GETTING DISTRIBUTED GENERATION RIGHT: A RESPONSE TO "DOES DISRUPTIVE COMPETITION MEAN A DEATH SPIRAL FOR ELECTRIC UTILITIES?"

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Synopsis: A recent *Energy Law Journal* article by Elisabeth Graffy and Steven Kihm claims that the electric utility industry faces a mortal threat in the near future from distributed generation and other emerging technologies that will allow customers to bypass the electric grid. The authors contend that utilities will be unable to recover in regulated rates investments stranded by this emerging competition and would be wise not to rely on such cost recovery. According to the authors, utilities face a stark choice between seeking cost recovery and developing new services that add value in a diverse electricity marketplace in which they will play a less central role. Although partial alternatives to utility service are beginning to emerge, the authors' predictions are overstated and their advice to the utility industry is unrealistic. No realistic substitute for reliable electric service from the utility grid currently exists, and distributed technologies would have to make remarkable gains to become a substitute in the time frame suggested by the authors. Distributed alternatives to grid-supplied energy are growing, but in response to huge government subsidies, the most significant of which is the regulatory practice of net metering. Net metering inappropriately prices distributed energy at the bundled retail rate. The utility industry is making substantial infrastructure investments, including investments that are necessary to allow distributed generation to succeed and to integrate renewables into the grid. The authors' suggestion that regulators will simply deny the recovery of these and other investments, with no legal recourse for investors, misunderstands the law and the role of the utility industry in our society. Even if distributed alternatives continue to grow, much of the public will rely on utility service for many decades, and the utility industry will continue to need access to capital and operating funds to provide this service. This capital will not be forthcoming if the authors' analysis is correct. Ultimately, the growth of alternatives to utility-supplied electric service may, over time, present a challenge to regulators and the utility industry, but the challenge will be much more complex than the authors recognize and will involve issues of fairness between those who rely on the grid entirely, those who use it for some unbundled services, and those who eventually are able to fully disconnect.

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I. SUMMARY OF DEATH SPIRAL

The May 2014 edition of the *Energy Law Journal* includes an article entitled *Does Disruptive Competition Mean a Death Spiral for Electric Utilities?*[1] *Death Spiral* envisions a utopian (for customers) and dystopian (for utilities) near future in which electricity from the utility grid is widely displaced by distributed energy sources that supply electricity at prices below utility service from the electric grid. According to the authors, distributed generation growth represents "a trend that is expected to enable households and businesses to substantially reduce power purchases from their local electric utilities in large portions of the country *within a decade*."[2] It is unclear whether the authors are predicting that customers will soon disconnect from the grid in large numbers or merely reduce their energy purchases and rely on the grid for reliable service.

The authors conclude that the distributed option will be so attractive to consumers and policymakers that efforts by the utility industry to limit its growth will be vigorously opposed. The utility industry will confront what they describe as a "synergistic wave" of new technology, consumer sentiment, and public policy acting collectively against the utility industry model.

> We propose that disruptive competition signifies a synergistic wave of innovations occurring in several sectors at once–technology research and development, policy development, social and cultural preferences, scientific investigation, and business . . . . This synergistic wave, not technology alone, is what utilities experience as a threat and risk to their established business model. The surge in distributed solar PV installations is best understood as the leading edge of this wave . . .[3]

The authors argue the utility industry should embrace this future ("ride the wave") by abandoning opposition to regulatory policies adopted to advance the distributed alternative.[4] Instead, the industry should be "adaptive" and "proactive" by restructuring its offerings to create value for consumers within the context of this new industry paradigm in lieu of the industry's historical practice of focusing on "cost recovery."[5]

Death Spiral argues, specifically, that the pursuit of "cost recovery" in regulatory proceedings, such as recent utility proposals to include fixed cost

1. Elisabeth Graffy & Steven Kihm, Does Disruptive Competition Mean a Death Spiral for Electric Utilities?, 35 ENERGY L.J. 1 (2014) [hereinafter *Death Spiral*].

2. *Id.* at 6 (emphasis added).

3. *Id.* at 3.

4. *Id.*

5. *Id.* at Part X.

components in retail rate designs as a response to net metering,[6] represents an unsustainable alternative strategy to forward-looking "value creation."

> Value creation and cost recovery offer two very different strategic choice pathways. Cost recovery is standard utility operating procedure under a wide range of conventional risks and may actually exacerbate and deepen disruptive competition risks by encouraging primarily backward-looking, defensive positioning to protect past infrastructure investment. Value creation, which is forward-looking, entails greater institutional adaptation, but it is the more likely strategy for transforming short-term risks into long-term viability because it encourages discovery of opportunities for economic returns.[7]

Accordingly, say the authors, utilities must make a "strategic choice between focusing on building value or recovering cost."[8] Indeed, "[r]elying too heavily on traditional regulatory solutions to provide insulation from a changing world constitutes defensive strategies that are like trying to put a genie back in the bottle."[9]

The authors also contend that the utility industry cannot rely on asserted legal rights to recover investments in the grid that are stranded by competition, because the law does not afford a right to recover such investments when customers voluntarily choose to take advantage of more attractive offerings in the marketplace.[10] They believe legal rights will ultimately give way to "social welfare objectives" that they claim have been historically favored over the rights of troubled industries.[11] From the article, it is clear the authors' definition of these favored social welfare objectives includes maximizing the use of distributed sources of energy but not compensating investors who provide capital to the utility industry.[12]

Death Spiral's legal argument against stranded cost recovery is based primarily on the authors' interpretation of the Supreme Court's 1945 decision in *Market Street Railway Co. v. Railroad Commission of State of California* (*Market Street*),[13] in which the Court held that the Fourteenth Amendment to the Constitution did not offer rate protection for a failed street railway business that was unable to attract sufficient customers to recover its costs at any rate level.[14] Based on that decision, the authors conclude that, whereas cases such as *Federal Power Commission v. Hope Natural Gas Co.* (*Hope*)[15] provide assurance that regulators will set utility rates high enough to recover costs and earn a return on investment when the public needs utility service, it affords no such protection when the demand for such service evaporates.[16]

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6. *Death Spiral*, *supra* note 1, at 11.

7. *Id.* at 10.

8. *Id.* at 14.

9. *Id.* at 38.

10. *Id.* at Part VI.

11. *Id.* at 16.

12. The authors deem utility investors insufficiently important to the overall economy and financial markets to warrant protection, and so their interests will be dealt with in bankruptcy court. *Id.* at 23, n.100.

13. *Id.* at 26; Mkt. St. Ry. Comm'n v. R.R. Comm'n of Cal., 324 U.S. 548 (1945) [hereinafter *Market Street Railway*].

14. *Market Street Railway*, *supra* note 13, at 560.

15. Fed. Power Comm'n v. Hope Natural Gas Co., 320 U.S. 591, 602-03 (1944) [hereinafter *Hope*].

16. *Death Spiral*, *supra* note 1, at 22.

II. OVERVIEW: PRONOUNCEMENTS OF A UTILITY DEATH SPIRAL ARE PREMATURE

I have written recently about the potential impacts of distributed generation subsidies on the utility industry and the public, including stranded cost issues that may emerge sometime in the future.[17] However, I do not share the authors' dire predictions for the electric utility industry and consider their proposed prescriptions to be unrealistic and unhelpful. *Death Spiral* exaggerates the threat from distributed generation by disregarding the critical role that subsidies play in making distributed generation attractive and failing to acknowledge other shortcomings that may (or may not) be overcome over time. The authors also misunderstand the essential role the utility industry will play for decades, even if, and long after, their predictions about the growth of distributed generation come true, and the laws that recognize this role.

Articles similar to *Death Spiral* have appeared in growing numbers recently, especially as the utility industry's opposition to "net metering," the driver of most distributed generation growth, has become more pronounced. The basic message is similar to one Enron and some of its allies propounded around the turn of the century; that the utility industry is sluggish, backward looking, and overly focused on the regulatory process. New entrants will be much more nimble and efficient, and will threaten the economic viability of the utility industry with more attractive offerings. How did that prediction turn out? The utility industry adapted to competition without abandoning its basic business model. Regulators continued to recognize that the industry is essential to the public interest. The industry is generally healthy and continues to provide an essential service to the public. Enron ended up offering little of real value and disappeared.

Death Spiral does not address the *cost* of distributed generation or attempt to show that it is, or how it will soon become, a realistic substitute for utility service. The sellers of distributed generation, as I will show, understand that their business model fails without substantial government subsidies. Apples-to-apples cost comparisons show that distributed electricity is still several times more expensive than electric service from the grid and therefore could not compete without someone tilting the playing field heavily in its favor.[18] The authors of *Death Spiral* believe this cost disparity is diminishing rapidly, but the cost difference and technological limitations are sufficiently large that predictions of the utility industry's demise should be taken with a grain of salt.

The authors also disregard inherent limitations on the growth of distributed generation due to the restricted capability of utility distribution systems to manage large amounts of variable energy and two-way energy flows. Ironically, at the same time *Death Spiral* makes grave predictions for the electric utility industry, there is a recognition that substantial investments will have to be made in utility

17. David B. Raskin, *The Regulatory Challenge of Distributed Generation*, 4 HARV. BUS. L. REV. ONLINE 38 (2013), *available at* http://www.hblr.org/?p=3673 [hereinafter *Regulatory Challenge*].

18. *See infra* Part III.

distribution systems in order to accommodate larger quantities of distributed generation and demand response.[19]

Dire predictions for the utility industry also disregard the service reliability available only from the utility grid. Even when *energy* from distributed sources achieves cost parity with central station *energy*, it will have to be combined with cost-effective and reliable storage before it can be compared with utility service. Storage technology that can perform this function is in its infancy. The point of the current regulatory debate, which *Death Spiral* claims is the product of an inordinate utility focus on cost recovery,[20] is that distributed generators want the consistency and reliability provided by the utility grid *without paying for it* in order to make their product appear more attractive and drive consumer demand. This strategy can work only for so long as distributed generation remains a minor niche alternative. The cost shifting effects of subsidized distributed energy will soon be noticeable, and this will threaten the current system of subsidies (especially net metering) that is driving distributed generation growth.

It is also unlikely that consumers will rapidly abandon utility service *en masse*, even if and when a realistic alternative exists. New technology will emerge, it will enter production in small numbers, it will be tried by new adopters, and then, assuming the public is sufficiently attracted, it will be produced in larger numbers and sold. This is a long-term process, during which most of the public will continue to rely on service from the grid for some or all of their demand. Many Americans, including some of the most economically vulnerable, will be unable to take advantage of distributed alternatives. A transition to distributed generation will therefore be protracted and will raise difficult issues over the appropriate sharing of the cost of the still-essential utility grid.

Finally, the authors neglect the potential for technological advancements that make electric service from the utility grid more efficient and desirable. No reason exists to believe that technological and economic improvements will occur solely in the sphere of distributed generation and storage. Comparisons of substantially more efficient distributed generation and storage with a static (and therefore increasingly less competitive) utility grid alternative are not germane. Electric service from the utility-owned grid may ultimately emerge as the winner in the fierce competition that *Death Spiral* envisions.

III. COST COMPARISON OF UTILITY SERVICE AND DISTRIBUTED ALTERNATIVES

According to the U.S. Energy Information Agency (EIA), the projected 2019 levelized cost of utility scale solar photovoltaic (PV) energy is approximately $0.13 per kilowatt-hour (kWh).[21] Recent studies show that utility scale solar is substantially more efficient than rooftop solar, so the per kWh costs of the

19. *See, e.g.*, ELEC. POWER RESEARCH INST., THE INTEGRATED GRID: REALIZING THE FULL VALUE OF CENTRAL AND DISTRIBUTED ENERGY RESOURCES (2014) [hereinafter EPRI], *available at* http://tdworld.com/site-files/tdworld.com/files/uploads/2014/02/integratedgridepri.pdf.

20. *Death Spiral*, *supra* note 1, at Part III.

21. U.S. ENERGY INFO. ADMIN., LEVELIZED COST AND LEVELIZED AVOIDED COST OF NEW GENERATION RESOURCES IN THE ANNUAL ENERGY OUTLOOK 2014 [hereinafter ENERGY OUTLOOK 2014], *available at* http://www.eia.gov/forecasts/aeo/pdf/electricity_generation.pdf.

distributed version are much higher.[22] The EIA figure represents a substantial reduction from prior EIA five-year-forward forecasts, so it appears to incorporate recent estimates of improving solar efficiency. The National Resources Defense Council, hardly a neutral source, states that rooftop solar can produce energy at between $0.12 and $0.30 per kWh, and the EIA 2019 forecast suggests that the current number is near the top of this range.[23] Another clean energy source, the blog CleanTechnica, states that distributed solar energy costs vary from about $0.19 per kWh in Los Angeles to about $0.29 in Seattle.[24]

In contrast, the EIA's projected 2019 levelized cost of energy from a new gas-fired generator is approximately $0.065 per kWh, which barely differs from today's cost and therefore conservatively assumes no material efficiency gains.[25] Energy from distributed solar is therefore approximately three to five times higher than the lowest cost fossil energy available from the grid. This comparison does not include the value added by the dispatchability and higher availability of gas and other sources of central station generation.[26] For example, EIA's levelized cost calculations assume a 25% capacity factor for solar PV generation,[27] which means that a hypothetical customer using solar PV as a source of electric energy would require supplemental energy from the grid most of the time.

These figures compare only the cost of energy. A true competitive comparison would look at the cost of a substitute for service from the electric grid that is available virtually 100% of the time. The additional cost to achieve this level of reliability would presumably be based on the addition of storage to the distributed generation package, allowing the customer to disconnect from the grid. The Electric Power Research Institute's (EPRI) recent report, entitled *The Integrated Grid: Realizing the Full Value of Central and Distributed Energy Resources*,[28] provides relevant data for such a comparison. EPRI points out that the average U.S. residential cost of utility service is about $110 per month.[29] It performed a study which concluded that the additional cost "to recreate grid-level service [from rooftop solar] without a grid connection ranges from $275–$430 per month *above* that of the original [solar] array. Expected decreases in the cost of

22. *See, e.g.*, Eric Lindeman, *Studies: Rooftop solar far more expensive than utility-scale solar*, IHS THE ENERGY DAILY 5 (Sept. 29, 2014). Notably, these studies also show that grid-scale solar and wind energy (which rely on the grid for delivery) are approaching the cost of energy from fossil and nuclear plants.

23. *Renewable Energy for America: Harvesting the Benefits of Clean, Local, Renewable Energy*, NATURAL RES. DEF. COUNCIL, http://www.nrdc.org/energy/renewables/solar.asp (last visited Sept. 20, 2014).

24. John Farrell, *Solar Costs and Grid Prices On A Collision Course*, RENEWABLEENERGYWORLD.COM (July 9, 2013), http://www.renewableenergyworld.com/rea/blog/post/2013/07/solar-costs-and-grid-prices-on-a-collision-course.

25. ENERGY OUTLOOK 2014, *supra* note 21, at 6.

26. ENERGY OUTLOOK 2014 recognizes this: "Since load must be balanced on a continuous basis, units whose output can be varied to follow demand (dispatchable technologies) generally have more value to a system than less flexible units (non-dispatchable technologies), or those whose operation is tied to the availability of an intermittent resource." *Id.* at 1-2. EIA warns about improper comparisons between dispatchable and non-dispatchable technologies using its levelized cost estimates. *Id*. at 2.

27. *Id.*

28. EPRI, *supra* note 19.

29. *Id.* at 21.

battery and PV module technology *could* reduce this to $165–$262 within a decade."[30]

Therefore, even if the variable energy from residential solar PV could be produced at the same cost as energy from central station gas generation on the grid−which the EIA data show would require cutting solar costs by more than two times−the additional cost to produce a firm electricity product comparable to electric service from the grid expands the cost by *another* two to four times based on EPRI calculations. The reasonable conclusion from the data is that, without substantial subsidies, distributed solar energy is and will remain uneconomic as an alternative to utility service from the grid for a long period of time.

The cost comparison often made by advocates of distributed generation (and the one emphasized in the CleanTechnica article mentioned above) is misleading. Proponents of distributed solar energy claim the cost of distributed solar power will soon attain (or has attained) "grid parity" in some locations, but this assertion is based on an apples-to-oranges comparison. They are comparing the unit cost of variable, non-firm energy from solar panels (with a 25% capacity factor) with the bundled retail rates charged for reliable, firm electric service from the grid (which is available virtually 100% of the time). Typically, this faulty comparison also incorporates the effect of the 30% federal investment tax credit available to buyers of solar panels and additional subsidies that may be available at the state level.[31]

IV. THE ROLE OF NET METERING IN STIMULATING DEMAND FOR ROOFTOP SOLAR

In light of the cost differences, one can see that something other than economics is driving the recent growth of distributed generation. Subsidies of different kinds pervade the energy industry, but the level of subsidy available to distributed generation through net metering (on top of a 30% federal investment tax credit) is uniquely large, widely misunderstood and opaque. Most of the laudatory rhetoric about distributed generation in *Death Spiral* is an artifact of net metering, which I consider to be a perilous regulatory practice.

The financial statements of solar PV suppliers are open about the significance of net metering. They disclose that their business models rely on net metering and other subsidies to succeed. For example, Form 20F of JA Solar Holdings, an international supplier of solar panels, filed with the Securities and Exchange Commission (SEC) states:

> The near-term growth of the market for solar power products depends largely on the availability and scale of government subsidies and economic incentives, as the current cost of solar power substantially exceeds the cost of electricity generated from conventional or non-renewable sources of energy. Various governments. . . have used different policy initiatives, such as capital cost rebates, feed-in tariffs, tax credits, net metering, to encourage or accelerate the development and adoption of solar power and other renewable energy sources. However, governments may reduce

30. *Id.* at 23 (emphasis added).

31. 26 U.S.C. § 25D (2006).

> or eliminate existing incentive programs for political, financial or other reasons, which will be difficult for us to predict.[32]

Similarly, Solar City's SEC Form 10-K sets forth a list of "Government Incentives" to solar energy, including the fact that "[f]orty-three states and Washington D.C. have a regulatory policy known as net energy metering or net metering."[33] It then warns that "[w]e rely on net metering and related policies to offer competitive pricing to our customers in some of our key markets,"[34] and it concludes:

> Our ability to sell solar energy systems or the electricity they generate may be adversely impacted by the failure to expand existing limits on the amount of net metering in states that have implemented it, the failure to adopt a net metering policy where it currently is not in place or the imposition of new charges that only or disproportionately impact customers that use utility net metering.[35]

A. The Economics of Net Metering and Its Effects

As I described in *Regulatory Challenge*, the central economic fact about net metering is that it values every kWh of energy produced by a distributed generator located behind the retail meter at the bundled retail price for energy.[36] This is true both for the kWhs that are consumed behind-the-meter to offset purchases from the utility and any surplus energy that flows over the meter for sale to the utility.[37] However, distributed generators produce a product that is inferior to bundled retail service because the energy from these generators is variable and unavailable for substantial periods of time. Because net metered generators are paid the bundled retail rate for their non-firm energy, this regulatory practice effectively values the utility industry's investments in reliability and in transmission and distribution systems at zero, even though customers continue to rely on the grid substantially.

No new utility business model or changed business focus can fix this problem. The subsidy is too large. Competitors to distributed generation, including renewable generators connected to the grid on the utility side of the meter, must sell their energy at the wholesale market price for energy. Market prices for wholesale energy typically vary between about $0.02 and $0.05 per kWh, while bundled, residential retail rates typically vary between about $0.10 and $0.20 per kWh with even higher rates in a few instances.[38] Therefore, distributed generators eligible for net metering are paid several times the market price for their energy, solely because they are located on the other side of the retail meter. This distorts the competitive market for energy, creating an incentive to over-invest in a form of electric energy that is less efficient. The economic

32. JA SOLAR HOLDINGS CO., LTD., ANNUAL AND TRANSITION REPORT OF FOREIGN PRIVATE ISSUERS PURSUANT TO SECTIONS 13 OR 15(D) (Form 20-F) 47-48 (2014), at 8, 47, *available at* http://www.sec.gov/Archives/edgar/data/1385598/000110465914029306/a14-4388_120f.htm.

33. SOLARCITY CORP., ANNUAL REPORT (FORM 10-K) (2014), at 12, *available at* http://files.shareholder.com/downloads/AMDA-14LQRE/2986362375x0xS1193125-14-104447/1408356/filing.pdf.

34. *Id.* at 13.

35. *Id.*

36. *Regulatory Challenge*, *supra* note 17, at 40-41.

37. *Id.* at 41.

38. *Id.*

distortion affects investments in grid-scale (central station) solar, wind, geothermal and other forms of non-fossil (carbon-free) energy equally with investments in energy produced from coal, natural gas, or oil.

The economic effects of using net metering are not very different from the system of subsidies that Germany adopted under its *Energiewende* program.[39] Thus, Germany's experience offers a laboratory for assessing the impacts of net metering and other clean energy subsidies. For over a decade, Germany has subsidized solar PV energy with feed-in tariffs sometimes equal to or in excess of the full retail rate and has provided distributed renewable energy priority access to the electric grid. The impact on German electric consumers has been horrendous. Residential electric rates in Germany have doubled and now average approximately $0.40 per kWh (in comparison with the United States average of approximately $0.125).[40]

The German subsidies and grid priority have, as is intended, hurt the economics of central station generation that is needed to provide base load energy and balance the system, causing some experts to worry that the grid is reaching a point of instability.[41] Germany had hoped that the rate impacts of *Energiewende* would be contained and that pro-renewable policies would reduce CO_2 emissions. But after falling initially, CO_2 emissions in Germany are rising due to the expanding use of coal and lignite generation.[42] One of the architects of this policy, Sigmar Gabriel, who is currently Germany's Minister of Energy and Environment, has raised alarms about the potential adverse impacts of *Energiewende* as currently implemented, stating that it threatens serious economic harm.[43] He has recently warned that *Energiewende* is "on the verge of failure."[44] It is not quite the panacea described in *Death Spiral*.

Concerns about Germany's renewables policy could fade with technological improvements, but they are serious and reinforce my point. Distributed generation technology is not sufficiently mature to replace service from the grid and the

39. *See generally Energy Transition, The German Energiewende*, http://energytransition.de/ (last visited Oct. 10, 2014).

40. EPRI, *supra* note 19, at 12. *See also* Meg Cichon, *US Should Learn from Germany's Renewable Energy . . . Mistakes?*, RENEWABLE ENERGY WORLD (July 16, 2014), http://www.renewableenergyworld.com/rea/news/article/2014/07/us-should-learn-from-germanys-renewable-energymistakes ("Electricity prices in Germany have doubled from $.18/kWh in 2000 to $.38/kWh in 2013.").

41. Julia Mengewein, *German Utilities Bail Out Electric Grid at Wind's Mercy*, BLOOMBERG (July 30, 2014) ("Germany's drive to almost double power output from renewables by 2035 has seen one operator reporting five times as many potential disruptions as four years ago, raising the risk of blackouts in Europe's biggest electricity market while pushing wholesale prices to a nine-year low."). The price of balancing energy is reported in the same article to be as much as 400 times the price of wholesale electricity. *Id.*

42. Stefan Nicola, *Merkel's Green Shift Backfires as German Pollution Jumps*, BLOOMBERG (July 29, 2013), http://www.bloomberg.com/news/2013-07-28/merkel-s-green-shift-backfires-as-german-pollution-jumps.html.

43. Melissa Eddy, *German Energy Official Sounds a Warning*, N. Y. TIMES (Jan. 21, 2014), http://www.nytimes.com/2014/01/22/business/energy-environment/german-energy-official-sounds-a-warning.html?_r=0. Another article, after describing the problem, even suggests that the increasing electric rates from *Energiewende* may not be reversible. *Germany's Energy Transition: Sunny, Windy, Costly and Dirty*, THE ECONOMIST (Jan. 18, 2014), http://www.economist.com/node/21594336.

44. P. Gosselin, *Angela Merkel's Vice Chancellor Stuns, Declares Germany's 'Energiewende' to be on 'the Verge of Failure'*, NOTRICKSZONE (Apr. 27, 2014), http://notrickszone.com/2014/27/angela-merkels-vice chancellor-stuns-declares-germanys-energiewende-to-be-on-the-verge-of-failure.

economics are now unfavorable. Until this situation changes, policies such as net metering that induce an over-investment in non-competitive, variable sources of distributed energy are harmful to electric consumers, do not necessarily produce CO_2 reductions, and could threaten the security of the electric grid.

B. Distributed Generation Subsidies and Environmental Policy

Supporters of these uniquely large subsidies argue the adverse effects are outweighed by the need for aggressive policies to reduce the use of fossil fuels and thereby address climate change. That is the basic argument behind Germany's *Energiewende*. Thus, the argument goes, overpaying for distributed generation at this time is justified if it stimulates investment in the development of this technology, lowering its cost over time, and ultimately creating an environmentally superior alternative to utility service. I have a number of problems with this argument, even accepting that climate change warrants a strong policy response.[45]

First, this argument ignores the fact that net metering and other subsidies to distributed generation discriminate against central station generation alternatives that emit no carbon dioxide. This artificially suppresses investment in these clean alternatives and inhibits their development and use. These central station alternatives include wind energy, central station solar, hydroelectric energy, and nuclear energy, none of which are able to sell their energy output at multiples of the wholesale market price for energy. Therefore, they are at a competitive disadvantage relative to net metered energy. Clearly, this disadvantage in the market limits their ability to attract capital for growth and innovation. And yet, all of these alternatives are currently much more efficient than distributed energy alternatives, as shown by the EIA data discussed above.[46]

Second, because the carbon-free central station alternatives described are currently more efficient than behind-the-meter distributed solar energy, advocates of net metering and other subsidies to distributed generation are increasing the overall cost of reducing CO_2 emissions, making it less likely that aggressive CO_2 reduction targets will be met. It is logical to assume that the aggregate investment that this or any country is willing to make to address climate change is limited, even if addressing it is a high priority. Therefore, the more costly the policies used to achieve a level of substitution for fossil energy the less substitution will occur, and the less likely that aggressive CO_2 reduction targets will be achieved.

Third, if one wishes to argue that the higher cost of electricity resulting from the widespread use of subsidies like net metering is justified, one should be willing to admit in public forums that the subsidy exists, so that the public (including those who choose not to or cannot install rooftop solar panels) can decide whether the economic penalty hidden in their electric bills is worthwhile. Instead of addressing the subsidy head on, proponents of net metering, funded by the industry that is reliant on this ratemaking practice, have directed their public message to

45. The level of the threat from climate change and the appropriate policy response thereto is, of course, a subject of intense debate.

46. ENERGY OUTLOOK 2014, *supra* note 21.

the claim that the utility industry is trying to "kill solar."[47] In fact, the industry is trying to reduce or eliminate particularly aggressive subsidies that threaten to harm the majority of consumers (including low income consumers who do not have the option of installing solar panels on their rooftops) and other clean energy technologies.

V. THE CONTINUING NEED FOR UTILITY CAPITAL INVESTMENT

Based on its assertion that the service offered by the utility industry is becoming unattractive to consumers, *Death Spiral* proposes that the utility industry change its primary focus from cost recovery in regulatory proceedings to forward looking value creation in an emerging and very different business environment.[48] It treats these as mutually incompatible alternatives and therefore disregards the possibility that utilities might focus on both options. In any event, *Death Spiral's* prescription for the utility industry proceeds from a serious error in reasoning.

The U.S. electric utility industry has more than a trillion dollars of net (unrecovered) investment in the utility grid outstanding, and the industry is investing approximately $100 billion more each year to satisfy service obligations and comply with regulatory mandates, including the integration of distributed generation, smart grid technologies, and other renewable sources of energy.[49] Billions of dollars will likely be spent in the next decade to create the physical infrastructure necessary to integrate substantial amounts of distributed generation.[50] These intensive capital investments are what make electric service in the form and at the cost the public expects possible. As noted above, the very changes *Death Spiral* predicts could not occur without substantial additional investments in the grid.

The utility industry must therefore attract very large amounts of capital. This capital comes from private investors who have a very different perspective from the authors of *Death Spiral* on whether "cost recovery" is an appropriate utility business strategy. These investors have made investments in reliance on longstanding cost recovery rights in the regulatory process under cases like *Hope*. Putting aside legal debates over the extent to which these investments may be secure under different future conditions (a subject explored in Part VII), substantial additional investment in this industry will be necessary for decades.

47. *See, e.g.*, *Tell Utilities Solar Won't be Killed (TUSK)*, http://dontkillsolar.com/tusk/ (last visited Oct. 10, 2014).

48. *See generally Death Spiral*, *supra* note 1.

49. According to financial data from the Edison Electric Institute, the investor-owned sector alone has a net investment outstanding of just under $900 billion and is spending $90 billion per year at the present time. Including publicly-owned utilities, the above figures are likely conservative. STOCK PERFORMANCE, EDISON ELEC. INST., Q2 2014 FINANCIAL UPDATE (2014), *available at* http://www.eei.org/resourcesandmedia/industry-dataanalysis/industryfinancialanalysis/QtrlyFinancialUpdates/Documents/QFU_Stock/2014_Q2_Stock_Performance.pdf.

50. N.Y.S. DEP'T OF PUB. SERV., STAFF REPORT AND PROPOSAL, REFORMING THE ENERGY VISION, CASE 14-M-0101 (Apr. 24, 2014) [hereinafter REV], *available at* http://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/26be8a93967e604785257cc40066b91a/$FILE/ATTK0J3L.pdf/Reforming%20The%20Energy%20Vision%20%28REV%29%20REPORT%204.25.%2014.pdf.

Indeed, the current Chair of the Federal Energy Regulatory Commission (FERC) has recently emphasized the utility industry is entering a period of high investment that will require federal-state regulatory cooperation.[51]

What investors have historically provided to this industry, they can refuse to provide; and they *will* refuse to provide capital to an industry that takes the authors' advice and chooses to stop asking regulators for rates that fully recover costs. To be clear, loose talk about utility death spirals ignores the reality that the electric utility industry will require substantial amounts of capital for many decades to meet basic American needs. Policies that restrict access to this capital are and will remain harmful to the public interest.

At some point in time, perhaps, utility industry access to capital could become a matter of limited public concern, but that time is far distant. Therefore, the critical policy issue isn't that the utility industry will soon find itself unnecessary, like the Market Street Railway Company, but rather how the economic health of this critical industry will be maintained through a long transition in which some of the industry's customers may choose to reduce their demand or disconnect from the grid and take electric service entirely from distributed sources. Determining how utilities will satisfy their obligations to the public and investors in the face of this protracted loss of demand is an important and complex topic about which much ink will be spilled if the *Death Spiral* authors' predictions come true. But *Death Spiral* does not accurately analyze the issue or offer realistic business or policy prescriptions for responding to the transition that may take place.

At the same time, it would be a mistake to disregard the views expressed in *Death Spiral*, because the authors' thinking is probably in line with a substantial body of public opinion and some policymakers. Most of the public, and some policymakers, do not understand the electric grid, utility economics, or the utility industry's unique role in our society. For this reason, the public discussion about the impacts of the growth of alternatives to utility service must continue, but it needs to be a realistic, fact-based discussion that acknowledges the true economics of distributed generation, the complexity of the transition that will occur if and when the demand for utility service declines substantially. The stakes to our society are high if the transition is handled badly, and Germany is learning this the hard way.

VI. REGULATORY RESPONSES TO NET METERING

In *Regulatory Challenge*, I proposed that the FERC assert its jurisdiction over electric sales by distributed generators to utilities (which are sales for resale) in order to level the competitive playing field and protect the integrity of the energy markets that the FERC has worked for two decades to put in place.[52] The legal basis for the FERC's earlier disclaimer of jurisdiction over net metered sales has

51. *See, e.g.*, Rod Kuckro, *'Major Investment Cycle' and Rapidly Changing U.S. Energy Markets Pose Fresh Challenges for FERC–Chairman LaFleur*, ENERGYWIRE (Aug. 22, 2014), http://www.eenews.net/stories/1060004814.

52. *See generally Regulatory Challenge*, *supra* note 17.

been overturned by two recent decisions from the D.C Circuit.[53] The FERC is therefore in a position to ensure that the price paid to behind-the-meter generators for their energy is the same as the price paid to other generators with whom they compete to supply energy to the grid, promoting fair and equal competition consistent with longstanding FERC policy. All generation connected to the grid is the same. It all competes to displace other supply to serve aggregate load. The fact that there is a measuring device, a retail meter, between some generation and the utility-owned grid does not change this fact.

If the FERC does not step in, the cost shifting associated with net metering will, at some point, become so large that regulatory action will almost certainly be taken to redress the impacts on remaining utility customers. But, if policymakers wait too long to address the issue, they will face the politically uncomfortable fact that substantial investments in behind-the-meter generation were made in reliance on net metering, and the politics of fixing the subsidy will be problematic. Existing net metered customers will claim that they relied on the prior rate practice and potential new customers will ask why their neighbors got a better deal than will be available to them.

An alternative would be for state regulators to adopt EPRI's recommendation that retail rates be unbundled, as they have at the wholesale level to promote competition. As EPRI states:

> A logical extension of the analysis provided here, as well as many other studies that look at [distributed energy resources (DER)] under different circumstances, is that as DER deploy more widely, policy makers will need to look closely at clearly separating how customers pay for actual energy and how they pay for capacity and related grid services.[54]

The FERC long ago recognized that electric service in a competitive environment must be unbundled so that market participants get appropriate price signals, opportunities for cross-subsidies are eliminated, and suppliers can compete on a level playing field to sell component services.[55] Unbundling and electricity competition go together, and if we are to have competition at the retail level, as the authors of *Death Spiral* propose, retail service should be unbundled for the same reason it has been unbundled at the wholesale level.

In fact, given the rapid changes occurring at the retail level, and the jurisdictional issues that these changes are causing, it would be appropriate for federal law to require that states unbundle retail rates and that the states and the FERC coordinate ratemaking policies so that unbundling is done consistently across FERC and state-regulated services. This concept of federal-state rate coordination is not foreign to the Federal Power Act,[56] but should be made mandatory in light of the introduction of competition at the retail distribution level. Changes in the electric industry are blurring the boundaries between FERC and state regulation.[57] The growth of distributed generation and demand response,

53. *Id.* at 44-45 (citing Southern Cal. Edison Co. v. FERC, 603 F.3d 996 (D.C. Cir. 2010) and Calpine Corp. v. FERC, 702 F.3d 41 (D.C. Cir. 2012)).

54. EPRI, *supra* note 19, at 24.

55. Statement of William L. Massey on Behalf of the Compete Coalition, No. AD13-7-000 (Sept. 11, 2013), *available at* http://www.ferc.gov/CalendarFiles/20130911144725-Massey%20Comments.pdf.

56. 16 U.S.C. § 824h(b).

57. *See, e.g.*, Elec. Power Supply Ass'n v. FERC, 753 F.3d 216 (D.C. Cir. 2014).

which produce an expanded use of electric distribution systems for two-way energy transfers, are likely to make the traditional jurisdictional separation between federal and state regulators even more complex and difficult to maintain in the future.[58]

I believe that among experts there would be broad agreement that retail electric service consists of at least the following unbundled components, although some might use different names or suggest even further unbundling:

(1) Energy service, which is typically defined as an hourly amount of the commodity component of electricity. This is the component that distributed solar PV generators provide.

(2) Reliability services, which I would define as having two primary sub-components: (i) firmness, which is the built-in redundancy in energy supply that is necessary to ensure service is available virtually all the time (otherwise known as "capacity"); and (ii) balancing, which consists of the resources on the electric system that are necessary to keep supply and demand in continuous balance with a stable voltage. If and when reasonably priced distributed storage technologies are available, it is anticipated that they will provide a partial or even total competitive alternative to reliability services from the grid.

(3) Transmission and Distribution services, which are the wires services that make the essential connection between generators connected on the utility side of the retail meter and the customer. At some point, the combination of distributed energy and storage may evolve sufficiently to allow customers to end their reliance on the grid and disconnect from it. But this is a rare exception today and the economics suggest it will remain the exception for many years.

(4) Public Policy services, which I define as the additional costs imposed on utilities to satisfy public policy mandates. Examples would include mandates that utilities acquire a minimum percentage of renewable energy at prices above the market, investments in "smart" meters and related equipment, and investments to upgrade the distribution network so it is capable of moving power in both directions as is required to accommodate growing amounts of distributed generation. Some might also include environmental mandates that increase the cost of some central station generation options such as coal. The costs associated with these mandates are included in regulated utility rates and spread among all customer classes. One can fairly ask why customers who use distributed energy sources should be permitted to evade payment for these public policy expenditures.

As noted above, the current retail pricing system with net metering allows an energy-only supplier, located behind the retail meter, to be credited the full, bundled retail rate when it supplies only energy service. If energy service was unbundled, that supplier's energy would be in the same market as other energy

58. For example, the New York Public Service Commission has put forward a proposal to create distribution system operators that operate in parallel with the FERC-regulated New York ISO and manage energy transactions, including demand response, at the distribution level. As this proposal moves forward, difficult questions about the allocation of jurisdiction between the FERC and the NYPSC are likely to arise. Dan Cross-Call & Lena Hansen, *Bringing a Distribution System Operator to Life: Why New York's REV Proceeding is a Landmark for the U.S. Power Grid*, RMI OUTLET (Sept. 8, 2014), http://blog.rmi.org/blog_2014_09_08_bringing_a_distribution_system_operator_to_life; *see also* REV, *supra* note 50.

suppliers, and the behind-the-meter supplier would have to compete on a level playing field. A retail customer owning distributed generation would get a retail rate credit equal to the energy component of its retail service plus an appropriate reduction in other components that it avoids using. Meaningful competition would allow utilities, merchant generators, and behind-the-meter owners of distributed generation to compete to provide value to customers on the basis of their efficiency and reliability, the very solution that the authors of *Death Spiral* endorse for the utility industry.[59]

This non-discriminatory pricing regime is what I believe Congress had in mind when it added net metering to the list of practices that retail regulators should consider for adoption at the state level. The 2005 amendments to the Public Utility Regulatory Policies Act (PURPA) define net metering service as follows:

> Net Metering - Each electric utility shall make available upon request net metering service to any electric consumer that the electric utility serves. For purposes of this paragraph, the term "net metering service" means service to an electric consumer under which electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the electric consumer during the applicable billing period.[60]

This definition provides that owners of distributed generation located behind the retail meter will receive a retail rate credit only for the *energy* they provide. It does not contemplate or permit a trade of energy for bundled retail service. The Ohio Supreme Court also recognized this distinction in a 2002 decision addressing net metering under Ohio law at that time.[61] The court rejected the state public utility commission's proposal to require an offset based on the full bundled retail rate, finding that distributed generators provide only energy, not wires and ancillary services, and therefore the net metering offset should be limited to the energy supplied.[62]

Owners of behind-the-meter distributed generation will argue that they are entitled to a reduction in their payments for some of the non-energy services that have been unbundled because they use less of these other services. Perhaps, but that issue needs to be decided based on the facts. If the unbundled components of retail rates are correctly defined, and the rates are designed properly, customers that use less of an unbundled service other than energy thus allowing utilities to reduce their costs to provide those other services, would be entitled to a credit against the applicable unbundled rate components. Such issues are, and should be, decided in rate proceedings in which the interests of the utility and different classes of customers can be considered.

It is not necessarily the case, however, that distributed generation owners who remain connected to the grid use less of the other unbundled services. Utilities must be ready to serve the entire customer load whenever a distributed generator is not producing energy, such as during the evening peak and on rainy afternoons. Therefore, the cost to supply reliability and wires services does not necessarily decline materially for a customer with behind-the-meter variable

59. *Death Spiral*, *supra* note 1, at Part X.

60. 16 U.S.C. § 2621(d)(11) (2012).

61. FirstEnergy Corp. v. Pub Utils. Comm'n of Ohio, 768 N.E.2d 648 (Ohio 2002).

62. *Id.* at 652-53.

generation. The distributed generator's contribution to the cost of distribution facilities arguably might increase on a relative basis because investments must be made in the distribution system to accommodate two-way flows that include the output of distributed generation. In addition, the variability of solar energy (without adequate storage) may increase the utility's cost to supply balancing services because, as variable energy is added to the system, utilities must invest in or acquire a larger proportion of balancing resources relative to their total load.

VII. THE REGULATORY COMPACT AND *MARKET STREET RAILWAY*

The authors of *Death Spiral* warn that a point will be reached when regulators will not allow grid costs to be spread to remaining customers, leaving the utility industry with investments in the grid that are stranded by competition from distributed generation.[63] This is not a new issue for the utility industry and regulators. Around the turn of the century a debate occurred over the industry's right to recover costs "stranded" by competition. The utility industry argued that the law established a "regulatory compact" under which utilities made investments in order to serve their franchised customers in return for assurance of receiving a reasonable return on investment to the extent the investments were prudently made.[64] While the issue of stranded cost recovery was never definitively resolved judicially, virtually every state that adopted laws providing for retail choice of electricity suppliers provided for the recovery of some level of stranded costs.[65] The FERC also provided for stranded cost recovery in its open access transmission rule, Order No. 888.[66]

The *Death Spiral* authors argue that utilities will not be allowed to recover stranded costs this time around based on their interpretation of *Market Street Railway*, a case in which the Supreme Court held that the Constitution did not protect a failed street railway business that was unable to attract sufficient demand to recover its costs regardless of the level of rates set by regulatory authorities.[67] The authors posit that when a sufficient number of customers leave the utility, regulators will not permit costs to be re-allocated among a declining customer base, and that in any event such a re-allocation would induce other customers to leave the utility system, producing the so-called death spiral.[68] I explored the potential consequences of this same dilemma in *Regulatory Challenge*,[69] but *Death Spiral* misses a number of important considerations and therefore misunderstands the core issue.

Under the current regulatory paradigm, utilities do not have a strong incentive to oppose orders from legislators and regulators to spend money to promote public policies, because the regulatory system is designed to allow them to recover their

63. *Death Spiral*, *supra* note 1, at 30.

64. *See, e.g.*, J. Gregory Sidak & Daniel F. Spulber, *Deregulatory Takings and Breach of the Regulatory Contract*, 71 N.Y.U. L. REV. 851 (1996).

65. *Id.* at 858 n.14.

66. Order No. 888, *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*, 61 Fed. Reg. 21,540 (codified at 18 C.F.R. pts. 35 and 385) (1996).

67. *Death Spiral*, *supra* note 1, at 26.

68. *Id.*

69. *Regulatory Challenge*, *supra* note 17, at 45-47.

costs, including an allowed return on investments legislators and regulators tell them to make. This imperfect system revolves around regulatory proceedings in which utilities, representatives of the public, and appointed or elected utility commissioners come together to decide on which investments will be made to meet public needs, the most important of which is the ironclad requirement for reliable electric service. Most of the dollars that utilities spend must be approved in this process. In many instances, the expenditures are mandated by federal or state law.

The utility industry has to attract capital to make these investments, and so the authorities involved in this regulatory process also must set rates to allow the utility to recover its costs, and participants in the process routinely debate the appropriate level of utility earnings. The constitutionally grounded rule is that rates will be set to permit utilities to operate their businesses and attract investment capital on reasonable commercial terms.[70] Large sums of money are identified in the regulatory process and spent, and then regulators set prices to let those dollars be recovered with a reasonable allowed return on invested capital. No other industry in America is quite like this, largely because of the enormous implications of utility service on society and the economy. A bargain between regulators and investors is being played out, which some scholars have called the "regulatory compact."[71] One can ask where it is written, but it is the oil that lubricates the entire utility regulatory process so that utilities can attract massive amounts of capital for infrastructure investments that regulators approve in order to produce reliable universal service and satisfy regulatory mandates.

Death Spiral endorses a different worldview, one in which utilities face strong competition from a popular alternative and are no different from other private enterprises whose businesses are at risk. Thus, utilities will need to do what is necessary to attract and maintain customers in a highly competitive environment or else they will fail. Money spent to provide service is at risk and will only be recovered if utilities are efficient and can offer services that add value to consumers. This worldview, however, misunderstands the reasons for the regulatory compact and the consequences of abandoning it.

For example, an electric utility operating under the paradigm presented in *Death Spiral* and focused on customer value as the authors recommend, would logically consider whether regulatory mandates−such as expensive reliability rules, the costs to buy renewable energy at prices above market, and investments in smart grid technologies−are wise investments in a highly competitive environment. In order to ensure that distributed generators do not walk away with its customers, a utility (given the choice) would logically choose not to invest in at least some of these things, bringing its cost structure down to better compete with its distributed competitors who are not required to bear the cost of these regulatory mandates. *Death Spiral* does not suggest where regulatory authorities will turn to find someone willing to spend billions of dollars on these public policy preferences (many of which are explicitly designed to promote the very

70. That is the core holding of Fed. Power Comm'n v. Hope Natural Gas Co., 320 U.S. 591 (1944), and other related Supreme Court decisions. *See, e.g.*, Duquesne Light Co. v. Barasch, 488 U.S. 299, 314-15 (1989).

71. *See generally* Sidak & Spulber, *supra* note 64.

competition *Death Spiral* endorses) in a regime with no assurance of cost recovery and brutal competition for survival on the immediate horizon.

The following example, which will appear utterly unrealistic to utility industry participants, illustrates the point. Inside the *Death Spiral* paradigm, a utility might be forced to consider what it will do when the next hurricane, tornado, ice storm, etc. passes through its service area. In the past, the utility assumed its responsibility was to serve all the customers connected to the grid in its service area, and to spend whatever amount of money was required to restore the electric system after a storm. But the utility now understands from *Death Spiral* that it faces an imminent threat of competition and has no guarantee that it will recover costs expended to restore service to customers who are then free to leave the system in favor of a preferred alternative. Spending huge sums to restore or provide utility service that may be uncompensated is not rational. Thus, a rational utility would judiciously choose which customers it wants to continue to serve (its target market) and which ones it will leave to its competitors, something competitive businesses do all the time.

Of course, no such choice exists. This essential difference between a utility and a typical business is the foundation for the regulatory compact. The authors of *Death Spiral* do not appear to have considered the unique role and responsibilities of the electric utility industry in American society. Or perhaps they did, and their expectation nonetheless is that the industry will continue to do all of the things required by the regulatory compact (and investors will continue to provide capital) without an assurance of cost recovery even while the customer base is being syphoned off by competitors who have none of the same obligations.

Market Street Railway is not relevant here. The most important reason is that the Market Street Railway Company did not have a monopoly or an obligation to serve and, by the time of the Supreme Court's decision, its service was unnecessary. It could not attract customers at any rate level that would recover its costs. For this reason, even Market Street was not arguing that it should recover in rates sufficient money to attract capital and pay for its ongoing expenses; there was never a realistic hope that its business could be restored.[72]

The Court distinguished between utility companies, whose service was required by the public and who therefore could charge higher rates to a captive customer base, and the failed Market Street Railway business.[73] The decision in *Hope*, the Court said, "concerned a company which had advantage of an economic position which promised to yield what was determined to be an excessive return on its investment and on its securities."[74] In other words, the purpose of regulation was to cabin the rates of a monopolist, and in that situation, the Constitution permitted regulation of the prices charged while still requiring regulators to set prices at a level that provided a reasonable return to investors.[75] Market Street Railway Company, in contrast, was a company "whose financial integrity already [was] hopelessly undermined [and] could not attract capital on any possible

72. *Market Street Railway*, *supra* note 13, at 565-66.

73. *Id.* at 566.

74. *Id.*

75. *Id.* at 566-67.

rate."[76] The Court found that the Constitution did not provide a rate guarantee to a company whose "current financial statements showed the value no longer to exist."[77] It concluded "[t]he due process clause has been applied to prevent government destruction of existing economic values. It has not and cannot be applied to insure values or to restore values that have been lost by the operation of economic forces."[78]

If distributed generation becomes a material competitor to utility service from the grid, the utility will see a reduction in its demand that will have to be addressed in the next rate case to provide sufficient revenues to meet the *Hope* standard. Long before the utility becomes the Market Street Railway Company, however, the question of how the government must respond to reductions in the demand for utility service will have been addressed in circumstances in which a large part of the public continues to rely on utility service. And during this period, the promise of cost recovery provided by *Hope* and its progeny will be the controlling law because the public will be relying on the utility industry for an essential service, and the industry will need to continue to attract capital in order to provide this service. Thus, the stranded cost issue will have been addressed and resolved under *Hope* long before the facts of *Market Street Railway* apply.

Death Spiral suggests that even while the utility industry remains necessary to the public, regulators will simply withhold cost recovery, forcing utilities into bankruptcy where they can be restructured pursuant to Chapter 11 of the Bankruptcy Code while utility service continues.[79] That stratagem might work once, assuming the courts permit it. But when and if it happens, investors will not forget. So, the conclusion is the same−for so long as the public continues to need the industry, the regulatory community will have to satisfy the industry's need for capital and operating funds to serve the public. It is the continuing need for capital in order to maintain a necessary service to the public that distinguishes the electric utility industry from the Market Street Railway Company. Ensuring the availability of capital to the electric utility industry is not only required by the law, it is good public policy and fully consistent with the development of distributed alternatives to utility service.

VII. CONCLUSION

Broad support exists for substantial investments in the electric grid to maintain and improve reliability, expand the use of environmentally preferable energy sources, and incorporate new technology. Accomplishing these public needs requires more than accommodating the preferences of distributed generators seeking to expand their market. It will mean hundreds of billions of dollars of long term capital investment–by investors who understand that the return of their investment will be determined not by market forces but by cost-of-service regulation. Casual suggestions that these returns will be truncated or eliminated until we can do without the facilities, and that *then* the owners of the facilities will

76. *Id.* at 566.

77. *Id.* at 567.

78. *Id.*

79. *Death Spiral*, *supra* note 1, at 23 n.100. This footnote further contends that the interests of utility investors are not important enough to warrant intercession to protect them.

be left to their own designs, are inconsistent with attracting capital that is needed, and will continue to be needed, to maintain one of our country's most critical industries.