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DOES DISRUPTIVE COMPETITION MEAN A DEATH SPIRAL FOR ELECTRIC UTILITIES?

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Synopsis: A surge in rooftop solar installations leads a wave of innovation in energy markets that manifests as disruptive competition for electric utilities. These innovations are emerging not only in technology but in public policy, social preferences, and business practices as well. Risks to the stability of current arrangements in the power sector are real, but regulatory protections cannot entirely insulate utilities from all such challenges. Legal protections should not be interpreted as an absolute right to reclaim value lost to competition. Electricity is central to social, economic, security, and environmental necessities. The institutional forms through which power is provided and utilized reflects historical factors and policy goals that can change over time. Leaders in the emerging environment will succeed by focusing on strategies that create new value for customers and that demonstrate nimble responsiveness to the broader contextual demands on energy systems, perhaps particularly during a time of rapid change.

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I. INTRODUCTION

A surge in rooftop solar systems in the United States is driving heated debate about the future shape of the electric power sector, especially the status of electric utilities. Are legacy utilities, which have served public interests for more than a century, becoming obsolete? If so, with what implications for the industry and for society? If not, what role will they have in the emerging sector? With market and regulatory conventions in substantial flux, the fundamental question is whether changes underway will lead to a more resilient, sustainable energy system or simply destabilize the present one.

The characterization of renewable energy innovations, such as rooftop solar, as a "mortal threat"[1] or "radical threat"[2] to utilities and utilities themselves as in a "death spiral"[3] reflects an awareness that unconventional risks have emerged. However, most analyses fail to explain how this has occurred, what it signifies more broadly, and what—if anything—utilities might do to thrive in the new environment. This potentially increases risks both to utilities themselves and to society, which depends upon the availability of safe, secure, accessible, and abundant energy. The question is not simply whether the current business model of utilities will survive but, if not, what might take its place.[4]

Threats to the status quo are not predictive of certain collapse as much as indicative of serious risks to utilities and to society. We seek to place an understanding of these risks into a historical and analytical framework that highlights the critical role of strategic decision-making under rapidly emerging conditions of *disruptive competition* in the historically protected utility sector. Others commonly equate disruptive challenges with the impacts of new

1. *E.g.*, Marc Gunther, *With Rooftop Solar on Rise, U.S. Utilities Are Striking Back*, YALE ENV'T 360 (Sept. 3, 2013), http://e360.yale.edu/feature/with_rooftop_solar_on_rise_us_utilities_are_striking_back/2687/; Cassandra Sweet, *NRG Energy CEO: Home-Generated Power 'Mortal Threat' to Utilities*, WALL ST. J. (Mar. 21, 2013), http://online.wsj.com/article/BT-CO-20130321-710418.html.

2. David Roberts, *How Can We Boost Distributed Solar and Save Utilities at the Same Time?*, GRIST, (Apr. 11, 2013, 7:35AM), http://grist.org/climate-energy/how-can-we-boost-distributed-solar-and-save-utilities-at-the-same-time/#.UWcIVDvL65o.email.

3. Liam Denning, *Lights Flicker for Utilities*, WALL ST. J. (Dec. 22, 2014, 6:18 PM); http://online.wsj.com/news/articles/SB10001424052702304773104579270362739732266; Chris Martin, Mark Chediak & Ken Wells, *Why the U.S. Power Grid's Days Are Numbered*, BUS. WK. (Aug. 22, 2013), http://www.businessweek.com/articles/2013-08-22/homegrown-green-energy-is-making-power-utilities-irrelevant; Jeff McMahon, *Utilities Want Regulatory Rescue from 'Death Spiral*,' FORBES (Feb. 4, 2014, 9:36 AM), http://www.forbes.com/sites/jeffmcmahon/2014/02/04/utilities-want-regulatory-rescue-from-death-spiral/.

4. *See, e.g.*, Travis Bradford, *Three Regulatory Models That Could Help Utilities Embrace the Future*, PROMETHEUS INST. (Sept. 17, 2013), http://prometheus.org/2013/09/17/three-regulatory-models-that-could-help-utilities-embrace-the-future/.

technology,[5] but that severely mischaracterizes the problem facing electric utilities and underestimates its impact. Even a notion like "big bang disruption,"[6] which combines technological and business innovation, is incomplete. *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.* Disruptive competition facing electric utilities involves the entry of new ideas and actors in all of these sectors, calling into question basic assumptions in ways that can fundamentally transform market structure.

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, which should be expected to bring more new ideas, actors, and technological breakthroughs. Utilities are not, by definition, unable to ride that wave, but doing so requires some dramatic strategic shifts to which they are not accustomed. Conventional strategies for managing competition fail to suffice, and failure to adapt in a proactive and timely manner can produce dire results for affected firms. Indeed, successful adaptation in these circumstances must be anticipatory, not merely responsive.

Strategies for recognizing the need for change, leading change, and achieving thriving outcomes can differ somewhat between private and public sector institutions because of guiding missions, statutory obligations, incentive structures, prevailing cultures, opportunities for or constraints on experimentation, and, frankly, differing societal risks associated with failure.[7] Electric utilities, as quasi-public institutions, share characteristics with, and can learn lessons from, both private and public sector experiments but face some unique considerations, which we examine through three lenses. First, we review the evidence driving adaptation and assess how utilities are thus far rising to opportunities and threats.[8] Second, we identify the special vulnerabilities of

5. PETER KIND, EDISON ELEC. INST., DISRUPTIVE CHALLENGES: FINANCIAL IMPLICATIONS AND STRATEGIC RESPONSES TO A CHANGING RETAIL ELECTRIC BUSINESS 3-5 (2013), *available at* http://www.eei.org/ourissues/finance/Documents/disruptivechallenges.pdf; s*ee, e.g.*, Michael T. Newsome, *The Challenge of Disruptive Competition*, IN$IGHT (Zachary Scott Inv. Bankers, Seattle, Wash.), Winter 2013, at 1, *available at* http://www.zacharyscott.com/insight/corporate-finance/challenge-of-disruptive-competition.aspx.; *see generally* MCKINSEY GLOBAL INST., DISRUPTIVE TECHNOLOGIES: ADVANCES THAT WILL TRANSFORM LIFE, BUSINESS, AND THE GLOBAL ECONOMY (2013), *available at* http://www.mckinsey.com/~/media/McKinsey/dotcom/Insights%20and%20pubs/MGI/Research/Technology%20and%20Innovation/Disruptive%20technologies/MGI_Disruptive_technologies_Full_report_May2013.ashx (including solar energy as one of these potentially market changing technologies).

6. Larry Downes & Paul F. Nunes, *Big-Bang Disruption*, HARV. BUS. REV., Mar. 2013, at 49-50.

7. There is substantial attention to strategic management and organizational change in the business literature and on generally leading change in either business or public administration contexts, but our point here is to highlight the uniquely part-public, part-private character of utilities and its significance to the task. *See, e.g.*, Paul C. Nutt, *Comparing Public and Private Sector Decision-Making Practices*, 16 J. PUB. ADMIN. RES. & THEORY 289 (2006) (discussing several factors contributing to the differences between public and private entities in a specific case).

8. *Infra* Part II.

utilities as regulated monopolies facing disruptive competition.[9] Third, we consider how utilities might effectively adapt to emerging conditions.[10]

Our analysis suggests that utilities, in their current form, may be ill-suited to meet emerging demands on the energy sector but that they retain substantial assets that could be employed as transformative factors in a system transition. However, a response emphasizing short-run tactics aimed at protecting the legacy utility model might perversely increase the risks of a death spiral by ignoring the vulnerabilities of the legacy model and squandering critical assets that are required for successful adaption.

II. EVALUATING THE EVIDENCE DRIVING ADAPTATION

Since 2006, solar installations in the United States have increased by 1600%,[11] and the overall market is expected to grow by a factor of ten between 2010 and 2016.[12] The rate of new rooftop solar installations jumped from one every eighty minutes in 2006 to one every four minutes in 2013, and the rate is still accelerating.[13] In addition to residential systems, distributed solar installations are also on the rise atop visible, well-known commercial establishments (Figure 1).[14] The new prevalence of solar photovoltaic (PV) installations shifts the common perception of solar energy from being a luxury, niche, or even fringe product to an increasingly mainstream, commercially viable option within the reach of many and already being embraced by Fortune 500 companies.[15]

The ascendance of solar energy is part of a broader shift in focus in power markets. Renewable energy is the fastest-growing source of power worldwide, predicted to account for nearly half of new electric power by 2018, ranking second only to coal,[16] and for 8% of the total energy mix.[17] "As global renewable electricity generation expands in absolute terms, it is expected to surpass that from natural gas and double that from nuclear power by 2016," becoming the "most important global electricity source after coal."[18]

9. *Infra* Part III.

10. *Infra* Part IX.

11. *Solar Investment Tax Credit (ITC)*, SOLAR ENERGY INDUSTRY ASS'N, http://www.seia.org/policy/finance-tax/solar-investment-tax-credit (last visited Jan. 18, 2014).

12. Stephen Lacey, *A Solar System Is Installed in the US Every 4 Minutes*, GREENTECH SOLAR (Aug. 19, 2013), http://www.greentechmedia.com/articles/read/america-installs-a-solar-system-every-four-minutes; *see also* INT'L ENERGY AGENCY, RENEWABLE ENERGY MEDIUM-TERM MARKET REPORT 2013: MARKET TRENDS AND PROJECTIONS TO 2018 (2013), *available at* http://www.iea.org/Textbase/npsum/MTrenew2013SUM.pdf.

13. Lacey, *supra* note 12.

14. Rebecca Smith & Cassandra Sweet, *Companies Unplug from the Electric Grid, Delivering a Jolt to Utilities*, WALL ST. J. (Sept. 17, 2013, 11:05 PM), http://online.wsj.com/news/articles/.

15. *Id.*

16. INT'L ENERGY AGENCY, *supra* note 12, at 3.

17. *Id.*; Press Release, Int'l Energy Agency, Renewables to Surpass Gas by 2016 in the Global Power Mix (June 26, 2013), *available at* http://www.iea.org/newsroomandevents/pressreleases/2013/june/name,39156,en.html.

18. INT'L ENERGY AGENCY, *supra* note 12, at 3.

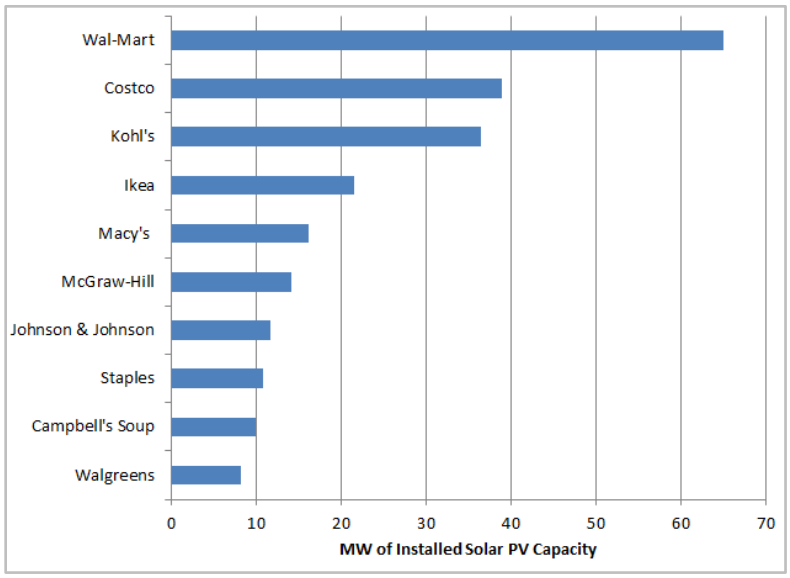

Figure 1: Commercial entities add solar capacity.[19]

These statistics obscure the fact that, while global growth forecasts include all renewable sources and while utility-scale solar capacity continues to grow in the United States, distributed residential installations became the fastest growing market segment in 2012 with a 61% growth rate; furthermore, this growth was enabled by new private leasing opportunities, not through the actions of utilities.[20] By as early as 2016, installed distributed solar PV capacity in the United States could reach thirty gigawatts (GW).[21] If that forecast is on track, distributed solar generation will have increased from less than one GW in 2010[22] to the equivalent of nearly one-third of the nuclear generating capacity in the United States in less than a decade.[23]

These forecasts are based upon expectations of current and reasonably foreseeable capabilities, not upon those that could yet emerge in an unpredictable fashion. Investments in renewable energy technologies and businesses remain

19. Smith & Sweet, *supra* note 14 (presenting data compiled by the Solar Energy Industries Association).

20. LARRY SHERWOOD, INTERSTATE RENEWABLE ENERGY COUNCIL, U.S. SOLAR MARKET TRENDS 2012, at 10 (2013), *available at* http://www.irecusa.org/wp-content/uploads/2013/07/Solar-Report-Final-July-2013-1.pdf; *see also* Katherine Tweed, *Solar Leasing Gains Momentum, Costs to Federal Taxpayers Fall*, GREENTECH SOLAR (July 24, 2013), http://www.greentechmedia.com/articles/read/Solar-Leasing-Gains-Costs-to-Federal-Taxpayers-Falls.

21. Giles Parkinson, *Deutsche Bank Says US Solar Boom to Reach 50GW by 2016*, RENEW ECON. (Sept. 4, 2013), http://reneweconomy.com.au/2013/deutsche-bank-says-us-solar-boom-to-reach-50gw-by-2016-18298.

22. *Id.*

23. ENERGY INFO. ADMIN., AEO2014 EARLY RELEASE OVERVIEW 14 (2013), *available at* http://www.eia.gov/forecasts/aeo/er/pdf/0383er(2014).pdf (reporting that nuclear generating capacity in 2012 was 102 GW).

high despite uncertainties in policy incentives, indicating optimism and dynamism in the marketplace.[24] Technology costs for wind and solar PV generation have steadily declined, reaching parity with conventional energy resources in certain markets. From a slow and uncertain start in the 1970s, PV systems present increasingly viable alternatives to conventional retail electric utility service in parts of the United States,[25] 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.[26]

Changes can be incremental, but they can also be explosively transformative or some unpredictable combination of both. The availability of technology itself is insufficient to explain current trends. Associated social, economic, cultural, and policy factors have both supported and are supported by technological advances in solar installations and together are beginning to reshape energy markets along with social expectations of the entire energy sector. Utilities are not the only entities affected, but these trends pose a threat to the prevailing utility business model.[27]

The emerging preferences and innovations mentioned above have already changed utility obligations in a significant way. Between 1997 and 2006, twenty-two states adopted a renewable portfolio standard (RPS), a regulatory requirement that utilities generate some percentage of their energy supplies from renewable sources, like wind, solar, and biomass.[28] Currently, twenty-nine states plus the District of Columbia have an RPS in place, and eight more have established renewable energy goals, as shown in Figure 2.[29] State and national legislation has established and reinforced related aspirational targets as a matter of policy,[30] and regional energy markets have arisen to support trading of mixed energy resources across large geographic areas.[31]

24. INT'L ENERGY AGENCY, *supra* note 12, at 4.

25. *See, e.g.*, BLACK & VEATCH, 2013 STRATEGIC DIRECTIONS IN THE U.S. ELECTRIC UTILITY INDUSTRY 42-43 (2013), *available at* http://bv.com/reports/2013-electric-utility-report.

26. Stefan Reichelstein & Michael Yorston, *The Prospects for Cost Competitive Solar PV Power*, 55 ENERGY POL'Y 117, 126 (2013).

27. KIND, *supra* note 5, at 6-7, 11-13; Beth Gardiner, *Bypassing the Power Grid*, N.Y. TIMES (Oct. 8, 2013), http://www.nytimes.com/2013/10/09/business/energy-environment/bypassing-the-power-grid.html?pagewanted=2&src=recg&pagewanted=print.

28. BARRY RABE, PEW CTR. ON GLOBAL CLIMATE CHANGE, RACE TO THE TOP: THE EXPANDING ROLE OF U.S. STATE RENEWABLE PORTFOLIO STANDARDS 1-3 (2006), *available at* http://www.c2es.org/docUploads/RPSReportFinal.pdf.

29. *Renewable Portfolio Standard Policies*, DSIRE, http://www.dsireusa.org/documents//RPS_map.pdf (last visited Feb. 15, 2014) (summary map as of March 2013).

30. At the national level, the Energy Policy Act of 2005 (EPAct), the Energy Independence and Security Act of 2007 (EISA), and both the 2002 and 2008 Farm Bills established policy targets related to renewable energy, including wind, solar, and biofuels. Energy Policy Act of 2005, 42 U.S.C. §§ 15801-16538 (2012) (mandating annually increasing volumes of renewable energy to be used in the fuel market); Energy Independence and Security Act of 2007, 42 U.S.C. §§ 17001-17386 (2012) (increasing and expanding the volumes required under the EPAct); Farm Security and Rural Investment Act of 2002, Pub. L. 107-171, 116 Stat. 134 (specifying amounts of funding to be used to promote development of agricultural-based renewable energy products); Food, Conservation, and Energy Act of 2008, Pub. L. 110-246, 122 Stat. 1651 (allocating funding as in the 2002 Farm Bill to promote to goals of the EISA). *See also* RANDY SCHNEPF, CONG. RESEARCH SERV., RENEWABLE ENERGY PROGRAMS AND THE FARM BILL: STATUS AND ISSUES (2011).

Policies for energy generally align with the overarching policy mood and goals of any given era; these include shifting attention to and interpretation of issues like economic development, security, equity and justice, geopolitics, sustainability, and federal-state authority.[32] Historically, energy policies were deemed biased toward gas and coal, putting solar energy at a substantial disadvantage.[33] In more recent years, policies supporting fossil fuels have remained largely in place while policies supporting an accelerated deployment of renewable energy have become more active.[34] In the United States, state energy policies exert significant influence on national trends, and achievement of renewable energy targets has proceeded apace, with some states meeting and even exceeding their targets before the designated date.[35] Some utilities have developed reputations as creative leaders in this effort, but others have acquired a reputation for reluctant compliance with social preferences for renewable energy and policy calls for accelerated deployment.[36]

Just as technological advancements do not fully explain the surge in distributed solar installations, it is an over-simplification to attribute recent dramatic growth or the pace of growth solely to policy incentives. Public attitudes have consistently favored renewable energy sources, especially wind and solar, even while opportunities for consumer choice remain limited and despite debate regarding implementation.[37] This long-standing trend suggests a

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As an example of state legislation, Iowa lawmakers have stated: "It is the policy of this state to encourage the development of alternate energy production facilities and small hydro facilities in order to conserve our finite and expensive energy resources and to provide for their most efficient use." IOWA CODE § 476.41 (2013), *cited in* SZ Enters., LLC v. Iowa Utils. Bd., No. CVCV009166, slip op. at 12, 23 (Iowa Dist. Ct. Mar. 29, 2013).

31. *Tracking Systems*, ENVTL. TRACKING NETWORK N. AM., http://www.etnna.org/learn.html (last visited Feb. 16, 2014).

32. *See generally* NAT'L ECON. COUNCIL, COUNCIL OF ECON. ADVISERS & OFFICE OF SCI. & TECH. POLICY, A STRATEGY FOR AMERICAN INNOVATION: SECURING OUR ECONOMIC GROWTH AND PROSPERITY 2, 25-26, 54 (2011), *available at* http://www.whitehouse.gov/sites/default/files/uploads/InnovationStrategy.pdf; DAVID HOWARD DAVIS, ENERGY POLITICS (4th ed. 1993); MICHAEL T. KLARE, BLOOD AND OIL (Metro. Books 2004); TED NORDHAUS & MICHAEL SHELLENBERGER, BREAK THROUGH: FROM THE DEATH OF ENVIRONMENTALISM TO THE POLITICS OF POSSIBILITY (Houghton Mifflin 2007); WALTER A. ROSENBAUM, ENERGY, POLITICS, AND PUBLIC POLICY (1981); Clark A. Miller, *Energy Justice*, CAIRO REV. GLOBAL AFF., http://www.aucegypt.edu/gapp/cairoreview/pages/articledetails.aspx?aid=164 (last visited Apr. 4, 2014).

33. *E.g.*, Deborah Lawrence Rogers, *Coal Displacing Nat Gas...Already*, ENERGY POLICY FORUM (Oct. 30, 2013), http://energypolicyforum.org/2013/10/30/coal-displacing-nat-gas-already/.

34. Joshua P. Fershee, *Promoting an All of the Above Approach or Pushing (Oil) Addiction and Abuse?: The Curious Role of Energy Subsidies and Mandates in U.S. Energy Policy*, ENVTL. & ENERGY L. & POL'Y J. 125 (2012).

35. *Most States Have Renewable Portfolio Standards*, ENERGY INFO. ADMIN. (Feb. 3, 2012), http://www.eia.gov/todayinenergy/detail.cfm?id=4850; *see also, e.g.*, Naureen S. Malik, *California Seen Exceeding Renewable Energy Generation Target*, BUS. WK. (Nov. 7, 2013), http://www.businessweek.com/news/2013-11-07/california-seen-exceeding-renewable-energy-generation-target.

36. *See, e.g.*, Umair Irfan, *Renewable Energy: Solar, Utility Companies Clash over Changes to Net Metering*, E&E PUBLISHING, LLC (Sept. 3, 2013), http://www.eenews.net/stories/1059986606.

37. Barbara Farhar-Pilgrim, *Surveys: What They Can and Cannot Tell Energy Policymakers*, *in* ENERGY AND MATERIAL RESOURCES: ATTITUDES, VALUES AND PUBLIC POLICY 15 (David Conn ed., 1983); Stephen Ansolabehere & David M. Konisky, *Public Attitudes Toward Construction of New Power Plants*, 73

latent demand that can be readily mobilized by new opportunities or motivating factors. This may partly explain why efforts to significantly roll back policies aimed at accelerating renewables have, thus far, failed to gain traction and have generated public disapproval.[38]

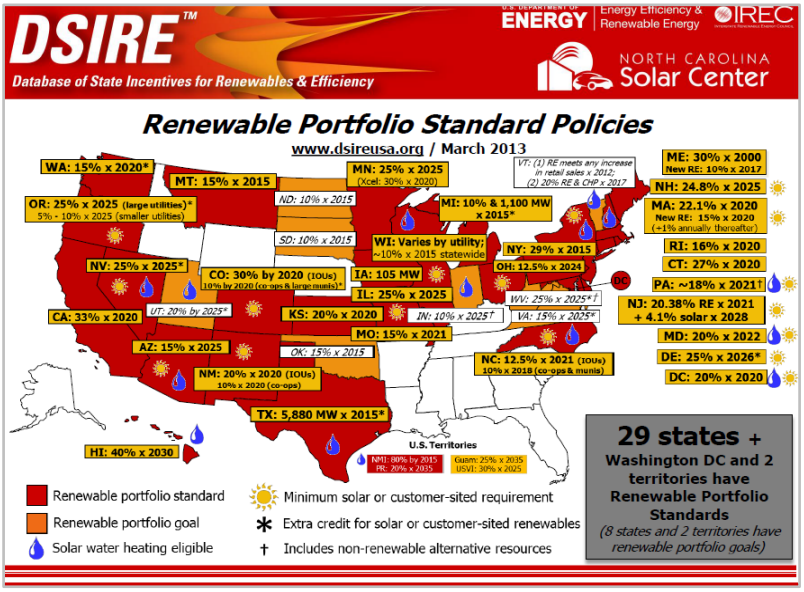

Figure 2: Map of State Renewable Portfolio Standards[39]

We do not maintain that contextual social factors dominate, but neither are they irrelevant. They are plausibly among the constellation of factors, in addition to cost, that go into consumer choices as options expand. It is not required that all consumers consider these factors—just that enough do to shift the historical market dynamics upon which the legacy utility business model depends.

The critical strategic question for utilities during this time of flux is not whether scenarios that pose the highest risk to their survival currently exist but whether quantitative and qualitative evidence suggests that these highest risk scenarios are plausible. If they are plausible, then pursuing strategies that require customers to pay higher fixed charges, reduce their choices, or poorly address their preferences will likely encourage the development of non-grid

PUB. OPINION Q. 566 (2009); Ian H. Rowlands, Paul Parker & Daniel Scott, *Consumer Perceptions of "Green Power,"* 19 J. CONSUMER MARKETING 112 (2002); Jeff St. John, *Consumers Want Green Energy from the Utility If the Price Is Right*, GREENTECH SOLAR (Nov. 14, 2013), http://www.greentechmedia.com/articles/read/Consumers-Want-Green-Energy-From-the-Utility-If-the-Price-is-Right.

38. *See, e.g.*, D. A. Barber, *The Battle for a Solar Arizona*, TUCSON WKLY. (Sept. 26, 2013), http://www.tucsonweekly.com/tucson/the-battle-for-a-solar-arizona/Content?oid=3880921; Mileka Lincoln, *Lawmakers Call Hearing to Discuss HECO's Solar Policy Changes*, HAW. NEWS NOW (Oct. 15, 2013), http://www.hawaiinewsnow.com/story/23689275/lawmakers-call-hearing-to-discuss-hecos-solar-policy-changes.

39. *Renewable Portfolio Standard Policies*, *supra* note 29.

alternatives. This shift in thinking substantially deviates from conventional utility culture, but it is fully consistent with the utilities' primary aim of aligning energy provision with financial viability.

III. THE SIGNIFICANCE OF DISRUPTIVE COMPETITION FOR REGULATED MONOPOLIES

Even though expansion of renewable energy is overall deemed positive and, indeed, a striking policy success as well as a potential pathway for business opportunities and economic growth,[40] the scope and pace of change have begun to exceed the capacity of electric utilities to adapt, both technologically and financially. Increasing the share of renewables in the supply portfolio brings the technical challenge of incorporating the inherent spatial and temporal variability of those resources into systems that were designed around the unique characteristics of fossil fuel feedstocks like coal and natural gas.[41] Moreover, the utility business model, in which financial viability is based on economies of scale and long-term cost recovery of investments in physical infrastructure,[42] makes utilities reluctant to abandon infrastructure with decades of remaining useful life. This reluctance is reinforced by existing regulatory controls, creating a tension between the past and the future that is unlikely to be resolved by perpetuating traditional practices. We argue that the market for electric power is, indeed, undergoing changes that are potentially paradigm-shifting and that these changes present current providers with profound risks and challenges as well as with new opportunities.

The origin of utilities as centralized, regulated monopolies corresponded to societal needs and goals at the time, not to some absolute definition of how things should or must be. The strategic choices which utilities and their competitors make while responding to and even anticipating new needs and goals will differentiate leaders from laggards, and may even determine survivors and casualties. The substantive factors driving change in the sector suggest that the overall momentum behind current trends will continue and may intensify.

40. RABE, *supra* note 28, at 6; *see also* NAT'L ECON. COUNCIL, COUNCIL OF ECON. ADVISERS & OFFICE OF SCI. & TECH. POLICY, *supra* note 32; GEORGE HORNSBY & MILDRED WARNER, ICMA CTR. FOR SUSTAINABLE COMTYS., DEFYING THE ODDS: SUSTAINABILITY IN SMALL AND RURAL PLACES (2014), *available at* http://icma.org/en/icma/knowledge_network/documents/kn/Document/305454/Defying_the_Odds_Sustainability_in_Small_and_Rural_Places (See the report generally but especially note the case of Columbus, Wisconsin, on pages 2-4.); Felicity Carus, *How the National Football League Became a Champion of Sustainability*, GUARDIAN (Apr. 26, 2013, 11:38 AM), http://www.theguardian.com/sustainable-business/nfl-champion-sustainability; Peter Kelly-Detwiler, *IKEA's Aggressive Approach to Sustainability Creates Enormous Business Opportunities*, FORBES (Feb. 7, 2014, 8:40 AM), http://www.forbes.com/sites/peterdetwiler/2014/02/07/ikeas-aggressive-approach-to-sustainability-creates-enormous-business-opportunities/.

41. *E.g.*, Ben Kellison, *How Solar Breaks Traditional Planning on the Distribution Grid*, GREENTECH SOLAR (Mar. 7, 2014), http://www.greentechmedia.com/articles/read/how-solar-breaks-traditional-feeder-planning-and-engineering; Melissa C. Lott, *Integrating Renewables into the U.S. Electric Grid*, SCI. AM. (Aug. 24, 2011), http://blogs.scientificamerican.com/plugged-in/2011/08/24/integrating-renewables-into-the-u-s-electric-grid-a-discussion-with-dr-paul-denholm/.

42. *See generally* ALFRED E. KAHN, 1 THE ECONOMICS OF REGULATION (1988).

Therefore, strategies that depend on reversing or even appreciably slowing this momentum can place utilities that adopt them at significant risk.

No strategies can, or should, eliminate risk,[43] but theory, history, and empirical evidence all suggest that some strategic choices will manage disruptive competition more effectively than others. 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.[44] In Germany, where renewables have penetrated deeply into the energy system and utilities are exhibiting classic symptoms of a "structural crisis" or death spiral, some executives attribute the depth of their plight to the strategic mistake of waiting too long to enter the renewables market and failing to adopt a service-oriented business focus.[45]

Focusing on cost recovery may introduce higher risk under disruptive competitive conditions, particularly those involving distributed systems, on three fronts. First, it requires successive upward recalibration of customer rates as system costs remain largely fixed while electricity use shifts from the grid to distributed systems.[46] Second, it encourages utilities to defer corporate adaptation unless a deep crisis forces the issue. Third, it encourages them to take actions that slow innovation either by competitors or in the policy domain. Customer backlash, loss of regulatory support, high opportunity costs, and institutional brittleness to external shocks[47] are all foreseeable byproducts that put utilities at greater risk. A singular focus on cost recovery, while understandable in a historic regulatory context, undermines natural strategic assets and encourages a non-innovating culture at a time when both are most needed to navigate uncertainties.

One strand of the current debate argues that these risks are low because electric utilities are not like other industries and that no foreseeable innovations can realistically eliminate the need for the centralized grid or allow customers to defect from the current system in large numbers. In this view, the rooftop solar segment must remain interconnected with the grid and accommodate the cost

43. Actions taken *solely* to reduce risk do not increase the value of the firm. RICHARD A. BREALEY, STEWART C. MYERS & FRANKLIN ALLEN, PRINCIPLES OF CORPORATE FINANCE 721 (2006).

44. *See also* Kelly-Detwiler, *supra* note 40.

45. Stephen Lacey, *This Is What the Utility Death Spiral Looks Like*, GREENTECH SOLAR (Mar. 4, 2014), http://www.greentechmedia.com/articles/read/this-is-what-the-utility-death-spiral-looks-like.

46. This is true even under the high-fixed charge rate design if the utility loses not only load but customers as well.

47. The potential for institutional brittleness is not restricted to electric utilities and can be observed in other organizations with strong historical traditions that, shaped by mutually reinforcing managerial, scientific or technical, and cultural norms that efficiently support continuity, can undermine the capacity to nimbly adapt to destabilizing contextual trends. Elisabeth A. Graffy Commentary, *Compact Adaptation and Institutional Risks of Reform*, 71 PUB. ADMIN. REV. 42 (2011).

requirements of maintaining the system largely as it exists today. Another strand of debate moves that the existing legacy system cannot meet new and emerging challenges in the energy sector and that new systems must be created. A third strand in the debate suggests that technological and business innovations in the sector will eventually inundate and replace or possibly just work around the old utility system.[48] In all cases, a transition is envisioned, but the nature of that transition and its implications for customers and system characteristics may differ widely.

Continued reliance by utilities on cost recovery strategies aligns with the first strand of argument and depends upon regulators' approval of rate designs and other protections consistent with that notion. However, a pattern of decisions by courts, commissions, and legislatures indicates that these outcomes cannot be assumed. For example, an Iowa district court overturned a regulatory decision to prohibit a solar entrepreneur from operating in a utility's franchise (service) area, finding that the private entity was not a utility and was not competing with the utility because its purpose was to help consumers reduce electricity purchases rather than provide alternative power.[49] Furthermore, the court observed that innovations led by the solar entrepreneur were consistent with broader state policies advocating reliance on renewable energy resources.[50] Whether this decision stands or is itself overturned by a higher court, this new logic has crept into the public and policy discourse beyond Iowa. The Iowa decision shows that an absence of legally-defined competition does not preclude de facto market competition in novel forms.

Regulatory decisions at the commission level also increasingly reflect the complexity of the issues. The Wisconsin Public Service Commission, historically viewed as very supportive of utilities,[51] declined to act on a proposal that would tie monthly customer charges to the utility's underlying cost structure.[52] Regulators in Arizona rejected a utility's proposed $50 to $100 monthly surcharge designed to recover fixed costs from distributed solar customers, approving instead one that in effect amounts to only about $5 per month.[53] The California Legislature set the upper bound on residential monthly

48. *E.g.*, Gardiner, *supra* note 27.

49. *E.g.*, SZ Enters., LLC v. Iowa Utils. Bd., No. CVCV009166, slip op. at 5, 13, 19, 23 (Iowa Dist. Ct. Mar. 29, 2013); *see also* Kari Lydersen, *Court Sides with Iowa Solar Installer in Dispute with Utility*, MIDWEST ENERGY NEWS (Apr. 12, 2013), http://www.midwestenergynews.com/2013/04/12/court-sides-with-iowa-solar-installer-in-dispute-with-utility/.

50. *SZ Enters.*, No. CVCV009166, at 22-23.

51. Wisconsin utilities traditionally have had among the highest bond ratings in the country, attributable in part to what the rating agencies describe as "Wisconsin's credit supportive regulatory environment." *Announcement: Moody's Disclosures on Credit Ratings of Madison Gas and Electric Company*, MOODY'S INVESTORS SERV. (Mar. 2, 2012), https://www.moodys.com/research/Moodys-Disclosures-on-Credit-Ratings-of-Madison-Gas-and-Electric—PR_239442.

52. Application of Madison Gas Electric Company for Authority to Change Electric and Natural Gas Rates, No. 3270-UR-118, at 31 (Wis. P.S.C. Dec. 14, 2012).

53. Luige del Puerto & Evan Wyloge, *Energy Regulators Approve Smaller Solar Surcharge*, ARIZ. CAPITOL TIMES (Nov. 14, 2013, 5:48 PM), http://azcapitoltimes.com/news/2013/11/14/arizona-energy-regulators-approve-smaller-solar-net-metering-surcharge/.

fixed charges at $10.[54] Ongoing robust debate about utility cost recovery and regulatory reform should be expected given the significance of the transition underway.

The push for utilities to accommodate renewable resources goes beyond ratemaking to general policy direction, as signaled in Iowa and stated explicitly elsewhere. The Georgia Public Service Commission expanded the requirement for the state's largest electric utility to rely on solar resources, dismissing arguments that this would increase customer energy costs and reduce reliability, stating that reliance on solar over coal or natural gas was the best strategy to meet future energy needs in a "businesslike fashion and try to stay ahead of the curve."[55] In Hawaii, the adoption of distributed solar PV systems reached significant levels, causing the utility to implement policies that restricted further solar deployment.[56] This, in turn, led the legislature to hold hearings and to ensure that restrictions would be temporary.[57] The Chair of the Hawaii House Committee on Energy and Environmental Protection suggested that the inability of the utility to modify its system to handle more distributed solar resources should not delay the state's policy goal of meeting 40% of its electric power needs through renewable generation by the year 2030.[58] The message to utilities was direct: If your systems cannot handle larger volumes of solar distributed generation, then work with the solar providers to find solutions.

Our point is not that renewable innovations and distributed (rooftop) solar, in particular, are poised to wash away a century-old, well-established utility infrastructure and governance system. Rather, we propose that the surge in rooftop solar installations should be more broadly viewed as a leading indicator of dynamic innovations in the energy sector that will likely catalyze unpredictable forms of disruptive competition for utilities. By analogy, the music industry viewed the peer-to-peer song-sharing software, Napster, as a conventional threat rather than as the leading edge of a wave of disruptive competition that challenged the fundamental business model for distributing music.[59] By doing so, the industry became more vulnerable to the market transformation subsequently generated by iTunes.[60]

How utilities diagnose and respond to emerging challenges matters a great deal. Treating solar leasing entrepreneurs as conventional competitors or taking actions that appear to thwart the preferences and needs of customers not only fails to be a legal slam-dunk but leads more generally to a sort of blind spot

54. *AB 327's Solar Threat*, CALI. SOLAR ENERGY INDUS. ASS'N, http://www.calseia.org/ab-327-factsheet (last visited Feb. 16, 2014).

55. Claire Thompson, *Tea Partiers Fight over Solar Power in Georgia, and the Solar Fans Win*, GRIST (July 12, 2013, 6:13 PM), http://grist.org/news/tea-partiers-fight-over-solar-power-in-georgia-and-the-solar-fans-win/.

56. Nichola Groom, *Analysis: Clouds over Hawaii's Rooftop Solar Growth Hint at U.S. Battle*, REUTERS (Dec. 16, 2013, 7:28 AM), http://www.reuters.com/article/2013/12/16/us-solar-hawaii-analysis-idUSBRE9BF0I120131216.

57. Lincoln, *supra* note 41.

58. *Id.*

59. Downes & Nunes, *supra* note 6, at 49-50.

60. *Id.*

that exposes the utilities to even greater risks in policy, regulatory, and market spheres.

The suggestion that utilities should rely mainly on legal remedies to stave off competition or on regulators to redesign rates or make other tariff changes to avoid stranded costs constitutes a doubling down on conventional cost-recovery tactics[61] at a time when inventive adaptation and even creative leadership may be required. Neither regulators nor courts have an absolute obligation to preserve the solvency of utilities, as we shall shortly discuss in some detail, making them unable to render utilities any protection under certain conditions of extreme risk and making conventional cost-recovery, therefore, possibly self-defeating.[62] In fact, if the solar surge is indeed a leading indicator of this kind of risk, then a doubling down on conventional strategies could be the worst thing utilities could do. It is precisely the opposite of what is called for if substantial portions of customer entire load could plausibly be in play in the competitive market, as would be the case if hybrid solar PV-storage systems become available. If a utility wants to retain customers who have a full set of competitive options, then it will need to make it inexpensive, not expensive, for customers to remain connected to the grid. Furthermore, utilities may need to accommodate other preferences besides cost. The key to surviving the unique demands of disruptive competition is to execute a well-timed shift toward the customer with a strategy of value creation, which requires developing new products or services that better meet customer preferences,[63] rather than becoming entrenched in a regulatory battle over cost recovery.

This shift in strategy departs from conventional utility culture and may be perceived to bring its own risks. Indeed, any investment in new products and services may be viewed as detracting from existing investments, and targeting those new investments can be difficult when faced with several possible, but uncertain, future scenarios.[64] In addition, utilities must consider the risks posed by creating significant incentives for competition on the basis of cost, value, or both. If utilities make it expensive and onerous for a customer to remain connected to the grid, entrepreneurs will have a great incentive to help customers sever that connection.

Last but not least, investor-owned utilities may view shareholders as a barrier to adopting a value-creation strategy, but this is not necessarily the case. Shareholders are beginning to advocate for forward-looking thinking to protect their investments and their long-term interests.[65] Investors in fossil-fuel companies have stated a dual concern for the value of their investments in a time of flux and the implications of their investments for climate change, resulting in

61. KIND, *supra* note 5, at 3.

62. *See* discussion *infra* Part VI.

63. *See, e.g.*, KIND, *supra* note 5, at 6-7 (discussing Kodak's failure to adapt when the traditional film industry transitioned to digital, challenges to the U.S. Postal Service from advances in digital communications, and AT&T's adept shift from wired to wireless telephone services).

64. Downes & Nunes, *supra* note 6, at 49.

65. Todd Woody, *Climate Change Could Put $6 Trillion in Fossil Fuel Reserves At Risk*, QUARTZ (Oct. 26, 2013), http://qz.com/139907/climate-change-could-put-6-trillion-in-fossil-fuel-reserves-at-risk/.

a call to place "carbon asset risk on the agenda of the mainstream financial industry."[66]

The significance of choosing between cost recovery and value creation strategies need not be a stark, either-or proposition, at least not at the outset.[67] However, the dominant orientation toward cost- or value-oriented strategies will shape organizational culture and choices, influencing attitudes toward risk and even the types of risks organizations are likely to face. In the case of utilities, risk aversion and historical regulatory practices that drive decisions toward cost accounting and recovering stranded costs may be well-suited to conventional risks in a stable regulatory environment but not to novel, disruptive risks. An inability to shift toward value creation in the presence of disruptive competition could result in greater long-term risks, large opportunity costs, and poor resilience to periodic shocks.

Strategic decision-making involves both the initial management choice between adopting value creation or cost recovery as the guiding theme and the manner in which that initial choice is carried out in myriad decisions and actions over time. These choice pathways, not the external threats themselves, ultimately determine the resilience of utilities in the new environment.

There is no plausible scenario involving trajectories of innovation in the energy sector that enables utilities to avoid making a strategic choice between focusing on building value or recovering cost. The only scenario in which this would not be required, or at least in which the difference might not be consequential, is a return to the status quo prior to 2006. That scenario is, however, less plausible with available evidence than one in which hybrid solar-storage becomes commercially available.

IV. THINKING STRATEGICALLY AND OPPORTUNISTICALLY UNDER DISRUPTIVE COMPETITION

Electric utilities are no strangers to competition, but disruptive competition poses a set of challenges not commonly seen and, therefore, not accommodated in standard operating procedure. The best way to understand how this state of affairs could exist and why new strategies are required is illustrated by the historical and legal context of utilities, layered into a strategic risk-return roadmap. The result is a robust diagnostic tool for differentiating between conventional and disruptive competition dynamics and, thus, identifying the needed balance of cost-recovery versus value creation strategies.

Electric utilities connected by regional, centralized transmission systems emerged in the early 1900s as a governance innovation that could best meet the public policy goal of providing low cost, reliable power to communities nationwide.[68] The then-emerging energy production and transmission systems

66. *Id.*

67. Corporations cannot pursue multiple strategies simultaneously if they are to create a culture that breeds success. MICHAEL E. PORTER, COMPETITIVE STRATEGY 42 (1980).

68. Service to rural areas did not evolve at the same time. By 1930, 90% of urban dwellers had electricity service while 90% of rural homes did not. *Rural Electrification*, NEW DEAL NETWORK, http://newdeal.feri.org/tva/tva10.htm (last visited Feb. 28, 2014). Congress created the Rural Electrification

lent themselves to physical centralization of generation, highly controlled transmission, and concentrated ownership by natural monopolies and associated market and policy systems. These systems co-evolved, first at municipal and then state and regional scales, to support the stability of that system, using regulation to enhance efficiency and access to capital while protecting against the potential for market exploitation and corruption.[69] For the most part, citizens throughout the United States have benefitted from this model and utilities have generally thrived.

Within this regulated environment, utilities enjoyed the protection of franchise or service areas, but competition in electric utility markets has taken many forms over the decades nonetheless. For instance, gas utilities have attempted to capture electric utilities' space and water heating loads. The Public Utilities Regulatory Policy Act (PURPA)[70] allowed independent power producers to enter the market for generating power. Some states restructured their generation markets, removing regulatory protections altogether at that level.[71] While such competition posed certain challenges for regulated electric utilities, no serious challenge has occurred in one segment of the market—electric distribution.[72]

In recent decades, elevated attention has come to focus on the vulnerabilities of a complex and aging grid, the availability and sustainability of fossil-fuel-based generation, the security of centralized infrastructure to attack, and the resilience of utility systems to extreme storms. These concerns prompted incremental innovation in the sector along several simultaneous tracks, including promoting aggressive conservation and efficiency programs,[73] upgrading to a so-called "smart" grid, exploring decentralized energy options, and instituting a range of policies aimed at accelerating adoption of renewable energy.[74] None of these aimed to fundamentally challenge the underlying utility model as much as to refine and adapt it. Whereas even solar leasing was initially designed to fit within the utility distribution network, hostility by utilities to this arrangement appears to be stimulating a ripple of innovations aimed at accelerating the potential for off-grid systems. For example, NRG Energy has

Administration with the express purpose of bringing electric service to those rural customers. *Id.* Even today, many rural customers are served by electric cooperatives, not the investor-owned or municipally-owned utilities that assembled the original grid. *History of Electric Co-ops*, NRECA, http://www.nreca.coop/about-electric-cooperatives/history-of-electric-co-ops/ (last visited Feb. 28, 2014).

69. Thomas P. Lyon & Nathan Wilson, *Capture or Contract? The Early Years of Electric Utility Regulation*, 42 J. REG. ECON. 225, 227-29 (2012); John L. Neufeld, *Corruption, Quasi-Rents, and the Regulation of Electric Utilities*, 68 J. ECON. HIST. 1059, 1059-61 (2008).

70. Public Utility Regulatory Policies Act of 1978, Pub. L. 95-617, 92 Stat. 3117 (codified as amended in scattered sections of 16 U.S.C.).

71. *See, e.g.*, *Status of Electricity Restructuring by State*, ENERGY INFO. ADMIN., http://www.eia.gov/electricity/policies/restructuring/restructure_elect.html (last visited Mar. 1, 2014).

72. KIND, *supra* note 5, at 7.

73. DAN YORK & MARTIN KUSHLER, AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., THE OLD MODEL ISN'T WORKING: CREATING THE ENERGY UTILITY FOR THE 21ST CENTURY (2011), *available at* https://www.aceee.org/files/pdf/white-paper/The_Old_Model_Isnt_Working.pdf.

74. INST. OF ELEC. & ELECS. ENG'RS USA, 2014 NATIONAL ENERGY POLICY RECOMMENDATIONS (2013), *available at* http://www.ieeeusa.org/policy/positions/IEEE-USA-NEPR-2014.pdf.

announced plans to market a hybrid natural gas-solar self-standing system, and Solar City plans to launch a storage backup system in 2015 that, if successful in resolving critical cost and convenience issues historically posed by batteries, may represent a tipping point.[75]

Regulation is not designed to forestall or prohibit disruptive competition from entering a market even where firms hold monopoly status but rather to foster sectoral stability under certain conditions. The regulated monopoly model can, somewhat counter-intuitively, make utilities perversely more vulnerable to disruptive competition precisely because such challenges are, by definition, relatively rare and adaptation requires a departure from standard operating procedures that are deeply ingrained and, while helpful for continuity, contrary to supporting rapid change.

Herein lies the vulnerability of regulated utilities. The model is designed to maintain institutional stability in order to uphold social welfare objectives (in the historical case of energy, for example, to ensure low cost, reliable service), not to uphold the welfare of utilities themselves. Historical precedent clearly shows that when emerging conditions create a critical tension between upholding social welfare objectives and upholding continuity of a utility for its own sake, courts will decisively favor social welfare objectives and markets play no favorites.[76] Indeed, neither regulators nor courts can ultimately protect regulated utilities from all competition, even when—perhaps especially when—the character of that competition challenges the viability of their fundamental business model.

The initial responses to disruptive competition by many, though not all, electric utilities are framed almost entirely by accounting concepts; these lead to tactics designed to recover historically-incurred fixed costs from customers rather than strategies to support long-term resilience.[77] There are some significant collateral impacts associated with such approaches, as already mentioned. Adopting a more customer-focused response to the solar PV threat early on may avoid some of these down-side risks and build on the opportunities presented by disruptive flux.

Research on organizational strategy and change management suggest that there are three strategies that lead to competitive success for any firm: overall cost leadership, differentiation, and focus.[78] Case studies across many industries and sectors demonstrate the universality of value creation as a principle for navigating uncertainty and especially for reversing downturns in organizational

75. Christopher Martin, *NRG and Exelon See Batteries Spurring Demand for Solar*, BLOOMBERG (Oct. 23, 2013, 11:01 AM), http://www.bloomberg.com/news/2013-10-23/nrg-and-exelon-see-batteries-spurring-demand-for-solar.html; Christopher Martin, *SolarCity Says Batteries Reduce Risk of Utility Backlash*, BLOOMBERG (June 26, 2013, 3:08 PM), http://www.bloomberg.com/news/2013-06-26/solarcity-says-batteries-reduce-risk-of-utility-backlash.html.

76. *Infra* Part VI.

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

78. PORTER, *supra* note 67, at 35.

fortunes.[79] "In business, streams of innovation make it possible to stay ahead of competition, by increasing the value delivered to customers."[80]

This research shows a strong empirical association between an organization's decline and management responses that fail to promote key cultural practices including honest appraisal of facts, open and frank communication, transparent performance metrics, and innovation throughout the organization—characteristics that are central to building the confidence and problem-solving capacities so crucial to navigating an adverse environment.[81] Signals that risk-exacerbating factors prevail in firm culture include denial, blame-shifting, and turf protection.[82]

Winning streaks and even engineering turnarounds under adversity tend to correspond with a strategic vision and sustained leadership that link financial integrity, customer service, and substantive innovation in products and services at many levels.[83] Operations that promote accountability, collaboration, and initiative for creative adaptation must accompany vision.[84] This connection between strategic vision and operations emphasizes the choice pathways previously mentioned. Success or failure becomes a cycle–respectively virtuous or vicious–which entire organizations participate in perpetuating.[85]

Responding successfully during challenging times, especially to reverse a sense of decline, requires visionary leadership that prioritizes positioning for long-term risks over short-term threats. Firms that are facing shocks to their viability must not only adapt to them but embrace them as inspiration to find a new winning trajectory. Most observers conclude that the competitive environment for electric power provision is daunting and that a new, strategic look at providing valued and value-added energy-related products and services is warranted.[86] However, even while acknowledging the need for a new strategic look, many utility analyses ultimately recommend a doubling down on enhanced cost recovery tactics instead of value creation strategies. Such recommendations reflect a deep internal contradiction between an assessment of facts and resistance to acknowledging the full scope of the risks faced. This inconsistency is encouraged by the historical institutional structure in which utilities operate, but it may represent a form of denial that will not serve utilities well because it assumes away as temporary the trends in technology development, business,

79. ROSABETH MOSS KANTER, CONFIDENCE: HOW WINNING STREAKS AND LOSING STREAKS BEGIN AND END (2004).

80. *Id.* at 340.

81. *Id.*; *see also* Rosabeth Moss Kanter, *Leadership and the Psychology of Turnarounds*, HARV. BUS. REV., June 2003, at 6-8.

82. Kanter, *supra* note 81, at 5-6.

83. *See generally id*.

84. *Id.* at 6.

85. *Id.* at 5-6.

86. *See* discussion *infra* Part III; *see also* ACCENTURE, THE NEW ENERGY CONSUMER: STRATEGIC PERSPECTIVES ON THE EVOLVING ENERGY MARKETPLACE (2011), *available at* http://www.accenture.com/SiteCollectionDocuments/PDF/Resources/Accenture_New_Energy_Consumer_Evolving_Marketplace.pdf.

policy, public preferences, and consumer demand that are aligned with continuing innovation. All signs point to this being a heroic assumption, at best.

A full strategic analysis is beyond the scope of this article, and it is not the intent. Our purpose here is to assess and explore the vulnerability that utilities face in the present market, which is in flux, and apply lessons from theory and history to envision some plausible scenarios for the future. In that context, utilities and regulators that hold fast to the historical utility cost-recovery model and pursue what appear to be risk reduction strategies aimed at restoring a golden age of stability are choosing a strategy that endangers longer term success.

Utilities in different regions and regulatory environments will experience the implications of innovation and competition differently, but all must remain alert to avoiding strategies that cut too dramatically against the momentum of change in the sector to be sustainable or that fail to take advantage of the opportunities embedded in the risks they face. Strenuous efforts to mitigate rather than innovate seem likely to increase vulnerabilities by generating public and customer backlash, motivating market competitors, and instigating potential legal challenges.

V. UNDERSTANDING RISK AND RETURN IN QUASI-COMPETITIVE AND COMPETITIVE MARKETS

As already noted, utilities are quasi-public institutions; similarly, they operate in quasi-competitive markets. Regulated monopolies constitute a special case, subject to certain protections from regular competition but also subject to special vulnerabilities under disruptive competition that can be particularly destabilizing without strong, foresighted, and strategic leadership. In order to understand this special case, the general case requires some elucidation.

In any market, as competition increases, so does the firm's risk. Higher risk begets a higher cost of capital; that is, shareholders require a higher rate of return on their investments in the securities of firms with higher risk (investor required return). Nevertheless, as competition increases, a firm's profitability (earned return on equity) declines as customers defect to other suppliers. Does not finance theory, though, suggest a positive relationship between risk and profitability? That is to say, as risk increases, does not profitability also climb? The answer is that it does not; the theoretical link is between risk and expected returns to investors on securities, not to firms on their own profitability.[87] That is, while there is a well-developed finance theory that *investors* require higher returns on the *stocks* of companies facing increased risk, there is neither theoretical support nor empirical evidence to support an assumption that those *firms* will earn higher *accounting returns* (*returns on equity*) as their risk increases.[88] Indeed, the empirical evidence speaks quite loudly here—high-risk firms, which tend to face intense competition, earn low accounting returns, if

87. Win Whitaker, *The Discounted Cash Flow Methodology: Its Use in Estimating a Utility's Cost of Equity*, 12 ENERGY L.J. 265, 288-89 (1991).

88. *See generally* Stewart C. Myers, *Application of Finance Theory to Public Utility Rate Cases*, 3 BELL J. ECON. & MGMT SCI. 58 (1972).

they can earn any positive return at all (see Table 1 and Figure 3). This is not a new finding, but rather it is one that has been documented in numerous articles.[89]

Table 1 contrasts the median expected return on equity, which is a measure of firm profitability, and the median investor required return for the 891 non-utility firms in the *Value Line Investment Survey's* stock universe that have annual sales of $1.0 billion or more.[90] We use Value Line's safety rank, which ranges from 1 to 5, to categorize risk—the lower the number, the lower the risk.

Using this actual data, we see that low-risk firms earn returns well in excess of investor required returns, as shown visually in Figure 3. Companies in this category tend to be those with well-established brands and loyal customers, such as Coca-Cola, Procter and Gamble, or Johnson & Johnson.[91] While some individual high-risk firms may ultimately produce attractive returns, they are the exception. Most high-risk firms fall noticeably short in terms of delivering profitability, with many struggling to simply earn a positive return at all. Those firms hope to eventually improve their situations, leading to reduced risk, lower investor required returns, and improved profitability, but only a minority of high-risk firms will likely achieve this end.[92] Achieving success requires innovations along the lines of those described by Porter and Kanter. Firms that cannot evolve this way can linger, but some will eventually fail to survive.

Table 1: Risk and Returns in Competitive Markets

Safety Rank	Expected 2013 Return on Equity	Cost of Equity[93]
1	21.5%	8.6%
2	16.5%	9.7%
3	13.0%	11.1%
4	8.3%	14.6%
5	0.0%	14.9%

In unregulated markets where there is no agency protecting the firm's financial integrity through cost recovery mechanisms and where disruptive competition emerges, firms can simultaneously lose profits while investors demand higher returns, placing them both in a potentially difficult economic position. A widening gap between earned returns and required returns destroys

89. Whitaker, *supra* note 87, at 288-89.

90. Screening from *Value Line Investment Survey* proprietary database as accessed on May 24, 2013.

91. Zack's Investment Service reports that for the most recent year (2013) these three firms have returns on equity of 28.5%, 17.3%, and 22.6%, respectively. *E.g.*, *Johnson & Johnson: (NYSE: JNJ)*, ZACKS, http://www.zacks.com/stock/research/jnj/company-reports (last updated Apr. 14, 2014).

92. Deborah Gage, *The Venture Capital Secret: 3 Out of 4 Start-Ups Fail*, WALL ST. J. (Sept. 20, 2012, 12:01 AM), http://online.wsj.com/news/articles/SB10000872396390443720204578004 9.

93. These values were estimated using the capital asset pricing model with a risk-free rate of 3.0% and an equity risk premium of 7.0%. *See generally Capital Asset Pricing Model (CAPM)*, FINANCE FORMULAS, http://www.financeformulas.net/Capital-Asset-Pricing-Model.html (last visited Mar. 3, 2014). The evidence suggests that this premium is at the upper end of the reasonable range, but a discussion of that topic is beyond the scope of this research. Using an equity risk premium anywhere in the reasonable range has no bearing on the conclusion that high-risk firms earn returns on equity below their cost of equity.

the market value of a firm[94] represented by the "market value destruction wedge" in Figure 3. In extreme cases, the firm can go into bankruptcy and stockholders lose their investment.

The upshot of the empirical analysis is sobering. Increased competition cuts at the economic heart of a firm, simultaneously increasing investor required returns while decreasing the firm's ability to satisfy those requirements. Financially, the typical impact is reduced stock prices for firms facing increasing competition.

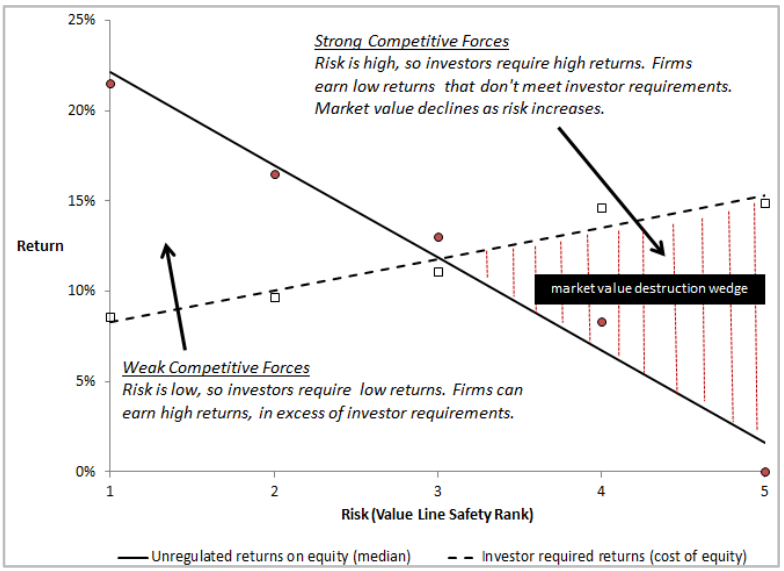

Figure 3. Rate of Return versus Value Line Safety Rank for Non-Regulated Markets. Profitability and loss in a non-regulated market vary by the intensity of competition, with earned returns declining as competition—and risk—increase.

In regulated electric utility markets, in the case of investor-owned utilities, the same forces apply but in a muted way under normal circumstances. The dynamics of investor required returns, which are determined in the financial markets, stay the same, but regulation changes the mechanics of profit and loss for firms. Under normal circumstances, regulation limits the extremes on both sides, putting a cap on upside profitability while reducing the likelihood of losses. However, under the unusual circumstances of disruptive competition, both regulators and firms find themselves outside the zone in which regulation is most effective. In a market environment with conventional competition—which means basic assumptions remain intact but efforts at participation are made by new actors—regulation is designed to limit utilities' financial losses by preventing competition and approving increased rates to cover rising costs.

94. TIM KOLLER, MARC GOEDHART & DAVID WESSELS, VALUATION: MEASURING AND MANAGING THE VALUE OF COMPANIES (5th ed. 2010).

Market environments in which the basic assumptions and rules of the market are in flux can limit the ability of the regulator to offer analogous protection, either in terms of preventing de facto competition or in terms of approving requested rates. This is partly because the nature of competition is likely to manifest new and unfamiliar dimensions that lie outside the purview of existing regulations or because changing contextual factors pin regulators between protecting utilities and upholding higher-level state or national policy goals.

The issue is identifying where electric utilities now fall, and where they likely will fall in the future, on this risk-return framework. Overlaying actual and potential earned returns for electric utilities on the non-utility firm framework produces interesting results. In Figure 4, we see that today all of the electric utilities that Value Line follows are either of average risk (safety rank 3) or below-average risk (safety ranks 1 and 2). That makes sense for firms subject to regulation of profit and loss; their gains are limited on the upside, but their exposure is limited on the downside. That is the good news for utilities. The second observation is less comforting. Utility regulation keeps risk in check but also limits utility returns to levels lower than those earned by low-risk firms in unregulated sectors.

The third point is likely the most disturbing from the utilities' perspective. As utilities venture into the largely uncharted waters of intensifying disruptive competition, shown with hypothetical returns on Figure 4, regulators may be powerless to alter market-derived results. That is, when competition shifts from conventional to disruptive, if regulators try to increase rates to restore profitability, utilities could be expected to simply lose more load, thus reducing revenues and ultimately returns. In other words, increasing rates can simply increase vulnerability to competition. When disruptive competition arrives with force, there may be no rate that allows the utility to meet investor return requirements.

Identifying the borderline between the *stable regulatory zone*, where the regulator has pricing power, and the *disruptive competition zone*, where the regulator is effectively constrained by a competitive market, is of utmost importance for strategic decision-making for regulated utilities. In the current case, this requires accurate, unbiased assessments about whether the widespread emergence and adoption of solar PV poses a singular threat or signals a disruptive wave of innovation that challenges the continued viability of both the infrastructure and institutions associated with the electric utility model—from generation, distribution, and transmission to regulation itself.

Figure 4 illustrates the relationship between the stable regulatory zone and the disruptive competition zone on the risk-return framework. In the stable regulatory zone, regulation can trump market forces as long as they remain relatively weak. Utilities' franchise monopolies have kept most competitors at bay, at least until recently. The question at hand is whether regulation can continue to do the same once disruptive competition ramps up. If it can, regulators then would allow returns to rise to whatever level would prevent the deterioration of profitability that we would otherwise see happening to high-risk firms. The framework suggests, however, that regulators may not be able to increase earned returns under those conditions to sufficient levels, leaving regulated utilities to earn subpar returns while their investors bear losses. The

only recourse to avoid this outcome involves substantial innovation by utilities on par with that required in a non-regulated market. This requires co-evolution between utilities and regulators.

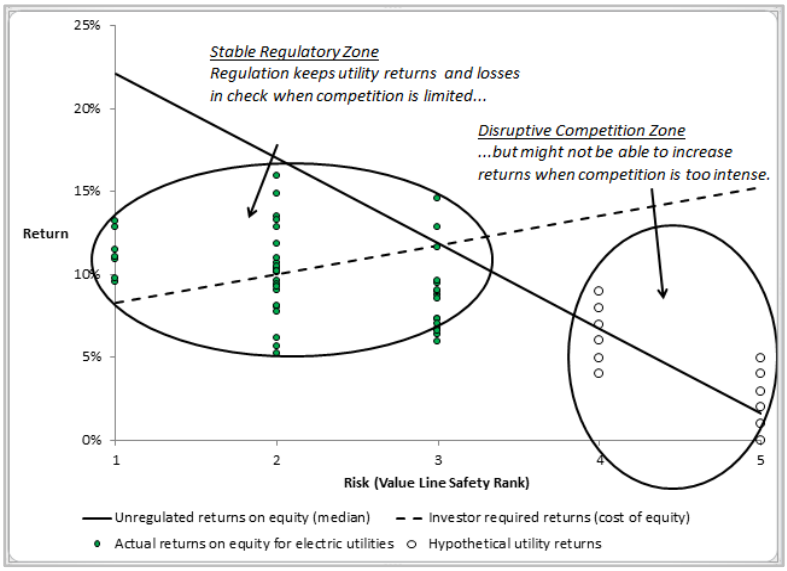

Figure 4: Rate of Return versus Risk Under Stable and Competitive Conditions.[95] The stable regulatory zone and disruptive competition zone are scenarios that describe well-established conditions associated with risk and return. Although regulated utilities typically lie in the stable regulatory zone, they are not immune to market forces that can push them toward greater risk where the power of regulation to mute market effects becomes weaker and, potentially, impotent.

Managers of regulated utilities may find the foregoing discussion contrary to their experience to date, which, by definition, it is. They may assume that regulators maintain power to limit utility losses under all conditions and, furthermore, that regulators are required to ensure that utilities have a reasonable opportunity to earn a fair rate of return, as established by the U.S. Supreme Court's landmark *Federal Power Commission v. Hope Natural Gas Co. (Hope)*[96] and *Bluefield Waterworks & Improvement Co. v. Public Service Commission*[97] cases. This is a misconception, and a serious one. The Court has found that there are limits to regulatory power and obligation: Regulators are not required to set rates that allow the utility to earn positive returns that maintain the firm's financial integrity when disruptive competition occurs to which a utility cannot adapt.[98] In fact, the Court has made clear that there is no legal requirement to ensure that a utility make any profit: "[R]egulation does not insure that the

95. Screening from *Value Line Investment Survey* proprietary database as accessed on May 24, 2013.
96. Federal Power Comm'n v. Hope Natural Gas Co., 320 U.S. 591 (1944).
97. Bluefield Waterworks & Improvement Co. v. Public Service Comm'n, 262 U.S. 679 (1923).
98. *Hope*, 320 U.S. at 603.

business shall produce net revenues, nor does the Constitution require that the losses of the business in one year shall be restored from future earnings."[99]

As we shall discuss in a moment, the just and reasonable rates for a utility subject to competition may essentially guarantee that the utility loses money (i.e., earns negative return on equity).[100] The Court recognized that when competitive forces strengthen, the market can trump the regulator.[101]

Utilities are accustomed to seeking regulatory protection to insure recovery of prudently-incurred costs, and that system has worked reasonably well for many decades. Yet, courts have held that cost recovery cannot be ensured under certain conditions of competition or if facilities are no longer needed.[102] If the solar PV threat—and more broadly the disruptive context within which renewables are emerging—turns out to be as significant as many suggest, regulators may not be able to use conventional practices to protect the utilities' financial integrity, and the utilities may find themselves in the high-risk, low-return positions just discussed. In those circumstances, utilities that attempt to rely on regulators for defensive insulation from competition may find themselves without the institutional profit protection they incorrectly presume the U.S. Constitution, policy commitments, or legal precedent provides.

This raises some fundamental questions as to regulatory policy as well as organizational strategy. What balance of regulatory policy changes and market innovation can successfully maintain sectoral stability while encouraging well-timed entrepreneurship? When is it prudent for a regulated firm to engage in zone defense and when to shift to zone offense?

VI. MANAGING DISRUPTIVE COMPETITION WITH REGULATORY PROTECTION: *MARKET STREET RAILWAY*

The case of Market Street Railway, a streetcar utility in San Francisco, illustrates that utilities which encounter disruptive competition face critical decision points. Furthermore, decisions made at such times focused on cost recovery alone can lead to a position of extreme and unbalanced risk from which it is difficult or impossible to recover.[103] By the 1920s, Market Street had been a

99. Federal Power Comm'n v. Natural Gas Pipeline Co., 315 U.S. 575, 590 (1942), *quoted in part in Hope*, 320 U.S. at 603.

100. Some suggest that utilities' lost profits might either result in loss of power to consumers who depend on utilities as the provider or last resort or in the hollowing out of pension funds, on which many people rely for dividend interest as income. However, when utilities file for bankruptcy protection (e.g., Public Service Company of New Hampshire) utility service can remain unaffected. 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. As to detrimental impacts on pension funds, utility stocks represent only 3% of the S&P 500, meaning that widespread bankruptcies in the utility industry, while devastating for utility investors, would have a minimal impact on most investment portfolios. Also, one must be cognizant of the fact that in competitive markets the utilities' losses will be other companies' gains.

101. *Hope*, 320 U.S. at 611-14.

102. Duquesne Light Co. v. Barasch, 488 U.S. 299, 301-02 (1989) (holding that disallowing cost recovery for property which is not "used and useful in service" is not a taking).

103. Market St. Ry. Co. v. Railroad Comm'n, 324 U.S. 548 (1945).

viable, innovating enterprise for many decades.[104] However, at a critical decision point, it was unwilling or unable to adapt to its new competitive environment and tried to rely reactively and almost entirely on regulators for defensive insulation against risks instead of on repositioning itself in a proactive way for resilience.

The utility rationally viewed involvement by regulators as a natural first step, but it failed to recognize that it had slid from the stable regulatory zone to the disruptive competition zone in which its own innovative initiative-taking would need to play a larger role. In fact, the streetcar sector as a whole was in decline, but Market Street found itself in a particularly precarious state. Figure 5 depicts the economic history of the streetcar utility industry in the United States, beginning at the industry's ridership peak in 1920. With the notable exception of the World War II period, in which ridership surged due to gasoline and other rationing, the streetcar industry's precipitous decline had concluded by mid-century.

The disruptive competitive threat at that point was not so much the automobile but rather the intra-city bus, which cost less to purchase, could carry more passengers, and could alter its route with ease—all desirable characteristics in growing cities.

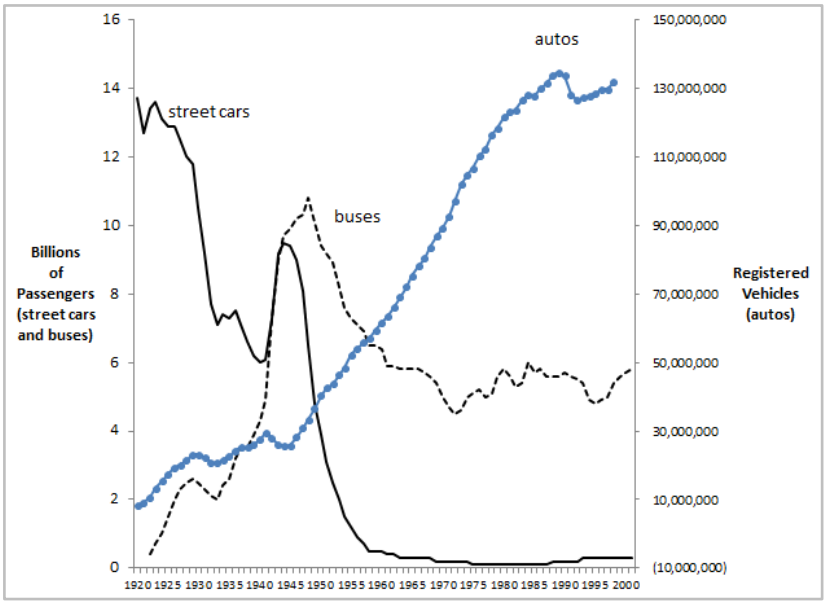

Figure 5: Modes of Transportation. Streetcar ridership in the United States peaked in 1920 and then declined as buses and automobiles gained dominance as preferred modes of transportation.[105]

104. *History of Market Street*, MARKET STREET RAILWAY, http://www.streetcar.org/about/history.html (last visited Mar. 3, 2014). Market Street first opened on July 4, 1860, as the first street railway on the west coast. *Id.*

105. AM. PUB. TRANSP. ASS'N, 2013 PUBLIC TRANSPORTATION FACTBOOK (64th ed. 2013), *available at* http://www.apta.com/resources/statistics/Documents/FactBook/2013-APTA-Fact-Book.pdf; *Motor Vehicle*

The bus era peaked in 1948, and bus ridership declined as the automobile became the primary mode of transportation in the United States, as depicted in Figure 5. However, unlike streetcars and despite a decline from dominance, a strong and steady bus presence has remained in the transportation portfolio of most cities, albeit under new ownership and regulatory structures.[106]

Market Street Railway operated in San Francisco until the mid-1940s.[107] As a traction utility, the Railroad Commission of California set its rates (fares).[108] Market Street was beset with competition on all sides. Not only was it losing riders to the aforementioned buses but to other streetcar companies, including one operated by the City of San Francisco.[109]

Under a five-cent fare, Market Street found that it was operating at a loss; it could not recover its accounting-based costs.[110] In a competitive market, firms must lower their prices to meet those offered by the competition, find a way to differentiate themselves from the other providers without dropping their prices, or focus on a particular segment of the market where they have a competitive advantage.[111] Market Street took none of those actions, instead continuing to offer the same service that it always had and simply asking regulators for a fare increase to seven cents, which was approved.[112]

The higher fare did not increase Market Street's revenues nor restore it to profitability.[113] The new revenue gained from the higher fare that customers paid was offset by the revenue lost due to customer defections to other transportation options.[114] In essence, Market Street's rate calculations were based on accounting arithmetic, not on market conditions. In addition, the Commission determined that "service had constantly deteriorated and was worse under the seven-cent fare than under the former five-cent rate. It recognized that some of the causes were beyond the Company's control. But, after allowance for those causes, it also found evidence of long-time neglect, mismanagement, and indifference to urgent public need."[115]

Seeing that the seven-cent fare provided no financial benefit to Market Street, the Railroad Commission reversed its decision and reduced the fare to six cents, prompting a judicial appeal by the utility.[116] In 1945, that appeal made its

Registrations, ALLCOUNTRIES.ORG, http://www.allcountries.org/uscensus/1027_motor_vehicle_registrations.html (last visited Mar. 17, 2014).

106. Arthur Saltzman, *Public Transportation in the 20th Century*, *in* PUBLIC TRANSPORTATION 38-39 tbl. 2-1 (1992), *available at* http://ntl.bts.gov/DOCS/11877/Chapter_2.htm.

107. Isabelle Lemon, *The Market Street Railway: Historical Essay*, http://foundsf.org/index.php?title=The_Market_Street_Railway (last visited Mar. 3, 2014).

108. Market St. Ry. Co. v. Railroad Comm'n, 150 P.2d 196, 200 (Cal. 1944), *aff'd*, 324 U.S. 548 (1945).

109. *History of Market Street*, *supra* note 104.

110. *Market St.*, 150 P.2d at 200.

111. PORTER, *supra* note 67, at 34-36.

112. *Market St.*, 150 P.2d at 200-01.

113. Market St. Ry. Co. v. Railroad Comm'n, 324 U.S. 548, 555 (1945).

114. *Id.* at 557.

115. *Id.* at 556.

116. *Id.* at 557.

way to the U.S. Supreme Court.[117] Market Street relied on the high Court's decision a year earlier in the landmark *Hope* case to support its contention that the regulator's approved rate was unreasonably low.[118] It argued that any rate that resulted in a negative return clearly failed to meet the *Hope* standards for a "fair" return–one that instills confidence in the utility's investors, among other considerations.[119]

Both parties and the Court agreed that a six-cent fare would prevent the utility from earning a return that would satisfy investors, thereby restricting its access to capital.[120] The problem was that in the competitive environment in which Market Street operated, if it continued to offer the same service it always had while competitors did just as well or better, no fare increase would allow it to recover the full amount of its historical investment, let alone earn a profit.[121] Indeed, even while arguing for a higher rate to recover its accounting-based costs, Market Street admitted that it did not expect the new rate to make it whole but was really arguing for cost recovery as its due entitlement, contending that the potential loss in revenue from a rate reduction constituted a taking under the Fourteenth Amendment of the U.S. Constitution.[122]

The Court made it clear that conflating a fair return and a takings argument, based on the *Hope* standard and the Fourteenth Amendment, respectively, reflected a fundamental misunderstanding of the law and that, furthermore, neither offers the protection the utility sought.[123] If market values decline in response to successful competition, utilities simply cannot look to their regulators to undo the impact of fundamental changes in market forces. Utilities have no constitutional protection from the economic damage caused by competitors; such losses cannot constitute a taking.[124] "The due process clause has been applied to prevent governmental 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."[125] Under such circumstances, the fair return may be negative, per the Court's finding. The Court found that, considering the economic circumstances the utility faced, establishing a rate that essentially ensured that the company would operate at a loss did not invalidate the order.[126]

Given Market Street's circumstances, Justice Jackson's majority opinion dismissed the common interpretation of the *Hope* standard as inapplicable.[127] He

117. *Id.* at 548
118. *Id*. at 566 (citing Federal Power Comm'n v. Hope Natural Gas Co. 320 U.S. 591 (1944)).
119. *Id.*
120. *Id.* at 565-66.
121. *Id.* at 560, 565-66.
122. *Id.* at 553-54.
123. *Id.* at 566-69.
124. *Id.* at 567.
125. *Id.*
126. *Id.* at 564, 566.
127. *Id.* at 566.

explained that it applies only when the utility has monopoly power, not when it is besieged by disruptive competition that it is failing to navigate.[128]

> Those considerations, advanced in [*Hope*] (which was reviewed pursuant to statute rather than under the Fourteenth Amendment), concerned a company which had advantage of an economic position which promised to yield what was held to be an excessive return on its investment and on its securities. They obviously are inapplicable to a company whose financial integrity already is hopelessly undermined, which could not attract capital on any possible rate, and where investors recognize as lost a part of what they have put in.[129]

This story has significant implications for electric utilities facing increasing and especially disruptive competition that may shift their risk position from the zone in which regulation is effective to one in which it is not. That Market Street responded to disruptive competition by simply requesting rate increases from its regulator reveals denial that their economic woes were due to fundamentally changed circumstances that required new organizational strategy, not just regulatory intervention. Market Street, while fully understanding the existence of threats to its viability, showed no real signs of innovation or adaptation in this regard, but rather continued a reliance on conventional cost-accounting-based utility ratemaking practices to the bitter end.

If utility-proposed solutions rely overly on regulatory recovery of accounting-based costs in lieu of strategic innovation and repositioning to accommodate the risks posed by the emergence of disruptive competition, then utilities may be headed in the same direction as streetcar companies as competition heats up. Whether utility assets end up on the scrap heap, as streetcars eventually did, is not the critical point to be taken from the Market Street discussion. It is that utilities have no constitutional protection against competitive impacts.[130]

Even if the grid survives intact as a physical entity, utilities may suffer unrecoverable financial losses under disruptive competition, possibly leading to bankruptcy but not necessarily to loss of service to customers. Under a Chapter 7 bankruptcy, a utility's assets are liquidated, but the assets that comprise the grid could retain sufficient value to justify Chapter 11 reorganizations of individual utilities in many cases.[131] Under that scenario, even if many utilities file for bankruptcy, we would likely see a recapitalized utility industry, one with a lower cost structure and operational changes without major discontinuities in service.[132] On the other hand, if the physical grid infrastructure itself becomes obsolete—which is to say those assets lose attractiveness in financial terms—utilities as distinct entities and electric service quality could collapse simultaneously. This indeed is the most feared outcome of the death spiral scenario. However, while such a combined collapse is theoretically possible, it seems unlikely since the very reason that physical grid assets would lose

128. *Id.*

129. *Id.*

130. *Id.* at 567.

131. *Bankruptcy Basics: Process*, U.S. COURTS, http://www.uscourts.gov/FederalCourts/Bankruptcy/BankruptcyBasics/Process.aspx (last visited Mar. 3, 2014).

132. *Id.*

investment value would be the emergence of other means of providing electric service that are more attractive to customers and investors.

If distributed generation continues to capture market share, and if utilities want to avoid financial reorganization, they may need to change their perspective. True innovation will require that utilities look for value-creating solutions as market needs and preferences change, however unexpectedly or even dramatically. Moreover, even low-risk companies cannot expect to remain low-risk indefinitely and may shift into higher risk status in surprisingly short periods of time given sufficiently disruptive conditions. Market Street's demise came not two decades after the height of the streetcar boom.[133]

VII. THE REGULATORY COMPACT AS INSURANCE POLICY

What happened to Market Street? The kinds of risks that confronted the utility were at once subtle and dramatic, seemingly suggesting that a relatively simple decision can lead to catastrophic results if conditions are ripe. In order to appreciate the special vulnerability of utilities to competitive risks, further consideration of the regulated monopoly as an institutional form is warranted.

Figure 6 relabels the zones specified in Figure 4 in terms of controlling Supreme Court decisions that shape regulatory obligations and utility expectations of protection. Under conditions of low risk, returns on equity are ample and consistent, as required by the Court.[134] This figure emphasizes that sectoral stability and steady profitability for extended periods is likely not simply a matter of regulatory protection but rather a combination of regulatory action plus the absence of disruptive competition that challenges the status quo of the regulated monopoly arrangement.

133. *History of Market Street*, *supra* note 104.

134. Federal Power Comm'n v. Hope Natural Gas Co. 320 U.S. 591, 603 (1944).

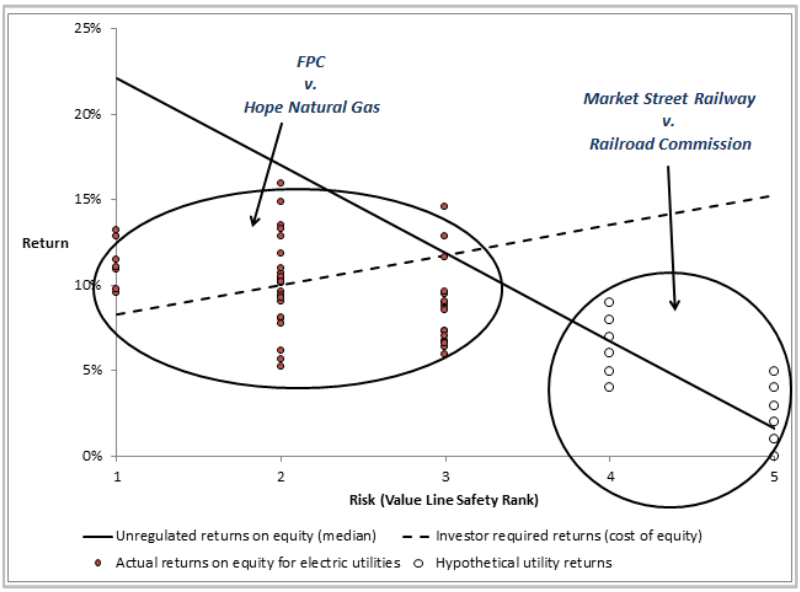

Figure 6: The Impact of Judicial Decisions. Regulatory requirements and capacities to provide utilities with protection vary, depending on the risk-return conditions in the market place. Policies intended to preserve stability can be rendered powerless under conditions of intense disruptive competition.

As already noted, disruptive competition does not signify the entry of new actors who want to compete in the existing market arrangement but rather new actors who represent truly paradigm-shifting innovations in technology, businesses, policies, consumer preferences, or a combination of these. In these rare circumstances, utilities confront peculiar threats that regulators may have limited ability and, furthermore, low incentive or authority to help them resist. Perversely, in the view of some, diminishing regulatory protection increases as conditions intensify and reach a tipping point, as illustrated by *Market Street*.[135]

In the energy sector, regulated monopolies evolved during a time when highly capitalized, centralized infrastructure was deemed the most feasible model. The purpose of utility regulation is to ensure provision of public services against destabilizing shocks, which then implies the need to keep utilities financially whole in order to maintain service continuity. However, if alternative models for providing needed services emerge that prove to be more efficient or otherwise more satisfactory than historical utility models, policy can quickly adapt. This critical insight is plainly operationalized in the legal decision regarding Market Street Railway.[136]

135. *See generally Market St.*, 324 U.S. 548; *supra* Part VI.

136. Market St. Ry. Co. v. Railroad Comm'n, 150 P.2d 196 (Cal. 1944), *aff'd*, 324 U.S. 548 (1945).

When a utility makes the argument that it has a right to recover "stranded costs," it must point to one of three bases for its claim: the *Hope* standard,[137] the constitutional takings clause,[138] or some notion of "a regulatory compact." The Market Street decision reminds us that utilities are not, in fact, guaranteed absolute protection under the first two bases.[139] The third basis, the notion of a "regulatory compact," is somewhat illusory and frequently misunderstood. First articulated in 1983, some question whether such a compact has ever really been formally in force or would represent a desirable state of affairs for either consumers or utilities themselves.[140] Even conceding the existence of a compact, reciprocal entitlements and obligation are not as strong as utilities may believe.

> There is no "entitlement" to "stranded" cost expressed or implied by the regulatory compact. The only entitlement granted was the revocable privilege to serve an exclusive territory. The obligation to serve stems from this privilege. The compact is not an agreement to pay *all* costs (prudent or otherwise) because of the obligation to serve. It is much more complex than simply "I am obligated to serve, therefore customers are obligated to pay all my costs." There is no reciprocal obligation on customers to buy, unless there is a written contract.[141]

VIII. ELECTRIC UTILITY RESPONSE TO THE SOLAR PV THREAT

The status of a regulated monopoly is not static. It can enjoy enormous stability during periods of low risk, but this can shift to a situation of enormous vulnerability to instability during periods of high risk, such as disruptive competition. In the case of electric utilities, a period of stability has lasted for many decades, especially with regard to transmission and distribution operations; therefore, most have no standing strategies for confronting disruptive competition upon which to fall back. Initial indications suggest that utilities will meet competition from solar PV in a variety of ways, including by proposing that regulators allow them to (1) impose substantially higher fixed monthly customer charges[142] (with concomitant reductions in volumetric charges), (2) reduce or eliminate feed-in tariff or net metering rates through which solar PV customers can sell excess power to the utility, (3) charge customers exit fees if they disconnect from the utility, (4) require that new customers pay hookup fees if the utility must build additional facilities to serve them, and (5) receive a

137. Federal Power Comm'n v. Hope Natural Gas Co. 320 U.S. 591, 603 (1944).

138. *Market St.*, 150 P.2d at 553-54.

139. *Market St.*, 324 U.S. at 566-67.

140. JAMES BOYD, RES. FOR THE FUTURE, DISCUSSION PAPER 97-01, THE "REGULATORY COMPACT" AND IMPLICIT CONTRACTS: SHOULD STRANDED COSTS BE RECOVERABLE? 1-2, 4 n.13 (1996), *available at* http://ageconsearch.umn.edu/bitstream/10803/1/dp970001.pdf.

141. KENNETH ROSE, NAT'L REGULATORY RESEARCH INST., NRRI 96-15, AN ECONOMIC AND LEGAL PERSPECTIVE ON ELECTRIC UTILITY TRANSITION COSTS VI, at 69 (1996), *available at* http://www.ipu.msu.edu/library/pdfs/nrri/Rose-Electric-Utility-Transition-Costs-96-15-July-96.pdf.

142. Utilities typically charge residential customers two fees: an unchanging (fixed) monthly charge and a variable per-unit charge based on the amount of electricity used in that month (volumetric charge). The high fixed-charge rate design would increase the fixed monthly charge while reducing the per-unit charge; regulators would not allow them to make more money but rather would allow them to avoid losing money if usage goes down. This is called a revenue-neutral rate design.

higher authorized rate of return to reflect their increased risk.[143] In the short run, these steps very well could insulate the utility from solar PV competition but at the same time create substantial medium- and long-term risks, including those of customer backlash, deferral of adaption, and stimulation of enhanced competition.

The proposal to institute a higher fixed monthly charge, either to all service customers or to those with solar PV systems, is among the most common cost recovery strategies under consideration by utilities. With the expansion of renewable energy, in particular solar PV, electric utilities have lost net revenue as customers use less electricity from the grid. Traditionally, utilities finance long-term infrastructure and return profits to investors through rate designs that produce a reliable revenue stream, assuming a consistent and nearly universal customer base in the service area. The diminished electricity demand or prospect of complete independence from the grid by solar PV customers in the service area undermines this assumption. Under a traditional volumetric rate design, loss of load mimics the impact of an absolute reduction in the customer base and, thus, reduces the flow of anticipated revenues. The solar PV threat is, at its core, the prospect of a continual drain on the utility customer base.

Under a higher monthly fixed charge design, loss of load and loss of customers are less strongly intertwined. In other words, lower electricity use does not translate as directly into lost revenue. If customers install a solar PV system and in turn use less electricity, the only costs customers avoid paying are the utility's variable expenses, such as its fuel costs, which the utility avoids when usage drops. Even if they do not consume a single kilowatt-hour (kWh), customers who maintain their connection to the grid still contribute substantially toward recovery of the utility's fixed costs because those are embedded into the higher monthly charge. Therefore, under this rate design, the utility would experience less revenue loss and would be less likely to incur stranded costs—as long as customers do not disconnect entirely from the system.

But the risk of that tactic is expressed in the qualifying clause. If customers do exit the system entirely, then the utility recovers *nothing* from those exiting customers—hence the proposal to also charge exit fees. If customers exit the system, which a high-fixed charge rate design might encourage, then even under the cost-based rate design, the utility fails to recover its fixed costs.

The utility's rationale here is firmly rooted in cost-accounting and makes the gamble that if the regulator approves the rate design, which is by no means assured, customers will accept the rate increase because they are essentially captured by a lack of alternatives in the non-competitive market. Non-solar customers are wholly dependent on utility service, and even solar PV customers typically rely on the utility for backup power and must remain connected to the grid to sell their excess power back to the utility under feed-in tariffs or net metering in states that allow it.

While some might see this proposal as a punitive action designed to harm customers who use solar PV, from the utilities' perspective this shift restores a sense of fairness and even good faith. Rates were originally designed to allow a

utility to recover the costs of building the system to meet projected demand. Solar PV customers now use less power than they did initially. From the utilities' perspective, in so doing those customers break the original contract and should nevertheless pay their pro rata share of those original system costs.

This idea that solar PV customers should pay the full accounting-based costs ultimately rests on the sector's historical assumptions and norms of practice, not on the conventional sense that applies to most other markets where customers pay only for what they use.[144] When one buys a gallon of milk, there is not a separate fixed charge in addition to the per-gallon charge, even though the dairy farmer and grocery store owner have substantial fixed costs. As discussed above, this pricing convention (along with the idea that a firm faced with increased competition should expect to maintain its net revenue and profitability streams regardless of changing conditions) is a peculiarity of the regulated monopoly arrangement.

Some may argue that it is precisely these historical norms that make the current proposals not only reasonable but fair: Neither the dairy farmer nor the grocery store has an obligation to provide milk to anyone, but the utilities must serve all comers. Utilities maintain that they are entitled to recover their costs through rate changes in return for providing reliable, universal service. No matter how reasonable this might seem to utilities, customers may not necessarily see this in the same light, and as noted above, utilities enjoy no such absolute entitlement. The fact that a higher fixed charge rate design better reflects the embedded system costs is likely to be largely irrelevant to customers and may only serve to raise questions about the regulatory framework under which utilities have historically thrived.

The higher fixed rate strategy foreseeably causes reputational risk for utilities and could severely undermine customer loyalty—arguably the strongest assets that utilities possess in a competitive market environment. "Utilities understandably oppose competition in the distribution business, and their first instinct likely will be to block it or marginalize it. But doing so poses its own risks—including the real possibility of a backlash . . . ."[145]

Customer backlash has serious consequences. A utility that upsets a large number of its customers will generate increased complaints and, when alternatives exist, a loss of customers. This failure to serve customers well also makes it more likely that the utility will receive unfavorable regulatory treatment in rate proceedings.[146] That is, consumer unrest may breed low authorized rates of return. It may also lead to legislative actions that are detrimental to the utility.

144. While there are some successful business models that use fixed pricing, such as health clubs, most firms recover all of their costs, fixed and variable, based on per-unit pricing. *See, e.g.*, Eric Noren, *The Subscription Business Model: Steady Cash Flow in an Unsteady Marketplace*, DIGITAL BUS. MODELS (July 29, 2013), http://www.digitalbusinessmodelguru.com/2013/07/the-subscription-business-model.html.

145. Michael T. Burr, *Economy of Small: How DG and Microgrids Change the Game for Utilities*, FORTNIGHTLY, May 2013, http://mag.fortnightly.com/display_article.php?id=1396395&_width=.

146. *E.g.*, Press Release, Angry Utility Customers to be Discussed by John Egan at Western Energy Institute Conference (Feb. 23, 2012) (noting that regulators, as elected or appointed public officials, must "show customers that they are listening to, respecting, and . . . collaborat[ing] with customers—or face

Such a customer backlash actually increases risks of competition, leaving utilities increasingly vulnerable, as technology advances and customer choice blossoms, to mass defections of unhappy customers. If the defections are significant, those still taking service may not be able or willing to bear the responsibility of residual utility system costs. The utility may then be forced to write off assets or even file for bankruptcy protection to react to the firm's loss of market value.

The implications for household renewable energy behaviors also merit consideration, particularly in terms of distributional effects, conservation, and adoption rates. These issues, like the social and policy factors discussed at the outset, provide a context within which utility actions are evaluated in the public domain. The higher fixed charge design could price some low-income consumers out of the market, raising concerns about equitable access to energy. Customers have little room to manage their utility bills when fixed charges are high and volumetric (per kWh) rates are low.[147] Reducing electricity usage does not save the low-use customer much, but those who use above-average amounts of electricity would be better off and may see a decrease in their overall bill. This pricing scheme also weakens economic incentives for conservation. These side-effects of cost recovery could further intensify resistance to proposed strategies, leading easily to critiques that utilities safeguard their own profits at the cost of creating or worsening energy poverty, benefitting high-end users over everyone else, and reversing decades of effort to promote energy conservation.

A hefty increase in grid-related charges, whether as an across-the-board monthly charge or a fee for PV backup service from the grid, might dissuade some customers from installing solar PV systems, just as hefty upfront costs of installation dissuade some from installing PV in the first place. In other words, higher utility fixed charges could be viewed by consumers as an increased cost of installing solar PV. This might slow the leakage of customers from the grid, but it does so by putting brakes on adoption of solar PV. Not only does this result conflict with policies and public sentiment that support accelerating adoption of renewables, but it might encourage customers interested in installing solar PV systems to seek non-grid alternatives to back up those systems and exit the utility altogether.[148] Such innovations are in development.

Energy utilities may gamble that the risk of customer exit is low under current conditions, given that most have no viable alternatives. Customers are captured by the existing utilities and have little choice but to accept the utility's proposals, assuming the regulator approves them. Customer capture may seem like a particularly safe assumption if higher fixed rates are accompanied by regulatory or legal tactics that can slow or suppress the kind of competition that may create more consumer options. However, this assumption only applies when the status quo is indefinitely static, which would seem inconsistent with

uncertain consequences at their public utility commissions"), *available at* http://www.prweb.com/releases/2012/2/prweb9220368.htm.

147. *E.g.*, JOHN WOLFRAM, CATALYST CONSULTING LLC, STRAIGHT FIXED VARIABLE RATE DESIGN 6 (2013), *available at* http://catalystcllc.com/documents/StraightFixedVariableRateDesign.pdf.

148. *See, e.g.*, Gardiner, *supra* note 27.

the dynamic energy environment. Innovations in the energy field—from technology, to business models, to policy, to public preferences—are undergoing such rapid change that presumptions of customer capture are dubious:

> While tariff restructuring can be used to mitigate lost revenues, the longer-term threat of fully exiting from the grid (or customers solely using the electric grid for backup purposes) raises the potential for irreparable damages to revenues and growth prospects. This suggests that an old-line industry with 30-year cost recovery of investment is vulnerable to cost-recovery threats from disruptive forces.[149]

The Edison Electric Institute acknowledges that high fixed charges are unpopular with electric customers.[150] Utilities propose high fixed charges because they believe that distributed solar customers do not pay their fair share of historical system costs and may believe that resistance to higher charges reflects a lack of public understanding that could be overcome with education. Yet, the trend looking forward instead of backward suggests that the value of solar is becoming defined in new terms. A Minnesota statute sets forth the items that contribute to the potential value of distributed solar resources:

> The distributed solar value methodology established by the department must, at a minimum, account for the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value. The department may, based on known and measurable evidence of the cost or benefit of solar operation to the utility, incorporate other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors.[151]

Although utility regulation has generally proceeded with limited public awareness or input, it has begun to draw more media attention.[152] Some argue that historical utility regulation has become a barrier to innovation and ought to be changed. Strategies by utilities that raise questions of fairness or appear to undermine advances toward accelerating adoption of renewable energy will likely attract more negative public attention and increase calls for regulatory change, not lend support to the argument that higher fixed charges are defensible because of historical norms. Utilities that bank on the indefinite continued reliance of customers on the grid, and thus that desired rate structures to satisfy cost recovery will ultimately be approved, are unlikely to prepare proactively for plausible scenarios of breakthrough innovation.

149. KIND, *supra* note 5, at 3.

150. EDISON ELEC. INST., 2010 FINANCIAL REVIEW: ANNUAL REPORT OF THE U.S. SHAREHOLDER-OWNED ELECTRIC UTILITY INDUSTRY 36 (2010), *available at* http://www.eei.org/resourcesandmedia/industrydataanalysis/industryfinancialanalysis/finreview/Documents/FR2010_FullReport_web.pdf.

151. MINN. STAT. § 216B.164(f) (2013).

152. *E.g.*, Reid Wilson, *In Sunny Arizona, a Battle over Solar Power*, WASH. POST (Oct. 16, 2013, 6:00 AM), http://www.washingtonpost.com/blogs/govbeat/wp/2013/10/16/in-sunny-arizona-a-battle-over-solar-power/.

IX. MANAGING DISRUPTIVE COMPETITION WITH VALUE CREATION: THE CABLE INDUSTRY

Until the mid-1990s, cable television providers were for the most part de facto monopolies in that, if a customer wanted anything other than over-the-air antenna-based television service, cable was essentially the only game in town. In this insulated world, cable companies combined what many thought to be unreasonably high prices with among the worst customer service ratings in the consumer sector, a specter that still hangs over the industry to some extent today.[153]

This seemingly cavalier attitude toward customers created a pent up demand for alternative means of obtaining television service. This helped to invite competition into the market, and when it arrived, many cable customers were glad to defect. Figure 7 shows that cable television subscribership peaked in 2001 and has been on the decline ever since.[154] The figure also shows how a single competitor, DIRECTV, captured a substantial portion of the pay-television market over the past fifteen years.[155]

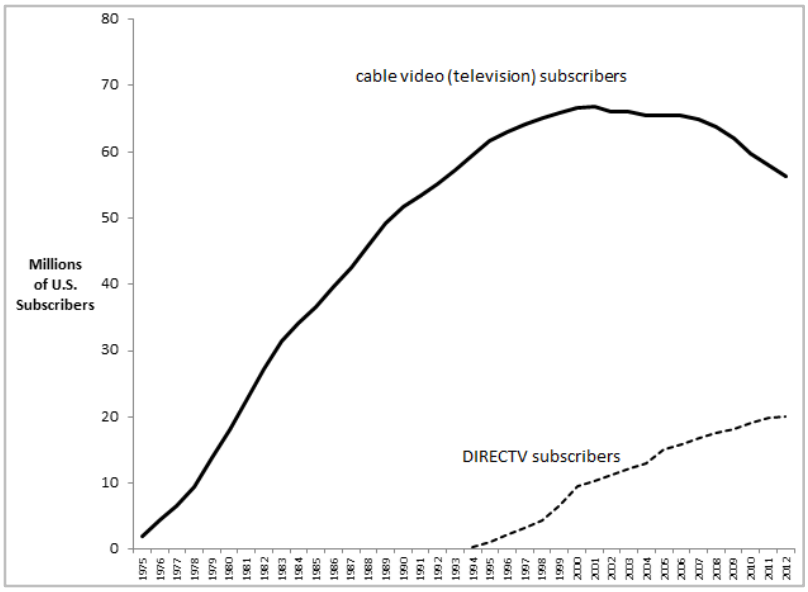

Figure 7: Impact of DIRECTV on cable subscriptions. The advent of satellite television providers posed a decisive challenge to the dominance of cable television firms, which were vulnerable to customer defections.

153. Andrea Coombes, *Airlines, Cable-Television Companies Lag in Latest Customer Satisfaction Ratings*, MARKETWATCH (May 15, 2007, 12:03 AM), http://www.marketwatch.com/story/airlines-cable-tv-companies-lag-in-customer-satisfaction-ratings.

154. *Industry Data: Cable Video Customers*, NAT'L CABLE & TELECOMM. ASS'N, https://www.ncta.com/industry-data (last visited Mar. 5, 2014).

155. DIRECTV, ANNUAL REPORT 2012 (2013), *available at* http://investor.directv.com/files/doc_financials/annual/DirecTV_2012_AR.PDF.

The decline in cable television subscriber count created substantial financial difficulty for some cable providers, but other companies were able to more than weather the storm. Charter Communications, the nation's fourth largest cable provider,[156] was among the hardest hit. It filed for bankruptcy protection in 2009, emerging from the process having written off $8 billion from its balance sheet.[157] Charter survives today as a profitable company but only after weathering the major disruption of reorganizing under Chapter 11 bankruptcy.[158] On the other hand, Comcast, now the industry's largest firm,[159] anticipated disruptive competition by bundling services and diversifying within its field of expertise. Having made a series of good strategic decisions at critical points, including maintaining low debt, it has fared quite well with its stock consistently outperforming the S&P 500 over the past fifteen years.[160]

Unlike Market Street Railway, which basically froze in the buses' headlights as customers defected, the cable industry underwent a superbly-timed strategic repositioning: Instead of going toe-to-toe with the satellite companies in the old product market, the cable companies expanded their service offerings and invaded other markets. They went from being television-only providers to also providing internet and phone service both individually and in novel bundles.[161] As Figure 8 shows, the number of customers taking internet service from cable companies is now approaching the number relying on them for television service.

156. *About Us*, CHARTER, https://www.charter.com/browse/content/about-charter (last visited Mar. 5, 2014).

157. Press Release, Charter Commc'ns, Charter Communications Completes Financial Restructuring and Emerges from Chapter 11 (Nov. 30, 2009), *available at* http://phx.corporate-ir.net/phoenix.zhtml?c=112298&p=irol-newsArticle_print&ID=1359904&highlight=.

158. *Id.*; CHARTER, *supra* note 156.

159. *Company Overview*, COMCAST, http://corporate.comcast.com/news-information/company-overview (last visited Mar. 5, 2014).

160. Motley Fool Staff, *Stocks for the Long Run: Comcast vs. the S&P 500*, DAILY FIN. (July 9, 2012, 4:34 PM), http://www.dailyfinance.com/2012/07/09/stocks-for-the-long-run-comcast-vs-the-sp-500/.

161. *E.g.*, Andrew Kantor, *Cable, Phone Companies Battle to Be Your Everything*, USA TODAY (Feb. 10, 2006, 8:44 AM), http://usatoday30.usatoday.com/tech/columnist/andrewkantor/2006-02-10-phone-vs-cable_x.htm.

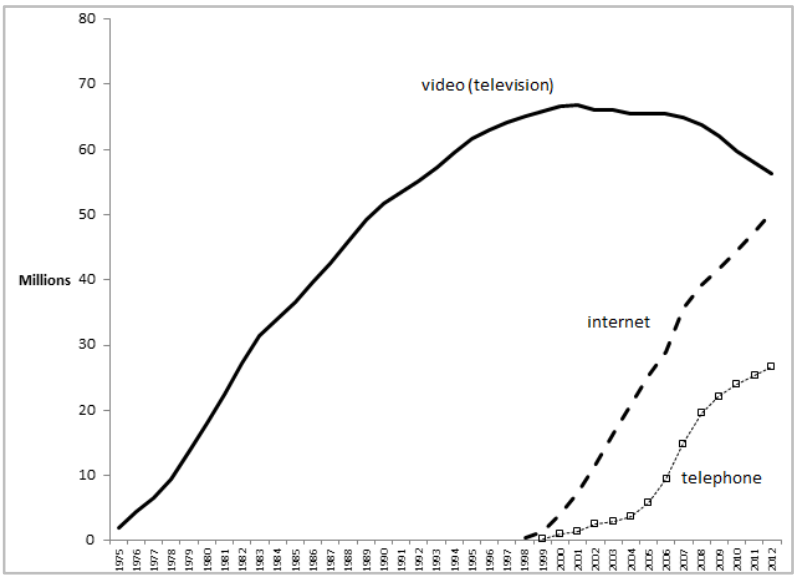

Figure 8. The impact of the bundle. The strategic decision by cable companies to expand from legacy television service to bundled internet, television, and telephone packages turned a crisis into a growth opportunity.

Cable's internet service, not its legacy television service, is currently the industry's most valuable offering and the source of customer increases,[162] providing speed and capacity that most other carriers cannot meet.[163] The industry showed additional savvy by bundling its less valuable television and telephone services with its high-value internet service.[164] While this has not slowed the loss of television subscribers, cable industry revenues did not decline in tandem with the loss of television customers because of the innovative creation of new revenue streams. At the 2001 cable television subscriber peak, industry revenue was $45 billion.[165] Even though, by 2011, the number of television subscribers had then declined by 13%, total industry revenue, which includes that from internet and telephone service, had increased by 117% to $98 billion.[166] This illustrates an effective value creation strategy.

162. *Cable Providers Lose TV Subscribers, But Gain Internet and Telephony Customers*, ELECTRONICS360 (June 10, 2013), http://electronics360.globalspec.com/article/175/cable-providers-lose-tv-subscribers-but-gain-internet-and-telephony-customers.

163. *DSL vs. Cable Internet*, PLUG THINGS IN, http://www.plugthingsin.com/internet/guide/buying/dsl-vs-cable-internet/ (last visited Mar. 6, 2014).

164. Sarah Jane Tribble, *TV, Phone, Internet: Choosing a Provider of All Three*, N.Y. TIMES (Oct. 15, 2008), http://www.nytimes.com/2008/10/16/technology/personaltech/16basics.html?_r=0.

165. *Television Broadcast Stations Market Report: SIC 4833*, HIGHBEAM, http://business.highbeam.com/industry-reports/transportation/television-broadcasting-stations (last visited Mar. 6, 2014).

166. *Id*.

Comparing Charter Communication's fate with that of Comcast makes a critically important point. The relevant question facing the electric utility industry is not how the introduction of disruptive competition will affect the electric utility industry. It actually is a long series of questions: How will it affect Arizona Public Service? How will it affect Georgia Power? How will it affect Consolidated Edison? The circumstances surrounding each utility might differ and, even if the situations match closely, the utility's reactions might vary. It is as much the utility's response to the threat as the threat itself that will be determinative as to how the utility fares.

Once again, this case from another industry holds potential lessons for electric utilities. Successful firms focus on customers and respond to changing circumstances by creating value for them. In so doing, those firms have a chance of surviving competitive attacks, or even thriving in spite of them. Those that respond by using backward-looking strategies, such as cost-based accounting, will increase their risks in a competitive world. Survival under such an approach, if it happens, will occur by coincidence since the firm's history tells us what happened to the company in the past, not what customers want today or what a successful company might look like in the future.

X. ADAPTING TO A COMPETITIVE MARKET: VALUE CREATION AS LEADERSHIP STRATEGY

When faced with disruptive competition, utilities can compete successfully by offering attractive products and services with the possibility of a revised price structure but not higher rates with the same or reduced service. Market Street Railway illustrates the outcome of the latter strategy if pursued to its logical extreme. Relying 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 a bottle. Investing substantial effort toward that illusory goal actually increases the utilities' risk whereas a posture of creative, truly strategic adaption can transform risk into opportunity. The latter is illustrated by the case of innovative cable companies that ultimately found a winning hand in what had appeared to be a losing environment.

Utilities have several well-established characteristics that become chief assets in an environment of flux: namely a reputation of service reliability, customer trust, and name recognition.[167] These assets are not only worth protecting but lie at the core of any advantage under conditions of disruptive competition and, thus, should be influential in all strategic decision-making. More than simply inspiring marketing campaigns aimed at reducing customer defections, these assets can help utilities organize a strategy of value creation in ways that respond to and build on these assets. This is the irrefutable conclusion to be drawn from the combination of theory, history and analyses by Porter and Kanter.[168]

167. *See, e.g.*, *CoreBrand Releases New Study on Top Electric Utilities Brands*, PRWEB (July 23, 2012), http://www.prweb.com/releases/2012/7/prweb9716201.htm.

168. *See generally* KANTER, *supra* note 79; PORTER, *supra* note 67.

The higher fixed rate strategy foreseeably causes reputational risk for utilities and could well enhance their overall risks in a competitive environment by severely undermining customer loyalty.[169] Furthermore, investing substantial political capital in such a strategy can orient organizational culture away from an honest assessment of what the future might hold and defer adaptation. Seeking to secure a firmer hold on the historical advantages of their market position, perhaps ever more strenuously as the sense of threat increases, may cause utilities to miss the fact that they are slipping outside of the stable regulatory zone, which is precisely where traditional cost-based logic falls apart.

Critical decision points occur near the borderlines of and between the two zones. If the goal is to remain proactive rather than reactive, early and iterative decision-making with an eye to the long run are required. If a utility makes the right decisions, it might flourish under competition, as Comcast did. If a utility fails to make decisions that manage risks appropriately, it may crash and burn, only to be resurrected in a recapitalized form, as Charter Communications did, or it could become a casualty of change, like Market Street.

It is not the purpose of this article to lay out a blueprint or comprehensive recommendations for utilities as to how to pursue value creation, but some illustrative comments are within the current scope.

Value creation, in the context of current and emerging conditions, suggests the need to consider whether utilities could offer one-stop shopping, from a known and trusted entity, for well-priced products and service packages that increase customer access to affordable power, enhance convenience, improve reliability and security during storm events, and increase customer choices for renewable energy. Some are experimenting with variations on rooftop solar leasing.[170] However, utilities could learn a larger lesson from the cable company strategy by developing new combinations of products and services that provide more than just electrons.[171] These offerings could include bundled products or packages that combine solar PV systems with electric backup, instead of viewing these as competing services. A deluxe bundle could include solar PV, grid access, energy storage, and standby household power.

Utilities could also learn from and respond to dynamics in the marketplace that suggest that customers are sufficiently concerned about service disruptions caused by extreme weather to drive noticeable trends in home purchases of portable and, increasingly, standby backup generators into more markets.[172]

169. WOLFRAM, *supra* note 147, at 5-7.

170. *See generally*, *Dominion Virginia Power Proposes Community Solar Power Program*, PR NEWSWIRE (Nov. 1, 2011), http://www.prnewswire.com/news-releases/dominion-virginia-power-proposes-community-solar-power-program-133012563.html; Mari Hernandez, *Why Utilities Are Afraid of Rooftop Solar*, CLIMATEPROGRESS (Aug. 20, 2013, 3:20 PM), http://thinkprogress.org/climate/2013/08/20/2492121/utilities-afraid-rooftop-solar/ ("In North Carolina, Duke Energy installs, owns and maintains solar panels on homes, schools and businesses through its solar distributed generation program, which pays annual rental fees to property owners for the use of their roofs or land.").

171. Kantor, *supra* note 161.

172. Sales of standby generators grew more than 500% between 2000 and 2005. Amy Hoak, *Generating Interest: Standby Generators Gaining Momentum in Marketplace*, MARKETWATCH (Aug. 28, 2006), http://www.marketwatch.com/story/standby-generators-gaining-momentum-in-marketplace?siteid=google.

However, chronic problems of quality control, safety, and emissions correlate to this rise in home generator use; given the array of products on the market, homeowners may have trouble choosing and servicing appropriate products or finding the best prices.[173]

Utilities suffer reputational damage when energy-disrupting storms leave homes without power for extended periods and have much to gain by demonstrating a creative response to these realities. Bundled products and services that include the option of having the utility install and service clean-burning, safe standby generators not only improve customer perceptions of system reliability but also provide an experimental platform for utilities to refine home hybrid systems with diverse components as innovations evolve. For customers, the utility's trusted track record, expertise, and economies of scale and scope make it more likely that customers will end up with a higher-quality product at a much better price than they could have obtained on their own.

Whether solar-hybrid service or bundled energy products-services would be attractive to customers depends on many factors, and the feasibility of offering such products depends on the specific circumstances facing a particular utility. Nevertheless, it is critical that utilities take a fresh, honest, and creative look at the policy and market circumstances in which they operate, consciously avoiding the tendency to dismiss new ideas as unrealistic without adequate scrutiny simply because they are not the way things have typically occurred. Common assumptions and basic definitions are being redefined rapidly and regularly in the current environment, and strategies that are constrained by historical norms rather than prompted by innovative thinking can be quickly overtaken. Value creation is not merely a proposition to wring out new revenues to meet old patterns. As the utilities already suspect, that equation will be nearly impossible to solve.

National and state policies interact with broader economic and social factors to spur trajectories of innovation in a variety of directions. For example, state RPS and national renewable energy policy targets contain explicitly envisioned outcomes. However, the explosion of third-party ownership (TPO) in the residential installation arena—the rooftop leasing model—was inadvertently enabled by the more favorable tax advantages conferred to third-party owners, compared to direct ownership by homeowners, in the 2006 Investment Tax Credit Act.[174] Notably however, when subsequent legislation leveled the playing

The trend in home sales of backup power generators has also continued to expand. Ken Belson, *Power Grids Iffy, Populous Areas Go for Generators*, N.Y. TIMES (Apr. 24, 2013), http://www.nytimes.com/2013/04/25/business/energy-environment/generators-become-must-have-appliances-in-storm-battered-areas.html?pagewanted=all.

173. William Pentland, *Backup Generators Are the Bad and Ugly of Decentralized Energy*, FORBES (Apr. 15, 2013, 12:52 PM), http://www.forbes.com/sites/williampentland/2013/04/15/backup-generators-are-the-bad-and-ugly-of-decentralized-energy/.

174. 26 U.S.C. § 25D (2006). Under the law, homeowners could claim up to $2,000 of their investment whereas third-party owners, such as solar leasing businesses, could claim 30% of their total investment in any given year. Felicity Carus, *Will 2016 Be the End of the Roof for Third Party Lease Models?*, PVTECH (May 14, 2013, 11:40), http://www.pv-tech.org/editors_blog/will_2016_be_the_end_of_the_roof_for_third_party_lease_models. New efforts to frame solar as the new, stable long-term investment are also testing the waters.

field,[175] the popularity of solar leasing models remained high. The solar leasing model is too nascent to predict its longevity, but its emergence suggests the presence of a synergistic interplay between needs and preferences in the sector that will continue to fuel experimentation and dynamism. The TPO innovation should not be dismissed as a policy-driven anomaly.

In a market and policy environment of flux, where historical norms may influence but are unlikely to dictate constraints on what emerges, care should be taken to differentiate between actions that enhance nimble repositioning and forward-looking adaptation in contrast to those that flirt with attempting to deny the reality of disruptive competition. The former approach to decision-making not only manages fluid risks more effectively but may reveal new opportunities that are otherwise unimaginable.

It is possible, though by no means clear from this hypothetical discussion, that new value-based offerings by utilities could cost customers as much as or more than some cost recovery proposals, at least in the short term. Whereas we previously argued that a high fixed charge pricing scheme for current service increases utility risk and vulnerability to competition, as per the Market Street rate example (where costs go up for no improvement in service), that argument is irrelevant when the product-service being offered is completely different, as per the cable example. But early indications there, too, suggest that value creation implies a new equation.

As a case in point, a solar-hybrid or solar-backup bundle may require very different pricing than standard electricity service. Traditional utility service prices electrons as commodities, and commodity markets compete on a lowest cost basis. Energy-related bundles are not commodities but rather value-added products and services, and the acceptable cost bases to customers may be very different. They are not, after all, only buying electrons. They are buying convenience, security, peace of mind, and the ability to engage in energy arrangements that fit their values of sustainability or energy independence but which they cannot do alone.

Why would customers pay a higher monthly fixed charge for a bundled solar-hybrid service when they are likely to balk at paying an even lower fixed charge for standard electric service? As already indicated, energy customers increasingly value the opportunity to make choices about where and how they get their energy. The bundled product-service package is likely to meet a broader and somewhat different set of customer needs than legacy electron provision. Customers may perceive a solar PV-utility backup bundle as being a largely fixed-cost package, and be willing to pay for it accordingly, while at the

See generally Roy Torbert & Dan Self, *A Rock That Churns Out Cash: Solar YieldCos*, ROCKY MTN. INST. (July 17, 2013), http://blog.rmi.org/blog_2013_07_17_a_rock_that_churns_out_cash_solar_yieldcos.

175. NAT'L RENEWABLE ENERGY LAB., SOLAR LEASING FOR RESIDENTIAL PHOTOVOLTAIC SYSTEMS (2009), *available at* http://www.nrel.gov/docs/fy09osti/43572.pdf; *Solar Investment Tax Credit (ITC)*, SOLAR ENERGY INDUSTRIES ASS'N, http://www.seia.org/policy/finance-tax/solar-investment-tax-credit (last visited Jan. 31, 2014); *Residential Renewable Energy Tax Credit*, DSIRE, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US37F (last updated Dec. 11, 2012).

same time they may view utility-only service as a largely variable-cost product, thereby refusing to pay high fixed charges for that service.

Perceptions and subjective judgments, not only financial facts, drive consumer behavior. Value of service is by its nature a subjective concept in which costs play a supporting, not sole, role. Accordingly, customers could be willing to entertain new pricing conventions that depart significantly from historical patterns if the entire package of services provided appropriate value. This is, indeed, what occurred in the Comcast and Charter cases.

Whereas utilities' anecdotal experience seems to persuasively suggest that most utility customers will prefer cheaper electricity when provided as a commodity, there is no clear evidence against and some evidence to support a strategy that is grounded in developing acceptable pricing structures for value-added products and services. A spectrum of solar-hybrid home packages may revitalize the utility revenue stream, much like bundled communications products established an entirely new revenue trajectory for the former cable television industry.

Utilities may not be the only beneficiaries of this new model. As noted, customers can look forward to the opportunities for more choices and potentially greater value. Such bundled products may ameliorate political concerns about the allocation of burdens for solar expansion, as has been a cause for controversy in some states by offering the bundled package for some customers while preserving a conventional service option. Solar-hybrid customers might essentially subsidize energy access for all, not the other way around, while still receiving more value than they would have without the bundled option. In this scenario, it is feasible that increased value creation and equity may move together instead of operating in tension.

For climate, environmental, and consumer safety advocates, utility facilitation and quality control over home energy systems comprised of solar PV, standby generators, and grid backup should reduce harmful emissions and hazards as well as accelerate the mainstreaming of hybrid systems well beyond the luxury good niche where they might otherwise stagnate.[176] Economies of scale and scope are an advantage in this case, and as home hybrid bundles expand throughout the service area, costs should drop and access should increase over time. Last but not least, regulators may find it easier to approve such utility initiatives as more in line with statutory missions and more politically viable than rate hikes, even though some creativity may be required on the regulatory end as well.

Utilities could work deliberately toward pricing most energy product and service packages within the means of most customers, not unlike the strategy of third party providers. As long as the monthly charges for hybrid systems remain accessible to many, or even most, customers—at costs sufficiently below those involved in capitalizing a privately owned system and demonstrably superior to maintaining standard service in terms of needs and preferences—they can become a viable win-win for the entire service area.

176. *Grid Connect Solar FAQ's*, ENERGY MATTERS, http://www.energymatters.com.au/renewable-energy/solar-power/grid-connected-systems/home-grid-faq.php (last visited Mar. 8, 2014).

New energy entrepreneurs are already hard at work crafting offerings that build these characteristics for themselves and have already demonstrated an ability to innovate quickly, amass capital, and attract utility customers. Fourteen states now permit third party solar providers, up from just two in 2010, and third party solar financing is expected to quadruple to nearly $6 billion by 2016.[177] If the utilities stand by while the entrepreneurs follow through with consistently lower-cost, reliable, renewable-based supplies along with excellent customer service, then the utilities have essentially surrendered some of their biggest assets. In that case, as the Supreme Court observed about Market Street, no regulation can return value to a firm that has lost its footing in the marketplace where competitors are thriving.

Rather than being focused on doubling down on cost recovery, utilities can interpret significant market shifts as an indication of high level of customer receptiveness to new energy-related products and services and, possibly, to new providers or at least to new ways of doing business. This should be viewed as latent demand worthy of investigation and experimentation. Regulators, too, should be viewing demand in terms of customers' energy service needs, not the need for electrons from a grid. If this demand remains unmet by utilities, energy entrepreneurs will begin to acquire assets that have been uniquely enjoyed by utilities and, therefore, strengthen their competitive position over utilities.

As discussed above, the shift from a low-risk to a high-risk status can happen rather quickly and unpredictably in the presence of disruptive competition. The need for keen attention to the possibility of that shift in the case of electric utilities, with correspondingly forward-looking decision-making, is the undeniable conclusion. Utility observers estimate that if current conditions continue accompanied by the existing utility response, a decisively negative financial shift could be felt by utilities as early as within the next five years[178]—an estimate wholly consistent with the dynamics we are describing.

Protecting the utilities from the effects of competition is not the public policy goal behind regulation. Legal precedent affirms that while protecting utilities in the interest of reliable and consistent service can be robust, it can only go so far. The prospect of a semi-regulated, differently regulated, or even unregulated electric provision sector is not outside the realm of possibility as current trends continue. How utilities are ultimately repositioned depends, to some degree, on their capacity to demonstrate leadership that aligns with redefined needs, preferences, and constraints facing all electricity providers and users. Any reform in the sector implies debate over larger policy objectives and actions in an intricate system of energy generation, distribution, access, sustainability and equity in which utilities are an important but not sole

177. *US Residential Solar Financing to Reach $5.7 Billion by 2016*, GREENTECH SOLAR (Feb. 11, 2013), http://www.greentechmedia.com/articles/read/us-residential-solar-financing-to-reach-5.7-billion-by-2016; Shayle Kann, *U.S. Residential Solar PV Financing: The Vendor, Installer and Financier Landscape, 2013-2016*, GTM RESEARCH (Feb. 11, 2013), http://www.greentechmedia.com/research/report/u.s.-residential-solar-pv-financing.

178. Christopher Martin, *Solar Power to Reduce Utility Profits in Five Years, Fitch Says*, BLOOMBERG NEWS (July 18, 2013), http://www.businessweek.com/news/2013-07-18/solar-power-to-reduce-utility-profits-in-five-years-fitch-says#rshare=email_article.

component. It is difficult to know where such debates will go, but gambling on maintenance of the status quo seems like a losing hand.

XI. CONCLUSIONS

In the end, the electric utility as an institutional form has not exhausted its relevance. Claims that utilities are in a certain death spiral seem premature. However, those predictions seem disturbingly grounded in tacit assumptions that utilities are too hidebound by their past to be able to adapt in a timely or agile way to rapidly changing conditions. If so, utilities will find themselves to be brittle rather than resilient when confronting disruptive competition in a sector that is central to social, economic, security, and environmental necessities and, therefore, cannot remain static. All signs point to the reality that utilities must change. The open question is whether they will change by embracing and, indeed, leading value creation or be changed by others in the market who embrace it first and more firmly.