Energy for Approval of an Increase in Base Distribution Rates for Electric Service Pursuant to G.L. c. 164, § 94 and 220 C.M.R. § 5.00, D.P.U. 17-05 (Commonwealth of Mass. Dep't of Pub. Util., Jan. 17, 2017), https://www.eversource.com/Content/docs/default-source/rates-tariffs/ma-2017-rate-case--grid-modernization-base-commitment-testimony.pdf?sfvrsn=0 [https://perma.cc/9F62-YEZ2] [hereinafter Eversource].

[188] *See* Jonathan Oosting, *Electric choice fuels Michigan energy overhaul fight,* DETROIT NEWS (May 16, 2016, 12:03 AM), http://www.detroitnews.com/story/news/politics/2016/05/16/electric-choice-fuels-michigan-energy-overhaul-fight/84423750/ [https://perma.cc/QG3A-3GLF] (discussing retail choice programs in Michigan)*;* Herman K. Trabish, *CA bill would let non-utilities sell electricity to commercial, industrial customers,* UTILITYDIVE (Mar. 5, 2015), http://www.utilitydive.com/news/ca-bill-would-let-non-utilities-sell-electricity-to-commercial-industrial/371421/ [https://perma.cc/C78P-GX7N] (discussing retail choice in California).

[189] *Transportation Electrification: Utility Fleets Leading the Charge*, EDISON ELEC. INST. (June 2014), http://www.eei.org/issuesandpolicy/electrictransportation/FleetVehicles/Documents/EEI_UtilityFleetsLeadingTheCharge.pdf [https://perma.cc/5JH8-695S].

[190] *Id.*

[191] *Id.*

electrification offers benefits for utilities, consumers, and the environment, and also cites data showing the utility is one of the consumers' most trusted sources for information about electric vehicles.[192] That said, the report focuses primarily on utilities leading by example with their own fleets, and is not fully focused on the larger opportunity in the transportation and heating sectors for expansion of beneficial load.[193] A 2015 EEI report does recognize more explicitly that electric vehicles offer "beneficial load" that can put "downward pressure on rates," and a 2017 EEI update shows $250 million in annual projects or programs to deploy electric charging infrastructure by utilities, and another $128 million towards supporting electric vehicles in utility fleets.[194] That is certainly a significant investment but not yet enough to tip the scales away from petroleum, at a moment when for the first time in almost four decades transportation greenhouse gas emissions in the U.S. exceeded electric power emissions.[195]

One only has to look backwards several years to 2009 to see what a large difference an engaged utility sector could be when it comes to changing the dynamics of climate and energy policy in the United States. During the debate on a cap and trade bill in the U.S. Congress in 2009 and 2010, EEI was more focused on how to divide up emission allowances among members based on their electric supply portfolios.[196] The bill that passed the House of Representatives contained only 3% of emission allowances revenues to invest in electric vehicles for five years, then dropping to 1% thereafter through 2025.[197] Investments in coal power plant technology received a greater share than that, and the bulk of argument among the utilities was how to distribute allowances among ratepayer

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[192] *Id.* at 4, 37.
[193] *Id.* at 3–4.
[194] *Employee PEV Engagement Initiative*, EDISON ELEC. INST. (2015), http://www.eei.org/issuesandpolicy/electrictransportation/PEVengagement/Documents/employee_pev_engagement_final.pdf [https://perma.cc/J9V3-3P7T]; *Delivering America's Energy Future: Electric Power Industry Outlook*, EDISON ELEC. INST. (2017), http://www.eei.org/resourcesandmedia/industrydataanalysis/industryfinancialanalysis/Documents/Wall_Street_Briefing.pdf [https://perma.cc/5PD3-CT8W] [hereinafter *Delivering America's Energy Future*].
[195] *Delivering America's Energy Future, supra* note 194, at 12.
[196] *See* Darren Samuelsohn & Katherine Ling, *'Fragile Compromise' of Power Plant CEOs in Doubt as Senate Debate Approaches,* E&E NEWS (Aug. 5, 2009), http://www.eenews.net/stories/81147 [https://perma.cc/R78C-RX62].
[197] *Comparison Chart: Plug-In Electric Vehicles in Climate-Energy Legislation for the 111th Congress*, CTR. FOR CLIMATE AND ENERGY SOL. (2010), https://www.c2es.org/docUploads/PEV_provisions_climate_energy_111th_legislation.pdf [https://perma.cc/EP4D-5GB4].

classes and geographic regions.[198] Utilities did not appear to see the climate bill as an opportunity to gain market share against fossil fuels in the heating or transportation sectors. This reluctance to aggressively seek to dominate new markets by utilities stands in stark contrast to the behavior of similarly situated businesses in other industries. For example, as previously mentioned, oil and auto companies systematically purchased and dismantled electric streetcar systems in major cities in the 1930s and 1940s, replacing them with bus service powered by petroleum.[199]

2. Five Principles for Regulation

Today in 2017, as has been documented, some utilities are starting to seek to engage in various ways in energy transformation in new sectors. What can be gleaned from early examples of regulation and legislation to determine guiding principles?

A first proposed principle can be found in Vermont's explicit pairing between an RPS and an energy transformation program: Utility-led energy transformation requires an increasingly clean electric supply to enable greenhouse gas emission and air pollution reduction benefits from strategic electrification.[200]

A second principle should focus on clarity for utilities from policymakers and regulators as to how utility-led efforts should integrate into competitive or quasi-competitive markets. This was raised as a concern by California and Kansas regulators, and is discussed in the Vermont RES as well. The Vermont RES requires utility providers running Tier III programs to partner with private sector vendors in implementing programs "unless exclusive delivery through the provider is

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[198] *See* Anne C. Mulkern, *Consumer groups push Senate on Waxman-Markey's rate-protection language,* E&E NEWS (July 16, 2009), http://www.eenews.net/stories/80415 [https://perma.cc/M6W5-N6U3], and *In BRIEF: What the Waxman-Markey Bill Does for Coal*, Ctr. for Climate and Energy Sol. (2009), https://www.c2es.org/publications/brief-what-waxman-markey-bill-does-coal [https://perma.cc/5E2V-VRNP] (detailing provisions that allow a utility rate surcharge of $1 billion per year to support commercial scale coal/carbon sequestration projects, and a provision providing 4% of emission allowances through 2050 cumulatively to support coal/carbon sequestration projects).

[199] Briglin, *supra* note 95; *See* John Robbins, *What Ever Happened to Public Transportation?,* THE HUFFINGTON POST (July 2, 2010, 9:24 AM), http://www.huffingtonpost.com/john-robbins/what-ever-happened-to-pub_b_633585.html [https://perma.cc/C3EV-6Y9Z] (discussing the "Great American Streetcar Scandal," whereby auto, tire, and petroleum companies bought up and dismantled streetcar systems in forty-five major cities through front organizations).

[200] *See* VT. STAT. ANN. tit. 30 § 8004, 8005 (2017).

more cost-effective," or "there is no person other than the provider with the expertise or capability to deliver the goods or services."[201] California regulators laid out a four-part examination of proposed utility programs[202]:

> 1) The nature of the proposed utility program and its elements; for example, whether the utility proposes to own or provide charging infrastructure, billing services, metering, or customer information and education.
> 2) Examination of the degree to which the market into which the utility program would enter is competitive, and in what level of concentration.
> 3) Identification of potential unfair utility advantages, if any.
> 4) If the potential for the utility to unfairly compete is identified, the commission will determine if rules, conditions or regulatory protections are needed to effectively mitigate the anticompetitive impacts or unfair advantages held by the utility.

In some cases such as Eversource's proposal to invest in electric vehicle "make-ready" infrastructure while leaving to third-parties the installation of charging infrastructure, utilities may naturally find a balance of roles with third parties.[203] However, some utilities will want to go beyond this, and regulators and lawmakers may appropriately want to focus utilities on strategic electrification to achieve energy and greenhouse gas emission goals. Nevertheless, a balance will necessarily be required to ensure monopoly utilities do not simply push third-party providers out of markets. Rather, utilities should be incentivized to pursue partnership models, and to invest in electrification programs and infrastructure in ways that complement other market actors.

A third principle for strategic electrification is that utilities will require reasonable and predictable regulatory treatment in order to have the confidence to make investments in new infrastructure or programs. While Kansas Power & Light ultimately decided to have its investors foot the bill for its electric charging infrastructure, there is a benefit to having these types of investments be made within the regulatory structure, as opposed to being an unregulated business.

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[201] VT. STAT. ANN. tit. 30 § 8005 (a)(3)(E)(i).
[202] California PUC, *supra* note 182, at 9.
[203] *See* Eversource, *supra* note 187.

Regulators can ensure that the balancing contained in principle two is accomplished. Pursuing these investments in the regulated structure also ensures a regulated rate of return on utility capital investments. Finally, given the scale of the challenge of investing in infrastructure changes along the lines the Brattle Group report suggests, its seems unreasonable to assume the private sector and unregulated investment will fully accomplish the transition on its own. As the CPUC noted in its 2014 decision, part of its rationale for overturning its previous limitation on utility investment in electric vehicle infrastructure was the recognition that "utilities have a crucial role in the electrification of transportation as the infrastructure support and fuel supplier in their service territories."[204] In addition the CPUC noted "certain market segments are harder for third parties to penetrate and the utilities may be better positioned to develop those market segments or support third-party providers to do so."[205]

At a hearing in May of 2017, CPUC President Michael Picker asked utility panelists to address the role of the monopoly utility in electrification of the transportation sector, and a panelist from Pacific Gas & Electric summed up that "utilities are committed to electrifying the transportation sector to achieve [the state's] greenhouse gas goals."[206] Picker himself in a speech earlier in the year argued for leveraging an increasingly renewable grid to significantly address greenhouse gas emissions through electrification of transportation, and his staff issued a white paper that found achieving California's policy goals will require "enormous investments in the electricity sector" including "widespread deployment of electric charging infrastructure."[207] This view was echoed by California Energy Commissioner David Hochschild in an interview in May of 2017 who stated, "the role of utilities is going to shift toward

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[204] *Id.* at 7.
[205] *Id.*
[206] Jeannine Anderson, *California regulators wrestle with 'dramatic' changes, consumer choice*, PUB. POWER DAILY (May 23, 2017), http://www.publicpower.org/media/daily/ArticleDetail.cfm?ItemNumber=48176 [https://perma.cc/V35D-5456].
[207] Press Release, Am. Council on Renewable Energy, National Renewable Energy Policy Forum Charts Path for Policy Progress and Continued Market Expansion (Mar. 16, 2017), http://www.acore.org/resources/press-releases/6203-national-renewable-energy-policy-forum-charts-path-for-policy-progress-and-continued-market-expansion [https://perma.cc/S7XB-DH4K]; *Consumer and Retail Choice, the Role of the Utility, and an Evolving Regulatory Framework*, CAL. PUB. UTIL. COMM'N 3 (May 2017), http://ebce.org/wp-content/uploads/Attachment-8B-CPUC_CEC-May-19-En-Banc-White-Paper-and-Agenda.pdf [https://perma.cc/FV7J-M5CS].

transportation" in order to both "reduce greenhouse gas emissions from our transportation sector" and "facilitate higher penetration of renewables."[208]

If the monopoly utility is indeed to play the role envisioned by California policymakers and by the Vermont RES, it will need clearer rules of the road for what types of investments can be rate-based than appear today. The Vermont RES's prior approval process for utility projects could provide some of that clarity.[209] Such clarity was also provided in Washington's SHB 1853 wherein one finding stated[210]:

> The legislature finds that utilities, who are traditionally responsible for understanding and engineering the electrical grid for safety and reliability, must be fully empowered and incentivized to be engaged in electrification of our transportation system. The legislature further finds that it has given utilities other policy directives to promote energy conservation which do not make the benefits of building out electric vehicle infrastructure, as well as any subsequent increase in energy consumption, readily apparent. Therefore the legislature intends to provide a clear policy directive and financial incentive to utilities for electric vehicle infrastructure build-out.

The Washington law then provides for utility return on investment for capital expenditures related to electric vehicle infrastructure deployed for the benefit of ratepayers, with an allowance for some bonus incentive rate of return under certain considerations.[211] While utilities will always have to demonstrate prudent investments to recover costs and earn a rate of return, these types of provisions in Vermont and Washington laws provide regulators with authority to set clear rules of the road to give utilities the certainty they will need if they are to make the significant investments required for strategic electrification.

A fourth principle, embodied in Vermont's RES, is the idea that strategic electrification should as much as possible provide consumer

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[208] Sunny Wang & Gwen Brown, *Q&A: The State of Clean Energy with David Hochschild of the California Energy Commission,* GREENTECH MEDIA (May 25, 2017), https://www.greentechmedia.com/articles/read/qa-the-state-of-clean-energy-california-energy-commissions-david-hochschild [https://perma.cc/36SQ-MTFU].
[209] VT. STAT. ANN. tit. 30 § 8005(a)(3)(F)(ii) (2017).
[210] S.H.B. 1853, 64th Leg. Reg. Sess. (Wash. 2015).
[211] WASH. REV. CODE § 80.28.360 (2016).

benefits not just for participating customers (who buy an EV or a heat pump), but for all ratepayers.[212] The Vermont RES sought to "ensure that all ratepayers have an equitable opportunity to participate in, and benefit from, energy transformation projects regardless of rate class, income level, or provider service territory."[213] Vermont utility Tier III plans encompass this goal, with utilities offering programs that include a focus on low-income customers, public transit services, and partnerships with community action agencies and fuel dealers as examples of ways to reach more potential participants.[214] In addition, the Vermont RES requires "best practices for demand management" in order to realize the benefits to the grid and all ratepayers of increasing load without exacerbating peak.[215] In this way, if implemented correctly, all ratepayers can benefit from strategic electrification whether they participate directly or not.

A fifth and final principle for reform is the concept that utilities should be given a wide berth and an open platform to pursue partnerships and investments that reduce emissions and fulfill the mandate of providing customers with reliable and least cost comprehensive services. The Vermont RES defines energy transformation projects that utilities are required to provide in the following way[216]:

> "Energy Transformation Project" means an undertaking that provides energy-related goods or services but does not include or consist of the generation of electricity and that results in a net reduction in fossil fuel consumption by consumers of a retail electricity provider and in the emission of greenhouse gases attributable to that consumption. Examples of energy transformation projects may include home weatherization or other thermal energy efficiency measures; air source or geothermal heat pumps; high efficiency heating systems; increased use of biofuels; biomass heating systems; support for transportation demand management strategies; support for electric vehicles or related infrastructure; and infrastructure for the storage of renewable energy on the electric grid.

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[212] VT. STAT. ANN. tit. 30 § 8005(a)(3)(F)(vi) (2017).
[213] *Id.*
[214] *See Tier III Plans*, *supra* note 174.
[215] VT. STAT. ANN. tit. 30 § 8005(a)(3)(F)(viii) (2017).
[216] VT. STAT. ANN. tit. 30 § 8002 (28) (2017).

The language here clearly indicates utilities should not be limited to only pursuing investments that involve strategic electrification, but rather can involve more comprehensive services to customers and a range of potential third-party partners (from fuel dealers to weatherization contractors).[217] It makes little sense for ratepayer dollars to be invested in a heat pump without allowing for consideration of how to make the home the heat pump is installed in more efficient at the same time. Utilities should have latitude either on their own or in partnership to pursue comprehensive opportunities.

CONCLUSION

In the 21st century the electric utility faces new challenges that offer risk and opportunity. The old business model of investing in ever larger centralized infrastructure has been upended by new technologies that are by their nature distributed and disruptive. In order to provide needed services to customers and needed emissions reductions, the utility model must be harnessed for a new purpose.

In its white paper on energy transformation, Navigant projects that global value of utility generation, transmission, and distribution, and retail markets could range from $4.7 trillion in a conservation scenario, to $6 trillion in a scenario that involves more aggressive energy transformation efforts.[218] However, the most interesting aspect of their analysis in the more aggressive scenario is not the differential in overall market value from the conservative scenario. It is instead the significant shift in market value downstream as conventional central generation gives way to investment in distribution infrastructure and retail services (such as smart consumer products, electric vehicles, distributed solar and energy storage, etc.).[219] This is exactly the shift EEI expressed concern about, not simply a shift in investments for utilities from generation to distribution infrastructure, but rather a shift from conventional utility investments to investments that can and are being made by third-party innovators. Navigant describes what the "Proactive Utility" looks like in this new environment, describing it as developing new services such as

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[217] See *id.*

[218] Mackinnon Lawrence & Jan Vrins, *Navigating the Energy Transformation: Building a Competitive Advantage for Energy Cloud 2.0*, NAVIGANT at 27 (2016), https://www.navigant.com/insights/energy/2016/navigating-the-energy-transformation [https://perma.cc/GSW4-N9KN].

[219] *Id.* at 27–28.

electric vehicle charging, creating a more distributed energy network, and moving away from the conventional business model while collaboratively partnering with third-party innovators.[220] Navigant notes, however, that "[w]ith some exceptions, utilities have generally not been granted much flexibility to assume significant risk when investing in emerging technologies."[221] That statement is borne out by the earlier examples of regulatory treatment of electric vehicle charging proposals in Missouri, Kansas, and Michigan, and in the conclusions of the Brattle Group white paper about the need for regulatory reforms. The time is right from a technology, consumer, and environmental standpoint for that dynamic to change. With careful application of the principles laid out in this Article, regulators can unshackle utilities to promote innovation and partnership while preserving reliability and ratepayer protection.

Some look back on the purchase and dismantlement of the electric trolley system by automakers and oil suppliers in the 1940s with regret for the impact that change had on our environment and the vibrancy of our cities.[222] If done properly, future generations could look back at the effort by utilities to strategically electrify the heating and transportation sector with gratitude for the environmental and consumer benefits such an effort provided. For those who acknowledge the need to reduce greenhouse gas emissions but might still oppose such an effort, it is critical to ask: What other industry has the capability, capital, and motivation to make transformational change in a heating and transportation sector long dominated by entrenched fossil fuel providers?

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[220] *Id.* at 28.
[221] *Id.* at 29.
[222] Robbins, *supra* note 199; *see* Briglin, *supra* note 95.