

SIEMENS

The Art of the Managed Transition

Designing and Implementing a Low Risk/High Value
Utility Business Transformation

Houston, We Have a Problem: Too Much Change, Too Fast

While the words from Apollo 13 were actually, "Houston, we've had a problem here," this phrase has come to signify the understatement of a dramatic problem. This white paper describes a problem that is only beginning to dawn on an industry that has had tremendous success over the past century: the problem of too much change, too fast. The electric utility industry and individual electric utilities find themselves at a crossroads as 2014 ends and 2015 begins. In the next few years, decisions that we make (or don't make) will have far reaching impacts on our personal and collective futures. An array of external trends are aligning that demand our attention to preserve the grid and all its parts, the engineering marvel that our forefathers designed and built to drive unprecedented economic progress in the twentieth century. While many in our industry argue that energy policy must protect and preserve existing business models by constraining new alternatives, this white paper agrees on the need to preserve grid and utility functionality, but offers a more proactive alternative to a reactive defense against disruption.

No doubt, defending the status quo is valuable to slow the path of increasing complexity and instability, but alone it is a short-term solution that only delays the inevitable. The only path forward with long-term sustainability is to proactively embrace changes and lead into the future. Incumbents must transform themselves to accommodate new business models that leverage new technologies if they are to keep up with outsiders bringing change to the power industry by offering more value to consumers. A strategy of embracing the future while preserving the best of the past promises a novel value proposition for the twenty-first century. But realizing this potential will require new levels of insight, perception, and courage to drive change against a pervasive conservative culture of risk avoidance, nurtured over four generations into a cultural norm. Executing such a strategy will require regional industry transformations and individual business transformations likely to take decades to accomplish, executed in stages in order to accomplish a managed transition from old ways to new.

A Shift from Defense to Offense: The Transformation Imperative

If it were only a matter of greening the grid, adding renewable energy could be accomplished with some modifications, albeit significant modifications, to business as usual. But the challenge is not limited to merely substituting clean fuels for fossil fuels, as radical as that may be in and of itself. In fact, much more is at stake. A utility today faces an array of challenges and constraints as it contemplates strategy in the face of disruption. Six of these challenges are outlined below. Of all these changes, two are the most

destabilizing (threatening) to the current utility business model: decentralization and disintermediation.

1. **Accelerating Change and Complexity.** Change is accelerating and the environment is growing more complex; the utility environment has been relatively stable throughout its history, so this growing trend represents a monumental challenge for utilities to become flexible and adaptable to a highly dynamic and unpredictable environment.
2. **Empowered Buyers, Innovative Solution Providers.** A maturing internet economy has empowered buyers, who leverage internet procurement to buy commodities at the lowest price. In response, successful sellers avoid this commodity trap¹ by becoming innovative solution providers, thereby maintaining margins and profitability.
3. **From Consumer to Prosumer.** New technologies and innovative business models drive the creation of new products and services, which enable consumers with increasing autonomy and control. As consumers mature, they become producers as well, i.e., prosumers.
4. **Decentralization.** Our modern economy is organized centrally, with distributors serving consumers. But newly empowered consumers benefit from technology change that puts value "out at the edge," i.e., decentralization. As our economic foundation increasingly leverages on-site elements, decentralized and centralized resources coexist, but new operating paradigms will be needed.
5. **Disintermediation.** As entrepreneurs and large companies outside the electric industry take advantage of new tools and business approaches to insert themselves between existing businesses (incumbents) and their long-term customers, they use value as a wedge to upend long-established relationships, i.e., disintermediation.
6. **Supply/Demand Side Equivalence.** As utilities (supply) and energy consumers (demand) each seek to optimize their condition, the opportunity for market equivalence emerges. A co-optimization approach begins with each side pursuing their objectives with the goal of minimal disruption to the other side, but ultimately evolves when the two sides actively seek synergy and leverage.

Decentralization and disintermediation have historically acted to create disruption, largely independent of incumbent control. In so doing, these trends have driven progress in a maturing IT world, as we moved from vacuum tubes to transistors to integrated circuits, then on to a series of information processing devices like calculators, computers, lap-

¹ Are You Facing a Commodity Trap? Don't be too quick to blame the economy – you might be the victim of your own complacency, Entrepreneur, December 1, 2009, <http://www.entrepreneur.com/article/204192>

tops, video games, smart phones and tablets². Understanding cross-industry patterns in technology creation and adoption is vital to understanding decentralization and disintermediation. A review of this history of the digital economy³ reveals three key capabilities employed to drive progress: 1) research and development (R&D) creates new technologies and new capabilities; 2) innovation crafts new products, services and business models to leverage new capabilities; and 3) marketing commercializes new approaches, educates buyers, stimulates uptake, and achieves economies of scale that drive costs down and market share up. Electric utilities are certainly engaged in such activity today, but as monopolies in a stable industry they have not historically invested in these categories to make them core competencies, certainly not to the degree that their likely market competitors have. This relative difference places utilities at a competitive disadvantage in a time of change.

The telecom industry offers the most cogent example to describe the challenge of rapid change facing the electricity world: how to successfully adapt and transform from infrastructure delivery of commodities (i.e., utility) to creation and delivery of value added products and services (i.e., service company). While there are myriad differences in these two industries, from the business model perspective in general, and for this transformation challenge in particular, they are quite similar. In fact, it would not be a stretch to describe power delivered by electric utilities today as “dial-tone” electricity, in so much as reliable, affordable grid electricity delivered to wall outlets so closely resembles the reliable, affordable dial tone delivered to phone jacks and wall phones by telephone utilities 30 years ago. Describing it this way is in no way a knock on grid power – to the contrary, universal access to reliable affordable power, and universal telephone services have each become hallmarks of modern societies and economies around the planet. In fact, high reliability and low cost have made dial-tone electricity the quintessential commodity of our modern lives.

But this widely accepted definition of the utility value proposition – providing highly reliable, low cost power – also constrains our collective imagination of what may be possible with new energy technologies; limited to thinking only in terms of lower cost and greater reliability, we may be blind to the potential of new value added energy services. And if we are to learn from what happened to telecom utilities and apply those lessons to the electric industry, we must start here: imagination is vital to innovation. It would have been a stretch in 1982 to imagine the rapid adoption of the platform/applications economy featuring the Wi Fi/internet-enabled iPhone or iPad in 2012. Lacking that vision, telecoms learned by painful trial and error, adapting to new technologies and external pressures over the decades, first with mobile telephony and soon thereafter with the internet

and data services (and now, in 2015, big data is leading the telecom industry into yet another massive transformation). In the same vein, while it is nearly impossible from our limited perspective here in 2015 to conceive what the corollary of a future of personalized energy services might be over the coming decades, it’s not hard to see the value in becoming innovative and adaptive in order to manage the transition to that future. It’s not hard to imagine this trend line that someday will transform electricity like it did information and telecommunications. And it’s only good business practice to evaluate how to improve on our predecessors in the face of similar technology changes, rather than learning the same lessons all over again the hard way.

Just as new services associated with mobile and data telecommunications pushed voice telephony to the sidelines, new forms of energy production, delivery, storage and consumption promise to bypass the grid and offer non-grid alternatives to grid plug power for monopoly-bound consumers. The few telephone companies that managed to evolve into telecommunication service providers adapted by replacing declining POTS (plain old telephone service) revenue with new cell phone and internet service provider revenue based on new technologies and value added products and services. In a process that took decades to unfold, the ultimate winners – in the US, that would be ATT and Verizon – swallowed their sisters (i.e., Bell South, Ameritech, NYEX, PacBell, ATT Long Distance, etc.) to create larger, successful, sustainable telecommunications giants. Traditional telecom didn’t go away in the face of technology change; rather, the strongest companies in the sector transformed themselves into something altogether new, shifting from reliable telecom utilities that provided an affordable, universal commodity service – dial-tone voice connectivity – to innovative service companies providing innovative value added services. Notably, many of the less successful telephone companies are no longer around, and therein lies a valuable lesson for electric utilities as industry transformation unfolds: there are no guarantees going forward.

As value added energy products and services mature with new technologies and business model innovations, the electricity industry is most likely to follow a similar path to that experienced by the local and long-distance telephone industry over the last 30 years. Value added product and services revenue will gradually displace traditional revenue that utilities earn through rates for providing reliable kWhs over the grid. Individual ratepayers will invest in energy efficiency and third party on-site energy solutions to lower their bills. Collectively, such activity erodes utility revenues still needed to support long-term grid investments: greater value for consumers becomes an existential challenge for electric utilities.

2 See The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution, Walter Isaacson, October 2014, <http://www.amazon.com/The-Innovators-Hackers-Geniuses-Revolution/dp/147670869X>

3 Ibid

What seems like a trickle of innovation today, or a far off phenomenon for utilities in Germany, Hawaii, or California, will in a matter of years develop into a clear and present threat for electric utilities worldwide, as technology advances and scale economies drive myriad distributed energy resources (DER) to become innovative consumer devices and solutions sold in commercial markets at ever-lower prices. These trends, whether they take two years or ten, are clear and distinct. What we choose to do at the industry and company level today will determine whether electric utilities in the future remain relevant with new, more dynamic roles to play, or whether they are relegated to a supporting role, leaving new service companies to enjoy the major growth in energy services because they are better able to offer innovative value using new technologies and new business models. On the one hand, utilities may react defensively and seek to slow such progress to protect their traditional revenue, gaining time, but not long-term advantage. On the other hand, utilities that choose to emulate the innovation and creativity that new competitors use to protect and/or gain market share will create a more diverse revenue base for long-term sustainability.

In this future of increasing uncertainty, we all have a vested interest in the continued health of the electric utility sector. It is vital that electric utilities acquire the flexibility and adaptability to address emerging threats and seize opportunities as they arise, because we need the grid to remain strong. We will need affordable and widely accessible plug power for decades to come, and industries will continue to need intensive power that is not possible from DER. Electric utilities are ideally designed to provide these types of economic value over their grids. But to stay competitive, electric utilities will need to divide their focus in two directions simultaneously: first, they will need to preserve current grid reliability and meet grid modernization challenges; and second, they will need to acquire the business capabilities required to provide higher value energy services, either by themselves or in partnership with third parties. We call this twin challenge *The Transformation Imperative*: grid reliability/grid optimization on the one hand, and business model changes to enable emerging DER-based products and services on the other.

Canaries in the Coal Mine: Monitoring Risk Indicators

In years past, coal miners would traditionally take a canary in a cage down into the mine with them as an early warning device to let them know that air quality was becoming unsuitable to support human life. When the small bird with its rapid respirations collapsed, miners knew it was time to beat a fast retreat from the mine – danger was imminent! What might we consider today to be the “canaries in the coal mine” regarding imminent threats to the electric utility industry? We only have to go back a few years to gather these few examples – there are many more besides those cited below.

1. **DER Rising.** In 2012, the Rocky Mountain Institute published a study, in collaboration with California utility PG&E, anticipating the deleterious impacts of DER on electric utility business and operations.⁴ The report concluded that utilities should understand the impacts of DER, adjust rates accordingly, and adapt their business models to increasing efficiency and DER.
2. **Service Business Model.** News in 2013 from Germany, an early and enthusiastic adopter of solar PV, showed that while feed-in tariffs drove rapid adoption of distributed generation to meet green objectives, these tariffs had a significant unintended impact when all that renewable energy, along with high gas prices, made it more difficult to dispatch the power from new gas power plants. German utility RWE opted for transformative change in 2013 by shedding its fossil fuel generation business in favor of a services business model after losing a significant amount of its shareholder value in a short time.⁵ Then in late 2014, Germany's largest utility, E.ON, followed suit, announcing that it would divest its traditional utility business to focus on energy services.⁶
3. **Potential for Rapid Disruption.** In March 2013, a Harvard Business Review article titled *Big Bang Disruption*⁷ described the potential of platform economics to rapidly disrupt existing businesses by introducing new levels of value made possible by maturing technologies and innovative business models. Building on Clayton Christensen's *Innovator's Dilemma*⁸ from the mid-1990s, the authors described a new trend that indicates the need for a new level of concern among powerful incumbents. To survive, incumbents must

4 Net Energy Metering, Zero Net Energy, and the Distributed Energy Resource Future: Adapting Electric Utility Business Models for the 21st Century, 2012, http://www.rmi.org/Content/Files/RMI_PGE_NEM_ZNE_DER_Adapting_Utility_Business_Models_for_the_21st_Century.pdf

5 Exclusive: RWE sheds old business model, embraces transition, Energy Post, October 21, 2013, <http://www.energypost.eu/exclusive-rwe-sheds-old-business-model-embraces-energy-transition/>

6 Germany's Biggest Utility, E.ON, Is Divesting Fully from Centralized Power Plants, December 1, 2014, <http://www.greentechmedia.com/articles/read/Germanys-Biggest-Utility-Is-Divesting-From-Centralized-Power>

7 Big Bang Disruption, HBR, March 2013, <https://hbr.org/2013/03/big-bang-disruption/>

8 In *The Innovator's Dilemma*: When New Technologies Cause Great Firms to Fail, Clayton Christenson showed that large companies have a difficult time innovating, which leaves the door open for small firms to come in, take a position, and grow into significant competition over time. See http://en.wikipedia.org/wiki/The_Innovator's_Dilemma

eschew conventional wisdom, understand the changes coming, and slow the oncoming innovation long enough to better it. Otherwise, incumbents should expect to be upended, or even driven out, unless they are prepared to radically change themselves if circumstances warrant. “The good news is that big-bang disruptions hold immense potential for those who can quickly learn the new rules of unencumbered development, unconstrained growth, and undisciplined strategy. Your current business may be replaced by something more dynamic and unstable but also more profitable. And the change will come not over time but suddenly. In other words, not with a whimper—but with a bang.”⁹

- 4. Utilities are Poorly Positioned to Respond to Rapid Change.** Just a few months later, in June 2013, the 35th DRUID Celebration Conference in Barcelona, Spain, included a white paper entitled *Creative Destruction and the Natural Monopoly ‘Death Spiral’: Can Electricity Distribution Utilities Survive the Incumbent’s Curse?*¹⁰ This paper described the risks associated with current technology trends, drawing some alarming conclusions. A survey of 18 electric utilities in the UK and Australia, representing over 80% of those two sectors, concluded that the threat of a Utility Death Spiral (see below) was real and more likely than many have acknowledged. Compounding the threat of disruption is the poor positioning of electric utilities to adapt and respond rapidly to sudden, or even evolutionary fundamental changes. The author documents 13 “Rigidities and Inhibitions” inside utility organizations that make it very difficult for them to rapidly respond to threats that require significant change and innovation.
- 5. Utility Executives Recognize the Connection between Transformation and Efficiency.** An Itron Resourcefulness Index survey of 800 informed consumers and 600 gas, water and electric utility executives¹¹ released in January 2014 found that 94% of utility executives think that transformation is essential to improved efficiency. Interestingly, the level of concern for transformation is higher among consumers than utilities, and among the utility executives, concern is higher in developing countries than it is in developed

countries. This study focused on operational transformation and transparency to consumers.

- 6. State Regulators are Initiating Industry Transformation.** Indeed, in 2014, multiple state regulatory bodies are driving industry transformation under their purview (e.g., NY, MA, CA, HI, MD, MN, etc.). Most notable may be the ambitious *Reforming the Energy Vision* of the NY State Public Service Commission, launched in spring 2014,¹² with its innovative market design based on a new energy services platform role to integrate centralized and decentralized sources of energy under the guidance of one or more distributed system platform providers or DSPs.

New Risks on the Horizon: Transformation Risk Unbundled

Together, the “canaries in the coal mine” above expose a trend line of real disruption on the horizon, what we might call a rising Transformation Risk, a broad term that includes at least five subcategories, which take their place alongside such traditional utility risks as reserve margins, system outages, cyber security, market exposure, long-term planning and capital expenses, etc.

- **Operations Risk.** Over the past few years, two concepts, the Duck Curve in CA¹³ and the Nessie Curve in HI,¹⁴ describe the impact of increasing levels of solar PV on traditional grid operations. These are prime examples of Operations Risk: increasing levels of DER on the edge – where the grid terminates at the customer site – will make the grid increasingly difficult to operate under the current system paradigm, including the new risk of power backflow on heavily loaded circuits.
- **Enterprise Risk.** The introduction of the phrase *Utility Death Spiral*¹⁵ into the mainstream usage in 2012 and 2013 highlights a second subcategory of risk, where rate increases become necessary when sufficient DER penetration reduces utility revenues. But besides making utility financial statements whole, rate increases also accelerate grid parity and enhance the appeal of DER, driving even more penetration, making further rate increases necessary. The end result is a negative

9 Big Bang Disruption, HBR, March 2013, <https://hbr.org/2013/03/big-bang-disruption/>

10 *Creative Destruction and the Natural Monopoly ‘Death Spiral’: Can Electricity Distribution Utilities Survive the Incumbent’s Curse?* Paul R. Newbury University of Queensland - Faculty of Business, Economics and Law, February 28, 2013, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2418076

11 2013 Itron Resourcefulness Index: A Report on the Current State of the Utility Industry, January 2014, <https://itron.com/BeResourceful/Documents/ItronResourcefulnessIndex.pdf>

12 New York: *Reforming the Energy Vision (REV)* Case 14-M-0101

13 Duck Curve, Clean Coalition, May 2013, http://www.clean-coalition.org/site/wp-content/uploads/2013/06/Renewables-Integration_Power-08_ssw-17-May-2013.pdf

14 Hawaii provides U.S. utilities a glimpse of the future, *Utility Dive*, June 2014, <http://www.utilitydive.com/news/hawaii-provides-us-utilities-a-glimpse-of-the-future/272824/>

15 Adapting to plug-ins: Electric cars could help save power utilities from a “death spiral”, *The Economist*, October 4, 2014, <http://www.economist.com/news/business/21621850-electric-cars-could-help-save-power-utilities-death-spiral-adapting-plug-ins>

self-reinforcing cycle that earns the scary title Death Spiral. Sounds like a Black Hole – stay away! But not so fast, as many still dispute the nature or even possibility of such an outcome. That said, the risk of flat or declining revenues is real, and reduced revenue constrains a utility's ability to respond to changes by becoming more flexible and adaptable.

- **Organizational Risk.** This next subcategory begins with the well-documented challenge of replacing aging utility workers, but expands when organizational changes in job descriptions, business processes and business model are contemplated. Slow to change, utility organizations find it difficult to mobilize against threats, discussed as the "Rigidities and Inhibitions" in the DRUID Conference white paper mentioned above. This challenge is compounded when most utilities have been through reorganizations and budget cuts that have left them leaner, but with slim resources to manage necessary changes. As workers take on additional tasks, their core job functions face the risk of disruption.
- **Market Risk.** The rise of a more mature energy consumer, adopting new consumption patterns and encouraged by energy service companies to leverage DER, creates this next subcategory of risk. Utilities will have to open up to collaborate with a more empowered energy consumer with more demanding expectations of the utility, or risk losing their natural role as local energy subject matter expert to those more willing to engage with energy consumers in new ways, on new terms. And as the utility loses its historic role in the community, loss of revenue opportunities are sure to follow.
- **Regulatory Risk.** Finally, monopoly utilities are still regulated in various degrees, their fates intertwined with regulators as both contemplate transformation. As regulators adjust their thinking and evaluate their options for industry transformation, this subcategory of risk for utilities includes managing business transformation inside their organizations and industry transformation expectations of the regulators who set their rates and guide their investments. Utilities must seek to guide industry transformations to be in alignment with their best interests, or suffer actions or inactions by regulators that confound their plans.

Looking Both Ways: Mastering Business Transformation with an Artful Managed Transition

In the face of such widespread and fundamental risks documented above – adherents of the Utility Death Spiral place this risk at the existential level, while others are more moderate in their projections – electric utilities have an impera-

tive to adjust their strategies and business models, operations, organizations, finances, market relationships, and regulatory approaches to manage risk and prepare for upcoming changes – in short, to transform themselves. Utilities must adjust internally, even as they participate in industry transformation to drive favorable changes in their industry as a whole. Electric utility leaders have an opportunity to shift from traditional passive regulatory compliance – following instructions from regulators and doing at least the minimum to remain in compliance – to a more active role of designing industry transformation so that their interests are addressed proactively. To describe the changes needed to address Transformation Risk at the individual utility level, we use the term *business transformation* as distinct from the modest to radical changes at the industry level driven by regulatory and legislative policy. Business transformation describes the measures a utility takes to address the new risks enumerated above, but also to take advantage of new opportunities to make new types of revenues. Like the Roman's Janus,¹⁶ the two-faced god of transitions who looks both to the past and to the future, utilities must look to the past to manage their traditional grid-based business, even as they look to the future to prepare for a new type of business that incorporates non-grid products and services.

The Art of the Managed Transition described below blends grid reliability/optimization with new value added services and new business models. Business transformation is closely aligned with technology initiatives, even being driven by technology plans, so the Managed Transition may well begin with a Smart Grid program. Beyond the technology procurement and implementation plans and activities of Smart Grid though, a business transformation becomes a broader exercise, including mobilization of internal stakeholders (organizational change management) and planning for collaboration with external stakeholders (customers, vendors and regulators). Without a focus on these indirect aspects of transformation, technology projects face greater implementation risks.

The low-risk high-value business transformation should be approached with a managed transition that includes some version of each of the following steps, as the utility designs a plan that will integrate grid optimization with new business models and other necessary changes.

1. **Vision.** Craft a vision of The Utility of the Future to kick off a strategy planning effort, with initial widespread acceptance at the leadership level;
2. **Orientation.** Understand strategic threats and risks from the perspective of the individual utility using analysis and assessments;
3. **Business Model Aspirations.** Evaluate alternatives for new business models to determine the best fit and to understand from a comprehensive level the interac-

¹⁶ <http://en.wikipedia.org/wiki/Janus>

tions of channels, product, pricing, etc.; tools such as the Business Model Canvas¹⁷ are well suited for this step;

4. **Platform Evaluation.** Consider technical alternatives to create a platform for management of disaggregated DER elements, but also engagement of DER vendors and potential partners;
5. **Organizational Change Readiness.** Assess the readiness of employees to begin a transformation process, surveying all levels of the organization and using educational tools to ensure widespread awareness of the issues associated with change within the organization;
6. **Strategic Roadmap (Qualitative).** Design a qualitative understanding of new business models, capabilities, and aspirations and the integration of technologies to craft a rough draft of a long-term plan; evaluate regulatory challenges and strategy, organizational impacts and readiness, and external stakeholder alignment and mobilization;
7. **Strategic Roadmap (Quantitative).** Craft a detailed quantitative assessment of costs and benefits of a transformation program to produce a value-based business transformation roadmap;
8. **Long-Term Partner.** Identify and engage one or more long-term partners with the necessary subject matter expertise, experience, and resources to assist with the transformation;
9. **Program Management Office and Value.** Establish the program management office (PMO) and begin the long-term implementation project, with a focus on consistent value creation and logical, progressive skill attainment; and
10. **Program Refresh.** Plan to refresh the strategic roadmap regularly to accommodate growing organizational maturity (changing strengths and weaknesses) and a dynamic external environment (new opportunities and threats).

These ten steps outline a strategy for utilities facing dramatic change. The challenge ahead for any utility is to craft a vision for their future – their own Utility of the Future vision – then build on it by defining a detailed Utility of the Future strategy to provide managers and line staff clear directives on their present and future roles to implement the strategy. A key component of the corporate strategy will be the business model strategy, perhaps the most challenging aspect of the strategy building exercise, which is best accomplished by starting with customer use scenarios to devise defensible and achievable business cases. The clever use of technology that combines utility core strengths with innovation, compelling marketing, and sound financial man-

agement focused on value will provide the success path to drive new business models.

Three critical aspects will lower risk helping to ensure a successful managed transition to a business transformation: Start Early; Engage an Experienced Implementation Partner; and Seek Strategic Partnerships to Create Market Advantage.

1. **Start as Soon as Possible.** It is vital to start early for a successful business transformation. Time is a critical aspect of success, given that time, resources and quality are three points of a dynamic triangle that affects all projects, with each working in a dynamic relationship with the other. Emphasis on any two will necessarily lead to a relaxation of the third constraint. For instance, if the project must be completed in a short amount of time and with limited resources, then quality is likely to suffer. Conversely, if the project must be quick and high quality, then greater resources will be needed. Finally, if the project must be high quality and resources are limited, the only alternative is to extend the project length, so that time may be used as an additional resource to ensure high quality. This is the nature of business transformation for electric utilities, who must maintain system reliability (high quality) and are under slow to no growth in load, and have limits on rate increases (limited resources). One need only imagine the increase in risk if a business transformation is delayed, and then becomes necessary two or three years later, but as an emergency. In that case, costs may be expected to go up, or quality to go down – both unwelcome outcomes for an electric utility. This conclusion may be counterintuitive for risk averse electric utility managers: with business transformation, delay doesn't lower risk, so much as it compounds risk. Electric utilities should take heed and begin immediately at the activity level appropriate for their particular situation, starting with an explicit plan for a Managed Transition.
2. **Engage an Experienced Implementation Partner.** Use of an experienced partner will lower the risk of a long-term business transformation. When considering a long-term transformation project, the selection of an external change agent who can also act as a subject matter expert reduces project risks as follows: 1) unforeseen outcomes may be anticipated and avoided with the use of best practices and by leveraging lessons learned from outside the utility; 2) third party experts can take greater risks, generate a sense of urgency and push the project harder than an internal team can; and 3) a third party partner lowers political risk and second-guessing later in the project, when difficult decisions are encountered, or when public doubts arise.

17 Business Model Generation, http://www.businessmodelgeneration.com/downloads/business_model_canvas_poster.pdf

3. Seek Strategic Partnerships to Create Market Advantage. As change accelerates, it will become more and more difficult for a utility to do all that is necessary to cope, without outside help. In a more static world, utilities could manage by themselves, and that approach became an accepted standard: anticipate and plan; deliver services; and finance long-term investments to serve a captive base of ratepayers by raising rates when necessary, through rate cases approved by regulators. But in the upcoming, more dynamic world, which is both more complex and less predictable, planning will need to be more flexible and adaptive. Investments will require shorter time horizons lest they be stranded by unanticipated changes. And revenue strategies will need to go beyond rates to include a diverse set of revenues from value added products and services. As the utility ventures into the unknown, where new skill sets associated with innovation and value creation are critical, where marketing savvy is as important as execution and delivery, it will be to the utility's advantage to partner wisely, but also to partner often. Partnering and collaboration – for skills that are lacking, for investments that are otherwise not possible, for competitive advantages in certain markets – will become a success strategy, a great way both to pursue opportunities that would otherwise be unattainable and to avoid risks that would otherwise be unavoidable. To optimize on flexibility and adaptability, utilities will need to make strategic partnering a core competency in the future.

Assessing Costs and Benefits: Valuing Business Transformation

The nuts and bolts of a cost/benefit analysis of business transformation are highly subjective. That said, every transformation will include a common set of elements. We start with the major considerations below, then go on to the details.

A good place to start in assessing the value of a business transformation may be to consider the core premise in this document, that a business transformation is imperative. With complete agreement on that count and the need for a sense of urgency, the matter of costs and benefits becomes a management task and the focus of the Managed Transition, with thorough planning and attention to execution to minimize costs and maximize benefits. The second step regarding value involves the Rigidities and Inhibitions list from above. Given that a business transformation begins with a strategy and program to address the inability to adapt to change, the degree to which that list aligns with the electric utility provides a starting point for the value of a transformation. A third step is to assess the level and impact of risks in the New Risks on the Horizon section above. The degree to which these risks are considered real, imminent, and/or substantial will drive the value of a business transformation. If this straight-forward initial assessment shows that

the business transformation is a) unavoidable and urgent based on circumstances; b) required by the nature of the electric utility; or c) necessary to avoid risks, then a valuation exercise becomes secondary to the decision to proceed: business transformation is simply a requirement regardless of its value.

But in business it is necessary to be objective and to run the numbers on such an exercise – a cost benefit analysis is not so lightly dismissed. So beyond the gross considerations on value in the paragraph above, there are multiple, subjective dependencies that will drive the cost benefit analysis, including:

1. internal analysis (i.e., relative maturity of the electric utility (readiness), core competencies and strengths, assessment of organizational weaknesses in relation to the vision, aspirations for new business model and assessment of requirements, and gap analysis between core competencies and aspirations);
2. external analysis (i.e., vision for the future – opportunities, estimates of the size and pace of industry change – threats);
3. planning and implementation costs;
4. short term benefits (operational expense reductions, revenue protection, new revenues, etc.); and
5. long-term benefits (capital expense avoidance, sustainable competitive advantages, etc.).

The Art of the Managed Transition: Recommendations for a Successful Business Transformation

1. Adopt a Sense of Urgency

A review of the multiple trends that impact the electric utility leading to a recommendation of a new business model must also acknowledge the strategic threat to electric utility revenue represented by Disintermediation and Decentralization. Accordingly, we recommend that electric utility leadership engender a sense of urgency throughout the organization to promote the pursuit of a new business model and customer engagement, which will in turn highlight the necessary organizational changes.

2. Protect Core Revenue

In the face of strategic threats, it is critical that the electric utility address revenue and financial viability by taking steps to protect revenue from kWh sales as the utility develops the capacity to generate revenue from energy service sales. Growing closer to customers and tailoring services to meet their needs will support protecting revenue.

3. Build Long Term Core Capabilities

We recommend that the electric utility get closer to the customer and the market by taking a series of actions to seek out third party opinions and recommendations on new core

capabilities associated with greater flexibility and adaptability, and incorporate the feedback into corporate planning.

4. Announce a Journey of Discovery

We recommend that the electric utility foster a culture of experimentation, sharing that culture with its customers. By admitting that innovation and creativity also come from customers, the electric utility may pursue the rapid acquisition of new core competencies, experimenting with new approaches with its customers in multiple iterations. As some call it, this represents a period where solutions may be seen to be in Permanent Beta, with consumers joining companies as a vital part of such experiments. This approach represents a Journey of Discovery with a defined mission: "1) protect our shared investment in a critical infrastructure;" and 2) "secure our future with new services that we develop together."

5. Develop a Strategy for both Vertical and Horizontal Integration

It is critical that the electric utility craft a strategic approach to implementation, developing a deliberate, coordinated approach to the implementation components of each of five strategic areas – Technology Implementation, Business Model Reform, Consumer & Market Engagement, Organizational Change & Adaptation, and Regulatory Engagement. For instance, a strategy for partnering is critically connected to the new business model of Energy Service Provider. As the strategy to vertically integrate within each of the strategic areas is identified and developed, we recommend that the electric utility devote increased attention to horizontal integration, ensuring effective operations across the five strategic areas, beginning by evaluating Consumer & Market Engagement, Organizational Change & Adaptation, and Regulatory Engagement, to consider how actions involving those three areas may affect the other two - Technology Implementation and Business Model Reform, as highlighted in this document.

6. Develop a Strategy for Consumer & Market Engagement

Even as work progresses based on the recommendations that follow for development and implementation of a new business model, we recommend that the electric utility initiate a more coordinated and focused approach to Consumer & Market Engagement, the third strategic area beyond Technology Implementation and Business Model Reform. It is vital for the organization to address any inconsistencies across the organization in strategic messaging, ensuring that it speaks with a common voice to its external stakeholders.

7. Develop a Strategy for Organizational Change & Adaptation

We recommend that executive attention be devoted to the organizational design and core competencies that will be required to support the requirements of a corporate strategy to be a Utility of the Future and to execute a Smart Grid Program. To a degree, the electric utility can make progress with its current organizational structure, job definitions, and work processes. But increasingly, it will become apparent that a parallel organization may be needed to incubate and grow the Energy Service Provider business model. Utilities that have undergone the most successful Smart Grid transitions have created separate organizations to focus on implementing and integrating technologies, and incubating a new business model, staffed by a group of talented and dedicated pioneer employees in a start-up culture that rewards deliberate risk-taking, whether it results in failure and learning or preliminary success, because both fast failure and immediate success are building blocks that are necessary to build the foundation of a long-term successful transformation.

8. Conduct a Business Model Canvas Workshop

Business Model Generation, a global sensation and best-selling book,¹⁸ offers a tool for dynamic business model planning called Business Model Canvas, with nine components: Customer Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships, and Cost Structure. We recommend that the electric utility develop and implement a workshop among its senior staff using the Business Model Canvas. The output of this workshop will be a more detailed and deliberate business model planning process than that described in this document.

9. Understand the Customer

We recommend that the electric utility take steps to craft a business model strategy that is based on a deep understanding of the customer and their relationship with energy – what it has been and what it is becoming. We recommend that the electric utility develop a discovery process that involves developing one or more hypotheses, testing the assessment of the problem, and then testing the assessment of the product or service itself, using customer perspectives to shape the offering.

10. Identify and Promote Customer Value

We recommend that the electric utility identify and promote customer value in addition to low kWhs as the standard in the marketplace, shifting emphasis from the commodity of electricity to the value it enables (e.g., comfort, convenience, etc.). With a thorough mapping of customer needs and desires, a sound customer value proposition can be constructed that will guide product development and market segmentation.

¹⁸ Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers by Alexander Osterwalder, Yves Pigneur, <http://www.businessmodelgeneration.com>

11. Obtain Customer Validation

With products and/or services based on real customer needs and values, we recommend that the electric utility engage early adopter customers with prototype products and services. The electric utility must move past ideas and concepts to real customers who pay for real services that meet their needs. These first customers are important because they will educate the electric utility further on market behavior, value propositions, etc. This is a good opportunity for the electric utility to align closely with communities that it trusts, to lower the risks associated with delivery of prototype products and services.

12. Create Customers/Develop Markets

We recommend that the electric utility build on its early success with early adopters by understanding the nature of demand and devising ways to grow demand into a viable market for new energy services. The electric utility will need to position its offer by building on its reputation in the regional marketplace as a reliable, trustworthy, local energy expert. This will be a good opportunity to understand segments and neighborhoods, focusing on communities that are most willing to work with the utility to develop new energy services.

13. Build an Energy Services Company

We recommend that the electric utility develop its ability to go beyond niche markets, to serve mainstream markets with the most popular products and services. The electric utility will need to develop a management structure and workplace culture to address a significant new energy services business, for instance, developing functional departments with the flexibility and adaptability to provide a fast response to new market opportunities as they develop.

14. Hold Workshops on Partner Engagement

Workshops offer a valuable approach to partnering. For instance, potential partners may view the electric utility as a potential buyer of services more than a partner in the beginning. Workshops offer the opportunity to share and compare visions about the emerging energy services market and to explore potential joint business opportunities. We recommend that the electric utility initiate partnering with engagement workshops and keep discussions at a high level.

15. Hold Workshops on Core Competency

We recommend that the electric utility explore core competencies internally by engaging in core competency workshops with key staff. With workshops designed for active listening, the utility can solicit perceptions of the utility's capabilities from its management staff, as well as aspirations, and associated gaps between current core competen-

cies and those that will be needed going forward. With such feedback, the utility is better positioned to partner based on a well-balanced understanding of its current capabilities and necessary actions to develop its energy services business.

16. Evaluate Partners

We recommend that the electric utility evaluate its potential partners by assessing partner capabilities against the list of gaps identified in the core competency workshops. Such an assessment will produce a rank order list of priorities and objectives that will support a partner engagement strategy.

17. Develop a Competency in Partnering

We recommend that the electric utility establish strategic partnering as a core competency and work to develop its internal capacity to partner. As the electric utility proceeds with its Energy Service Provider business model and builds a Smart Grid, it will have increasing opportunities to partner with companies whose business capabilities and business strategies align well with its own.

The Last Word: A Monumental Challenge for Utilities

Electric utilities are faced with a strategic opportunity to address disintermediation and decentralization, which we call the Transformation Imperative. The electric utility arose as an organization with a business model to distribute a centrally produced commodity, delivered and metered as a kWh by monopolies with prescribed service territories. But as the previous sections show in detail, the rise of decentralized systems offers consumers a grid alternative, almost a polar opposite, which would-be utility competitors embrace by offering clearly differentiated and diverse energy products and services with added value. To remain competitive, utilities must do nothing less than manage a transition to create a hybrid of Centralized and Decentralized business models, securing their traditional business while developing an answer to the challenges of new competitors. Decades ago, 7-Up memorably challenged the status quo of dominant cola soft drinks like Coke and Pepsi with a marketing campaign and iconic television ad, branding their product the UnCola.¹⁹

The table below imagines a similar comparison, contrasting two approaches – centralized and decentralized – as they apply to electric utilities and alternative power providers, foreseeing likely disruptor marketing campaigns and highlighting the polar opposition of these two paradigms on several fronts to make clear the scope of this monumental challenge. With a clear understanding of such differentiated value propositions, utilities may begin to map out their response to address this disruptive threat. We began this white paper by highlighting a significant challenge – trans-

19 7 UP: The UnCola, <https://www.youtube.com/watch?v=AXmc7DG4uu8>

formation – and highlighting a prevailing approach – a strong defense of the status quo. Denying a challenge is a short-term strategy that addresses immediate symptoms, but delays the development of solutions if the denial shifts attention away from the core problem. Recognizing a challenge, conversely, is the first step to addressing it with creative solutions. The principal challenge facing the utility industry is not that new players are using new technologies to chip away at utility revenue and to interfere with utility operations and grid stability. While those two issues get most of the press, and certainly demand our attention, they are not the core issue, rather they are symptoms of a deeper challenge, in three parts: 1) the world is rapidly changing and those changes are making the utility business model obsolete, faster than we might imagine; 2) our ability to respond is slower than the response the situation demands; and 3) the increasingly decentralized environment will be characterized by disruption, both gradual and rapid, driven by outside parties using new technologies, which will raise the stakes and add to difficulties in the years ahead.

Put simply, time is no longer on the side of electric utilities. Given that these factors are beyond the control of any single organization, **the core challenge for the electric utility is to gain new organizational capabilities and increase flexibility**, in order to become more adaptable: in short, more responsive to change. In an increasingly uncertain environment, the ability to anticipate changes, develop scenarios for response, and rapidly craft and adjust strategies will become ever more important. Further, the ability to stay close to customers by leading them in new directions with new services will help slow the pace of market penetration by third parties, thus preserving revenue and business options, buying more time and lowering risk.

About the Author

John Cooper is a Management Consultant for Smart Grid Strategies and Implementation programs at Siemens. A recognized expert in the utilities and innovation in particular, John is co-author of *The Advanced Smart Grid: Edge Power Driving Sustainability*. With strong business knowledge and more than ten years experience in management consulting, John has worked in a variety of cutting-edge energy and utility projects. Beyond management consulting, John has 18 years additional experience in entrepreneurial, business development, sales, marketing, political, and research roles.

For more information, contact John Cooper, US Business Development Manager, at j.cooper@siemens.com.

Contrasting Centralized and Decentralized Energy

Parameter	Status Quo: Centralized	Alternative: Decentralized
Primary Actors	Utilities use the grid to distribute centralized power to ratepayers and customers	Utilities collaborate with communities using the Internet, Devices and Apps to coordinate distributed loads, energy storage, and on-site generation with power from the grid
Primary Assets	Fossil fuel and renewable energy power plants and distribution grid infrastructure	Building-based technologies: Energy efficiency and distributed energy resources/services
Strategy	Evolution of the status quo (utility-led) based on protected markets, mergers and acquisitions, operational efficiency, and digitization	Revolution through edge creativity (consumer-led) based on innovation, diversity, new business models, and bottom-up flexibility
Operations	Physical: Central resources “follow” passive “dumb” loads based on voltage harmony, wholesale market prices, and demand response	Virtual: Active smart loads optimize to available/economic resources and energy storage, based on user priorities, local conditions, and grid price response
Economics	20th Century: Regulated supply side	21st Century: Networked demand side
Resource	Scarcity and dependence	Abundance and independence
Energy	Lowest cost commodity wins	Highest value differentiated services win
Value	Rates/Tariffs: \$/KW and \$/kWh	Services, subscriptions in contract service level agreements
Prices	Rising trend, upward pressure	Flat or declining trend, downward pressure
Supply Chain	Vertically integrated	Virtually integrated
Information	Opt-out “smart meters” (AMI) for utility: consumption data and revenue info, remote sensing for outage mitigation	Opt-in energy management systems empower consumers: information, feedback loops, and automation
Outages	Unavoidable, management and mitigation	Avoidable as an option, prevention
Management	Top down with smart grid (intelligence in network/core)	Bottom up with smart consumer/community tools and services (intelligence at the edge)