INNOVATION AND THE NEXT GENERATION UTILITY

EMBRACING THE NEW ENERGY ECOSYSTEM

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CONTENTS

EXECUTIVE SUMMARY

Faced with rapidly-evolving markets and incentives, electric utilities today have an unprecedented opportunity to develop new, innovative ways of structuring their businesses.

In the past, utilities were driven by two simple goals: to expand generation and grid infrastructure and to improve operational efficiencies. That model is changing. Competitive distributed energy technologies and analytics tools are opening up new markets, shifting the economics of infrastructure development, creating new statutory obligations, and offering the potential to grow utility earnings. Third-party challengers are also competing to serve customers with rooftop solar, batteries and energy management tools.

The dominant utility business model – a supply-only strategy designed to bring steady rate base growth with careful management of operating expenses – is being challenged. The new opportunity lies in figuring out how to harness the technologies and service models at the grid edge. Harnessing that opportunity requires a targeted innovation management strategy.

While changes in the electric sector have been underway for years, most utilities have not developed holistic strategies around managing and defining innovation. As a result, they may not be prepared to harness the coming market evolution. As the industry moves toward what we term “Dynamic Energy,” innovation will become necessary to sustain growth. Those that fail to establish innovation strategies will continue to be boxed in by regulators and traditional rate cases, and will continue to see long-term erosion to corporate earnings.

Since the late 1980s, regulators have tightened regulated return on equity (ROE) due to low interest rates, adequate access to capital, and a poor public appetite to fund utility earnings. Investors have accepted this decline due to how low-risk utility investment is compared to the market. However, any future interest rate growth may squeeze utilities due to regulatory lag and leave operating companies under earning (see Figure 1 below).

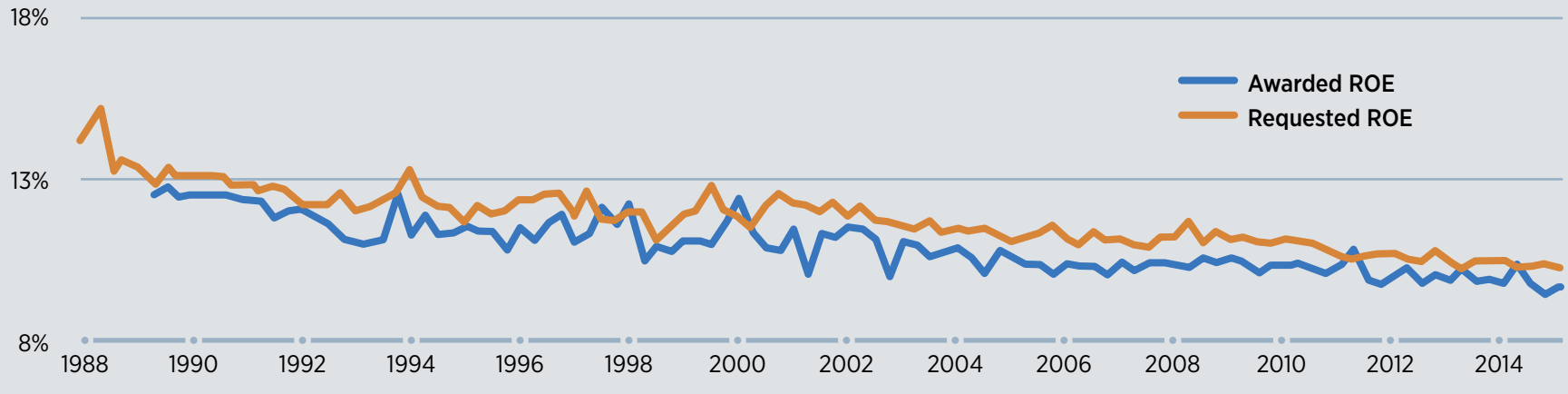


Figure 1: Source – Edison Electric Institute

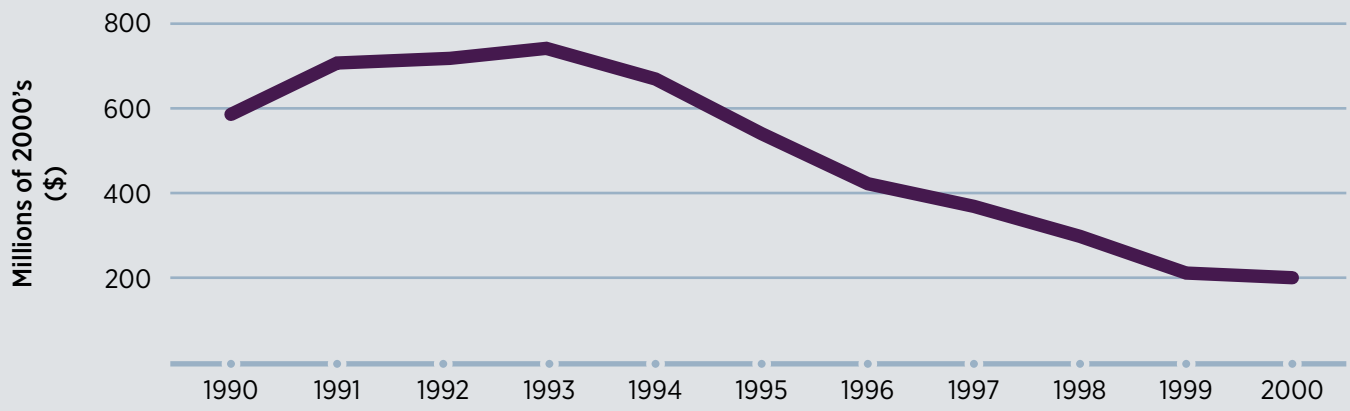


Figure 2: Source – Sanyal and Cohen, 2008, based on Compustat data, dollars expressed in 2000's dollars

Utilities have traditionally been safe investments. However, remaining safe investments in a changing market may require a bit of risk taking. Research activities have precipitously declined across the industry as utilities have grappled with deregulation activities, lower margins, and more frequent rate cases.

From 1993 to 2000, investment in R&D activities declined by nearly 74% in real dollars (with 2000 as base year). Since 2000, R&D spending has not significantly rebounded. For reference, American utilities collectively spent a nominal $245 million on R&D in 2012, or about $183 million in real, 2000, dollars.[1]

So how do utilities break out of this cycle and create a plan to foster innovation – all while generating better returns for ratepayers and shareholders?

The foundation of an innovation strategy can be built today. In this paper, we explain how utilities will be better positioned to participate in the Dynamic Energy system if they focus on three key competencies (See Figure 3 below):

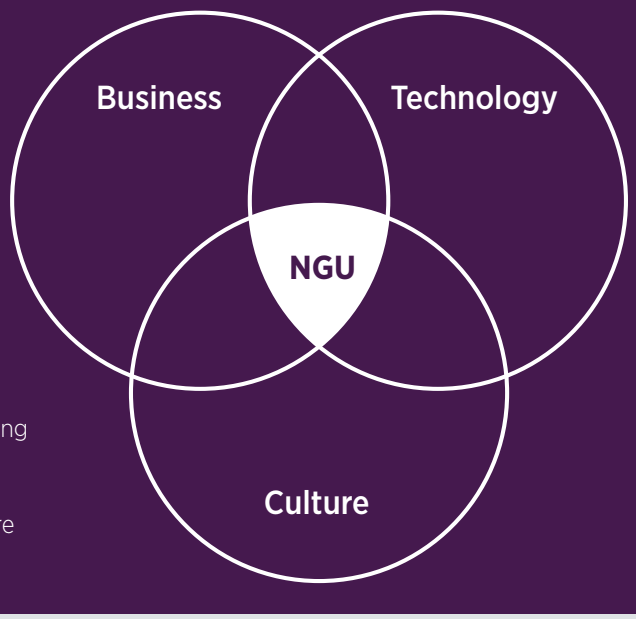


Figure 3: Building an Innovation Strategy – Summary Figure

1. **Business Model Innovation –** Driving the next generation corporate strategy through innovative new business lines, ways to earn revenue, and ways to manage costs and risks

2. **Technology Innovation –** Driving next generation grid systems and infrastructure through product development and technology management

3. **Cultural Innovation –** Driving a next generation workforce by formalizing the utility as a center for ideas and by drawing creative talent from the new wave of utility workers

The benefits of taking this three-pronged approach to innovation are clear. Doing nothing will lead to further declines in revenue and a loss of market share to third-party energy providers. Developing an innovation strategy – either company-wide or within specific teams – means opening up entirely new business lines and service models that will enhance the utility's reputation and grow earnings.

1. National Science Foundation: Business Research and Development and Innovation: 2012

INTRODUCTION AND BACKGROUND

The electric utility landscape is shifting fast. The steady push toward a Dynamic Energy system will unleash a broad range of technologies that encourage on-site generation, two-way power flows, and will require new methods to manage and fairly value those resources.

Looking across the electricity ecosystem, we can identify four main participants and their roles in driving the evolution of the utility. The participants include:

Innovative regulators are driving change in markets with high energy costs, aging infrastructure, resiliency concerns, and political pressures. Proceedings like Reforming the Energy Vision (REV) in New York State seek to create a regulatory environment that encourages a more affordable, reliable, and efficient market-based system that values distributed technologies on the grid edge.

Energy suppliers and services are utilities and retail providers that make investments due to capacity constraints, population growth, environmental mandates, or a need to improve operational efficiency. They can be driven by a specific infrastructure need, a customer-focused strategy, or a desire to drive the regulatory agenda.

Discriminating energy consumers facing high energy costs and subject to time-varying rates and demand charges have looked to ownership of generation and storage assets as a way to manage costs. In some cases, they are participating directly in electricity markets as a way to take greater control of their energy costs and sustainability goals.

Shareholders are concerned about the utility's ability to defend the regulatory construct that protects earnings, while at the same time being proactive in seeking new opportunities for growth as markets change and new technologies develop. Shareholders expect that utilities should be able to innovate without adding risk or disrupting earnings.

All of these stakeholders are facing a common set of issues, but each has a different set of expectations. Utilities have a clear opportunity to stay ahead of the market by engaging with each group, understanding their positions and developing a strategy to address them all.

Grid technologies are growing much more sophisticated as the IT revolution permeates the whole enterprise, enabling granular control of power plants, transmission lines, distribution infrastructure and devices on the customer's side of the meter.

In progressive states, regulators are working toward establishing a two-way transactive energy market that will allow customers of all sizes to participate. This will likely proceed in phases as regulators grapple with competing demands from the many stakeholders offering different perspectives on the transformation.

> "We are seeing companies such as SolarCity and Tesla innovate at the edge of the traditional energy value chain and chart new courses of growth in the industry … For utilities to react effectively to this shifting landscape, they should ensure that innovation is an integral part of their core competencies – in strategy, design and execution."
>
> **PAUL CHANDLER**, PA ENERGY AND UTILITIES EXPERT

A movement toward a Dynamic Energy system has significant benefits for utility operations, as well. Sensors and analytical tools can increase operational awareness and control, while maximizing consumer engagement. (Read more about these technological advances in our report, Leading Edge Technology Evolution and the Next Generation Utility.)

And, with utilities under pressure to provide affordable and reliable power, even as environmental rules grow stricter, these new technologies offer an opportunity to improve performance and profitability across the board.

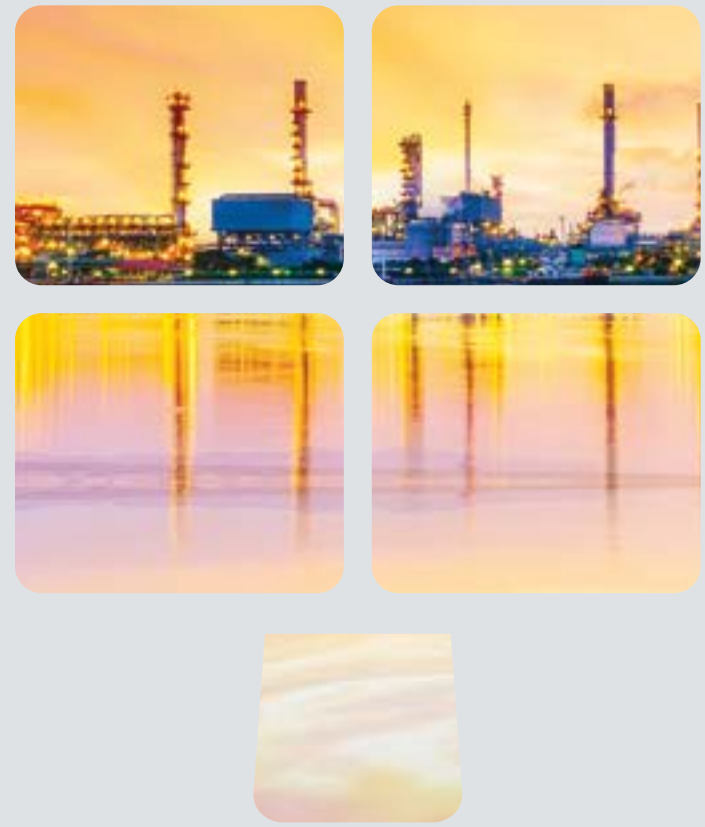
Finally, the growing army of grid edge vendors are ready to provide new services that supplement and replace utility offerings. These players will also influence regulations. Will utilities allow them to erode their relationships with customers? Or will they develop the tools to enhance their competitiveness?

"We are seeing companies such as SolarCity and Tesla innovate at the edge of the traditional energy value chain and chart new courses of growth in the industry," says PA Consulting Group energy and utilities expert Paul Chandler. "For utilities to react effectively to this shifting landscape, they should ensure that innovation is an integral part of their core competencies – in strategy, design and execution."

We maintain that utilities will be better positioned to participate in the Dynamic Energy evolution and to capture associated earnings than other third-parties. Their historical expertise across regulation, infrastructure development and customer engagement gives them a unique advantage. But tapping that advantage means adopting new innovation-centric strategies to guide internal planning.

So what would an innovation strategy look like? Below is an exploration of business model innovation, technology innovation and cultural innovation.

BUILDING AN INNOVATION STRATEGY



Business Model Innovation

Business model innovation is primarily focused on building new business lines that grow revenue opportunities, and build new ways to manage costs and risks.

The Changing Game

The old models of revenue generation are evolving. Historically, corporate utility growth has been based on expansion, acquisition, consolidation and standardization. Profitability has been managed through targeted capital spending, rate cases, and operating expense management.

In deregulated markets, wholesale and retail strategies have, predominantly, been oriented around lowering operating costs and competing for load. As a result, dominant utility business models have primarily focused on maximizing profits on the supply side of the market equation.

In the world of Dynamic Energy, simply growing the rate base, cutting costs, and managing regulators has left the utility industry unprepared for the future. New policy instruments and regulation are starting to focus beyond just affordability to environmental goals, social goals, and real-time grid optimization. Utilities are increasingly finding themselves driven by a diverse set of regulatory objectives and not by the traditional cost-of-service business strategy.

Utilities have been locked into a single method of money making which has served them well in the past. But, that basic model will not be flexible enough to capture the diverse value streams as part of the Dynamic Energy system.

Business Model Strategies to Employ

Business model innovation is based on the philosophy that earnings growth opportunities are out there, but the current models do not adequately capture and internalize them. Utilities can uncover new revenue growth by chartering a team with the core mission of identifying opportunities, implementing the necessary corporate structural changes, and internalizing associated profits. As this team develops, the utility could consider ways to manage them as a business unit.

This group would adopt three key doctrines:

Growth without asset growth: A challenge for utilities has always been that energy infrastructure is capital-intensive. Those investments introduce risk into the business, which is why utility growth strategies have been relatively narrow, organic, and implemented through acquisition or rate-based investments. But building capital-intensive projects are not the only way to grow. Companies can build significant revenue through the orchestration of services, in lieu of pure asset ownership.

One common example of this is Uber, which has built a transportation empire without much up-front investment or stranded cost risk. Most observers will credit them for their undeniably impressive customer experience, all managed through a basic cell phone app. Uber's success proves that healthy margins are possible in a market where growth is decoupled from

asset ownership. Information technology is the tool by which they can orchestrate asset participants without having to invest in their own fleet of automobiles.

As utilities consider where to target new growth opportunities, business models should be nimble and adaptive, while focusing on where customer value can be created outside the traditional asset base.

Supply, demand, and everything else: Utilities have the basic supply side covered. But they're only just starting to capture the economic surplus available in the market on the demand side.

Considerable attention is now devoted to managing demand. Whether that attention is in the form of demand elasticity (demand-side management and smart home infrastructure), the quantity of demand (electric vehicles and long-term load growth), or product bundling (renewable retail service agreements), there is surplus opportunity available to the utility. The opportunities to build revenue-generation services around these areas – while also improving the cost of managing intermittent renewable energy – are wide ranging.

Draw on business support: As those accountable for business innovation seek to identify and develop opportunities, they may want to encourage idea sharing between those developing new products and services and the subject matter experts within the corporate organization who can provide guidance. This has the added benefit of lowering contracting costs. They are the core tenants of an integrated innovation strategy that includes both technology and cultural influences.

There is also an opportunity to look at "innovation-as-a-service" models that allow utilities to outsource innovation planning so they can continue to focus on operations.

Utilities can start these efforts with nominal startup costs, thereby lowering financial risks to ratepayers and shareholders. However, as this group identifies and implements innovation strategies, it is important that the utility tie decisions back to profit and loss and codify the right performance management controls.

Whatever the method, without a holistic view of processes, checks, controls, and design, business model innovation can quickly devolve into a disorderly process.

So, who's doing business model innovation effectively?

IBERDROLA

In Action – Business Model Innovation

Iberdrola has implemented an integrated innovation strategy focused on uncovering emerging business opportunities across the industry. The company's strategy group is built to encourage collaboration with external technological partners and pursue projects with a high social value. Iberdrola does so through two teams: Iberdrola Ventures, and Iberdrola Innovation Program for Suppliers.

Iberdrola's supplier program targets three areas: enabling access to funding mechanisms for suppliers; fostering the set-up of joint companies (spin-offs with suppliers); and innovative purchases from small- to medium-sized business (SMEs). The set-up of socialized funding mechanisms and joint supplier profit models seem to target growth opportunities where asset ownerships are not necessarily burdensome or high risk to Iberdrola. This is a capital-lite approach that prepares it for adoption of future technologies or service models.

Technology Innovation

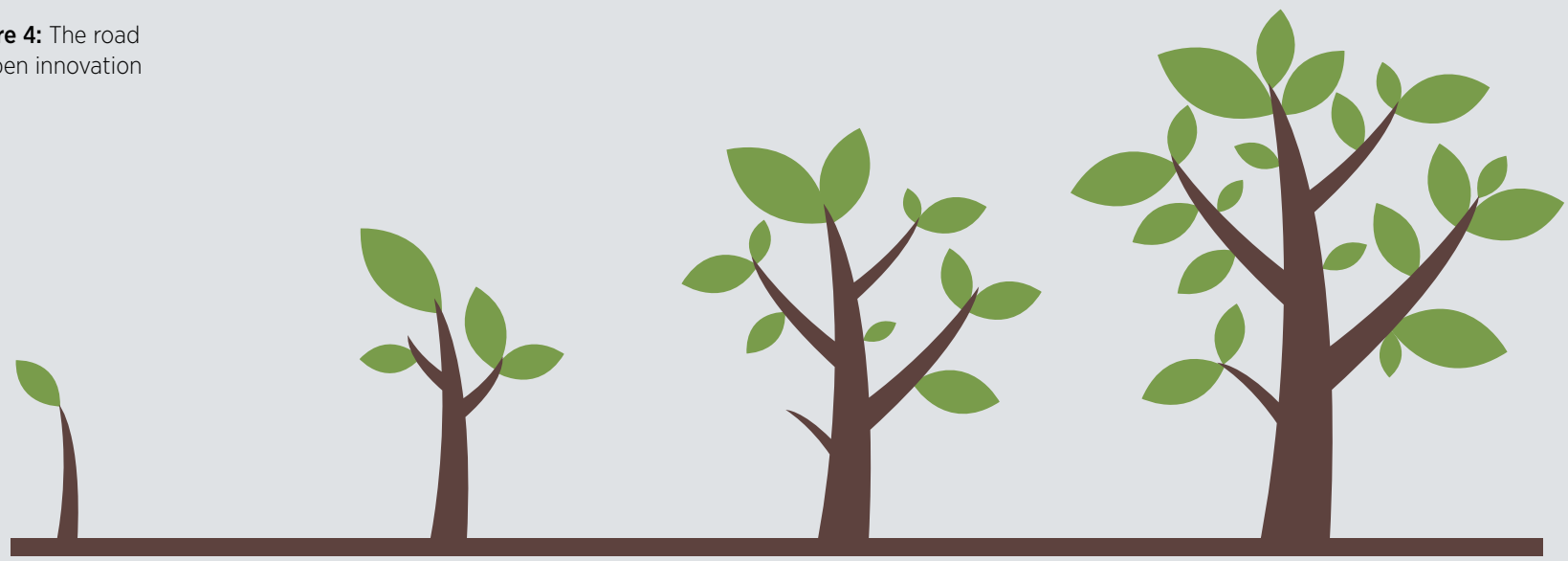
Technology innovation is driving the next generation grid by changing the way infrastructure is built, the way customers interact with markets, and the way utilities manage the system.

A Technology Revolution

The technology revolution is underway. As Moore's law continues to hold true and the sophistication of hardware and software improves, an unprecedented number of grid management tools are blossoming.

Utilities have commonly looked to the market for mature products and solutions that could be applied to the operating environment. There are a lot of technologies available, however. And the reliance on point solutions has created a fragmented environment in the software and analytics sector.

Figure 4: The road to open innovation



‘Fortress’

R&D is internally controlled and focussed – little to no connection to external world other than conventional supplier/customer relationships. Open Innovation is not actively worked.

‘Open Prison’

R&D is leveraging their conventional network for more connected innovation. Open Innovation is embraced sporadically.

‘Boy-Scout’

R&D is introducing themselves to new external parties in order to build their innovation portfolio and structure a journey to a fully engaged network. Open Innovation is a newly adopted strategy.

‘Epicentre’

R&D plays an integral part in a powerful, connected external R&D network. Seamless flow of ideas/technology/skills to and from external parties. Open Innovation is in the DNA.

Single solution products will no longer adequately serve the needs of the grid and customers. Therefore, as utility technology strategies evolve, they must be thinking more holistically about long-term integration strategies that enable multiple uses.

Embracing Technology Innovation

Utilities can begin today by considering their role in the market for intellectual property and new products. A good governing philosophy is one that positions the utility at the center of energy technology development and opens the doors to a powerful network of R&D participants. The utility manages the grid – making them key in building R&D work that leverages those assets.

Aligning this R&D work with testing goals, broader market need, and specific utility requirements is essential. Promotion of interoperability standards is also essential for aligning stakeholder objectives with the broader market need.

Above (Figure 4) is an illustration of the importance of open innovation. The most powerful outcome involves all parties – technology developers, integrators, system operators, and standards bodies – to truly unlock the promise of technology innovations.

Today, utilities tend to sit somewhere between “fortress” and “open prison,” where innovation is incremental, and where external relationships are often only built with long-trusted industry partners. For example, a close relationship with an established set of transformer vendors or software vendors could be considered fortress style innovation – innovation is embraced in an isolated way, often in the context of specific hardware or software issues.

Utilities have managed their industry relationships in this manner as a way to reduce risk – reputable brands lower the risk of asset failure and damages to earnings. In that context, however, innovation is primarily focused on incremental solutions to the problems of today, not for the more challenging opportunities of tomorrow.

There is another way. Utilities have an opportunity to embrace an active role in the entire product development lifecycle and consider alternative strategies for building, testing, and actualizing technology that keeps risks low by engaging with the broader marketplace. This requires a consistent, flexible innovation framework.

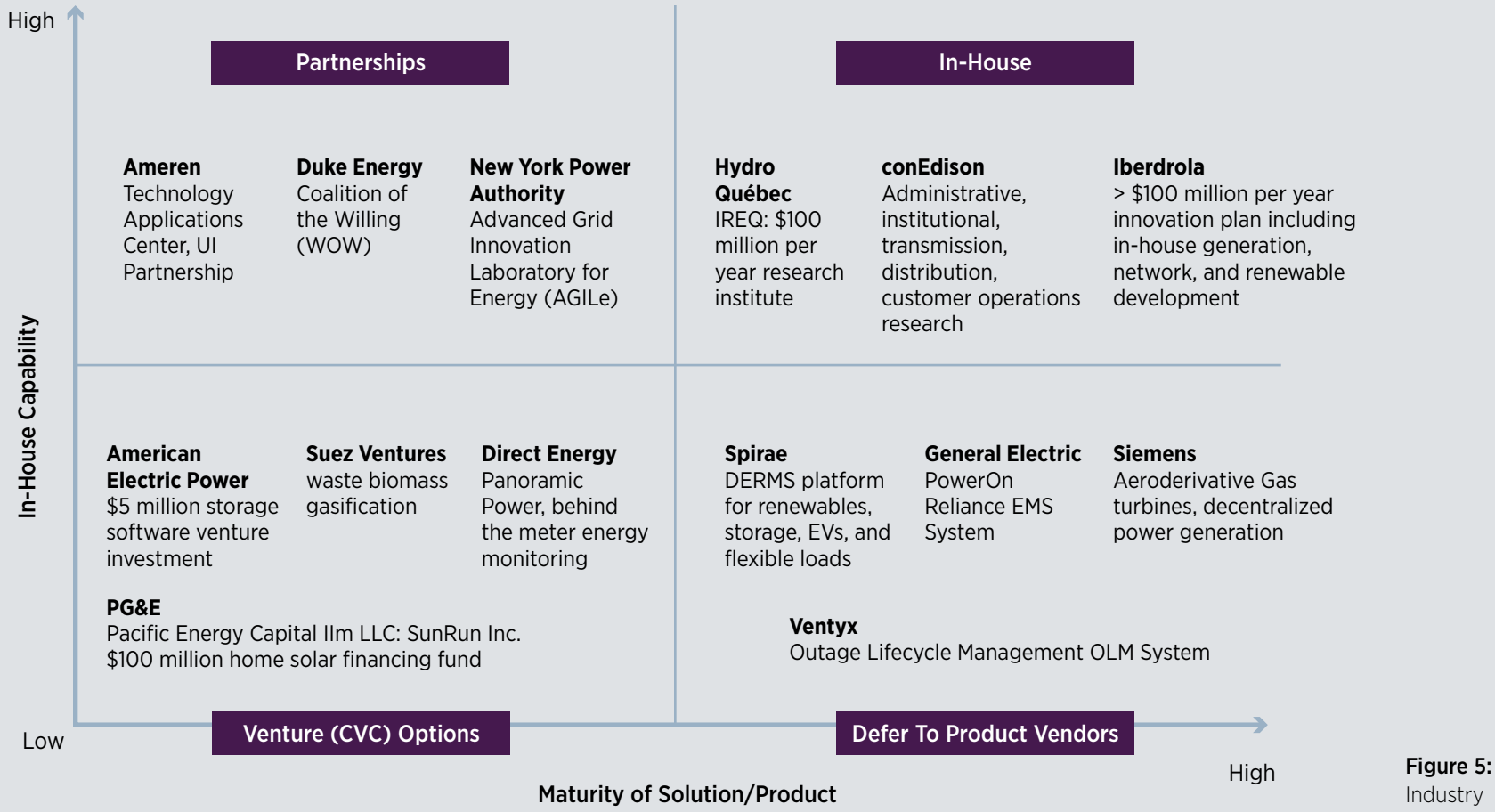


Figure 5: Industry examples

In developing that framework, PA recommends four ways to manage the continual investment and development of up-and-coming technologies:

1. **Partnerships:** Joint endeavors with industry participants, research institutions, or developers to bring new products and services to the marketplace
2. **In-house:** End-to-end internal management that links work across different areas of the business
3. **Defer to product vendors:** Selection and purchase of mature products from the marketplace
4. **Corporate venture capital (CVC) options:** Multi-strategy investment in emerging technologies that may yield viable products and services on several time horizons

Choosing the ideal balance of delivery models will depend on a utility's investment appetite, their preferred business strategy, and the readiness of target technologies. The balance of development models may also change as capabilities mature and system requirements change.

As an example, utilities in New York are allowed a non-bypassable system benefits rate rider that funds certain utility development activities. As a result of this recovery mechanism, those utilities may have a greater appetite to invest in a team of technology development personnel who conduct research in-house and can cover a core portfolio of supply chain innovation activities; however, they may not be willing to build an in-house team devoted to technologies on the customer side of the meter, where outcomes may not accrue calculable returns to ratepayers or shareholders.

In markets where R&D is a cost borne by shareholders, the predominant model may be to leverage CVC options at most points in the product development lifecycle or to socialize risk through partnerships.

When determining the optimal corporate venture approach, it is important to understand the in-house capabilities required to bring a solution to fruition, the associated investment required to retain those capabilities, and, of course, the maturity of the technology.

PA has identified several examples of utilities employing each strategy. Each demonstrates a commitment to innovative practices, yet few employ all strategies or cohesively manage innovation as a streamlined corporate objective (see Figure 5 above).

Utilities have begun to experiment with various technology innovation management strategies, but few have adequately aligned market outcomes back to corporate objectives. PA recommends the following for each entry point in the innovation lifecycle under each management structure:

Figure 6: Managing the innovation lifecycle across delivery models

	INNOVATION LIFECYCLE			
	IP	**Develop**	**Deploy**	**Support**
	• Ideas • Solutions • Requirements	• R&D • Prototype • Services • Production	• Plan • Build • Test • Actualize	• Sales and Marketing • Operating Support • Monetization Strategy • Sunset Planning
'In House' Management	IP sourced by innovation team Support from all lines of business Requirements defined by business	Development managed in house Final products refined by utility Closed platform for innovation Certain outsourced activities	Highly managed deployment Virtual and physical testing on proprietary systems Develop cost benefit estimates	Monetization strategy tied to ROI Integration managed with internal resources Customer deployment Outcomes inform IP Generation
'Partnership' Management	IP generated by utility or partners Flexibility in capability sets from market and from utility Support from all lines of business Requirements defined by business	Partnership sourced by innovation team Mixed resource commitment to development Open platform for innovation Outsourced innovation	Accelerated deployment phase Virtual and physical testing on proprietary systems Business integration managed with internal and external resources	Monetization strategy based on operating parameters and market Operating support by utility Technical support by partner and utility
Corporate Venture Capital (CVC)	IP sourced by innovation team Mixed ownership of IP Low new skills requirement Support from utility business groups Requirements defined by market	Investments made in IP Strong management support and requirements guidance Open platform for Innovation	Supported deployments Virtual and physical testing on proprietary systems Product integration where appropriate Access to broad markets	Monetization strategy exists in the market Proprietary operating knowledge and support Outcomes inform IP Generation
Deferral to Market Vendors	Innovation team signals vendor market Enable IP through defining requirements and adopting interoperability standards	No utility involvement	Vendor supported deployment Out of the box service and hardware Deployment strategy defined by use cases Business case verified by utility	Monetization strategy tied to use cases Business integration and operating support by utility Technical support from vendors

Identifying specific technologies is not an easy task. With so many promising early-stage options available to help manage and optimize the grid, there is a legitimate fear about vendor lock-in. As utilities select the types of technologies they are willing to explore and deploy, it is important that they remain tuned to the market, while also communicating closely with those accountable for business model innovation. It is critical that technology investments are linked to a clear bottom-line strategy.

"An innovative utility will explore multiple avenues in an effort to get closer to policy, technology, and economic trends – then use what it learns to improve its business model and enhance stakeholder value," says Matt Mooren, an energy and utilities expert at PA Consulting Group.

Utilities can take advantage of third-parties to help accelerate product development timelines. In fact, PA has helped companies all across the world with accelerated product deployment.

Mini Case Study: PA and Landis+Gyr

PA helped Landis+Gyr to develop their 'ecoMeter' in-home display and the software in their smart meters. The products represent the majority of the 16 million smart meters that British Gas is rolling out across the UK by 2020.

Working closely with Landis+Gyr, we brought together electronics, mechanics, industrial design, behavioral science, user-experience design, radio and software design to create an innovative and desirable product that delivers real benefit in reducing domestic energy use. The first functional units were exhibited seven months after work began, with the full software and delivery-to-production completed a few months later.

This is an example of how a utility worked with outside stakeholders to identify a need, design specific applications to meet that need, and then establish a business model around the deployment of the technology.

DUKE ENERGY

In Action – Technology Innovation

Duke Energy introduced the groundbreaking "Coalition of the Willing" project in 2013. The coalition brought together a range of industry participants to explore interoperability requirements culminating in multiple successful demonstrations in 2014.

The second phase of the project has been underway since 2014, growing from just six partners to 28 partners now engaged in a "non-proprietary, multi-phased project" to break down traditional silos between internal technology teams and vendors.

The end goal is to create a distributed intelligence platform that can lay the foundation for the "Grid of Things" where all distributed and centralized devices are using (or) speaking the same language.

Phase II will expand the scope of the project to include a microgrid system featuring solar, battery storage, and a field message bus-based distributed intelligence platform with wireless communications. The ambitious initiative is focused on the following objectives:

- Demonstrate the capabilities of an islandable microgrid with no rotating mass generation, utilizing PV and energy storage instead
- Demonstrate benefits of distributed intelligence
- Demonstrate interoperability with CIM between multiple open standards and publish platforms, such as Data Distribution Service (DDS) and Message Queue Telemetry Transport (MQTT)
- Prove that the microgrid can operate independent of a specific wireless or wired medium
- Develop applications that exploit the benefits at the edge of the grid, such as Var optimization, voltage management, solar smoothing, etc.

Duke's coalition is one of the most comprehensive efforts among U.S. utilities to develop an integrated technology innovation strategy. It encompasses virtually all of the key recommendations for integrating new technologies.

Cultural Innovation

Cultural innovation is driving a next generation workforce by formalizing the utility as a center for ideas, thus drawing from up-and-coming creative talent in the industry.

The Innovation Culture Advantage

One in every three utility employees will retire in the next 10 years. Power companies have a unique opportunity to shape their next generation workforce by targeting employees that have the capabilities to deliver the products, services and ideas for the next generation utility. According to PA research, the industry will have a new workforce demand of about 105,000 workers by 2030.

As millennials begin to inherit many of the traditional utility functions, they will also inherit a shifting industry landscape. Many of the old, linear utility roles are evolving to become more flexible positions – and utilities will inevitably develop a more adhocratic style of workforce management. According to PA research, right now, at least 95% of young employees want roles that involve creative thinking.

Innovation as a Core Competency

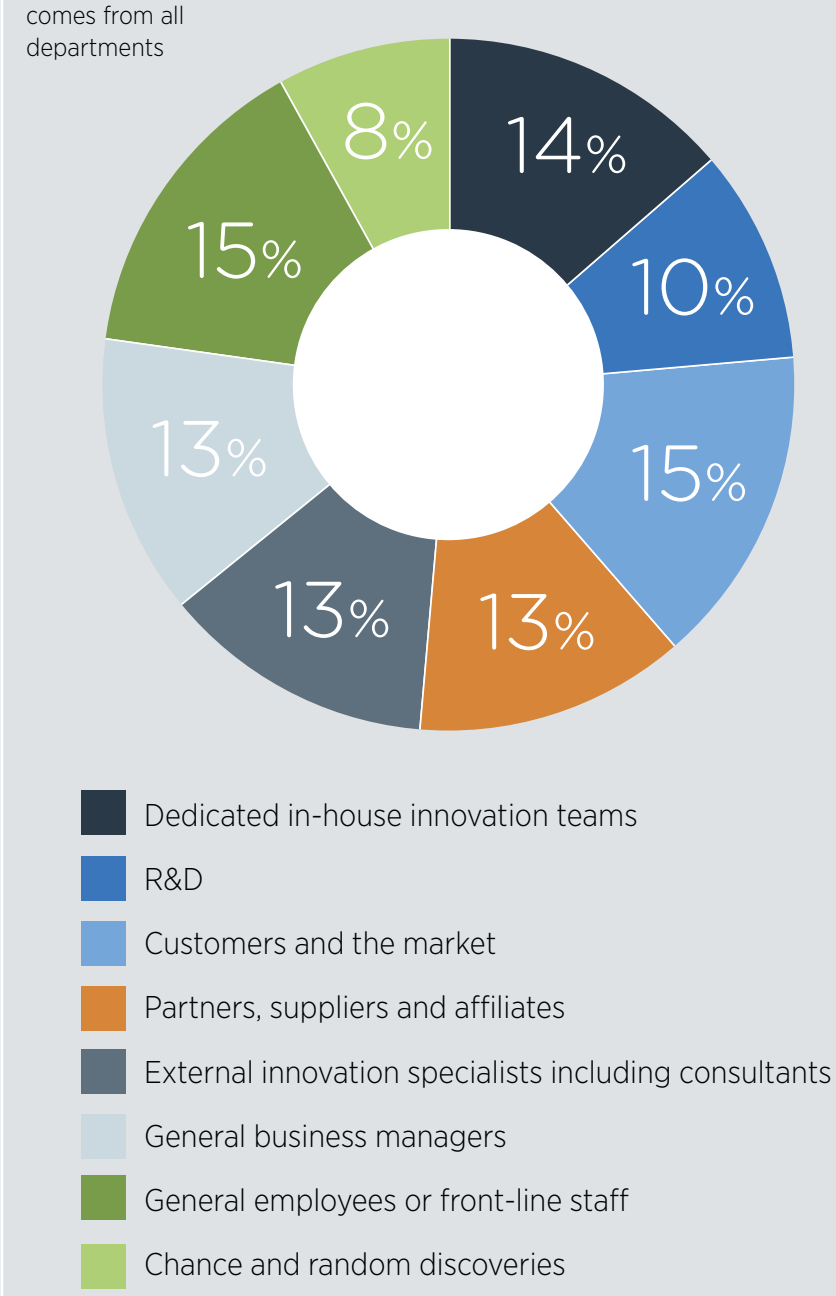
The industry has an opportunity to revitalize utility culture to ensure the best ideas and products can be translated into corporate or operating objectives. Embedding innovation in the skills and activities of the organization can result in a true culture of innovation to take hold, which yields benefits over a long-term horizon. Being proactive and anticipating or precipitating change results in greater control over outcomes.

To align incentives with innovation, a utility can benefit from providing staff rewards for forward-thinking ideas and behavior. It is also important not to punish failure that results from attempted innovation. Baseline risk is inherent in true innovation, and failure is inevitable. In some cases, failure should be rewarded and leveraged as a tool to promote new ideas and new thinking.

"Innovation is both a constructive and destructive process: sometimes things don't work," says Paul Chandler, an energy and utilities expert at PA. "But the number of failures is less important than having a portfolio of options that create new opportunities and value for the company." For that reason, utilities are better off with too many ideas than too little, and can begin to incent the workforce and boil up margin opportunities from all lines of the workforce.

PA's innovation research, which encompassed companies across eight industries and 15 countries, found that front-line staff and customers are among the most fruitful sources of innovative ideas. Consultants, in-house innovation teams, partners, R&D, and management – even random chance – also do their part.

Figure 7: Innovation comes from all departments



Source: PA's 2015 Innovation Report (www.paconsulting.com/innovation-research)

The challenge is to create a culture of innovation that can drive improvements in strategy, products and services, and operations. We generally see energy companies operate across a spectrum and share similar industry characteristics in how an innovation culture is fostered.

EXELON

In Action – Cultural Innovation

"If innovation is only top down or bottom up, it will fail," says Exelon. For this reason, they have a corporate focus on embedding innovation culture at every level of the organization.

For example, Exelon formed dedicated innovation teams. This includes a team devoted to emerging technologies, with a focus on productivity and efficiency. The team "goes beyond traditional corporate boundaries to identify and pilot new technologies," says the organization. By looking externally and internally, the team is always looking to improve the status quo without dramatically overhauling day-to-day operations.

Further, Exelon draws on ideas from all employees and has implemented innovation expositions as a means for bringing together experts from across the organization to share ideas and find solutions to business problems.

"To change the culture, people need to be exposed to new ideas and entrepreneurs and some of the disruptions that are going on. To encourage this, Exelon has established a 'Four i's framework for innovation,'" says Sonny Garg, Chief Information and Innovation Officer at Exelon. These include:

1. **Inspire:** Initiatives like the Innovation Expos encourage employees to imagine better ways of working.

2. **Ideate:** Exelon encourages employees to socialize their ideas among peers and discuss them with their managers. "A great crowdsourcing tool, the Innovation Central portal, provides another avenue for ideation. Employees can submit ideas, find a virtual innovation group to vet their ideas regardless of geography, contribute to and vote on other proposals, and let the best innovative thinking bubble up."

3. **Investigate:** An Innovation Peer Group considers whether new ideas are viable.

4. **Implementation:** Fully vetted proposals are handed off to the appropriate operating company for planning and execution.

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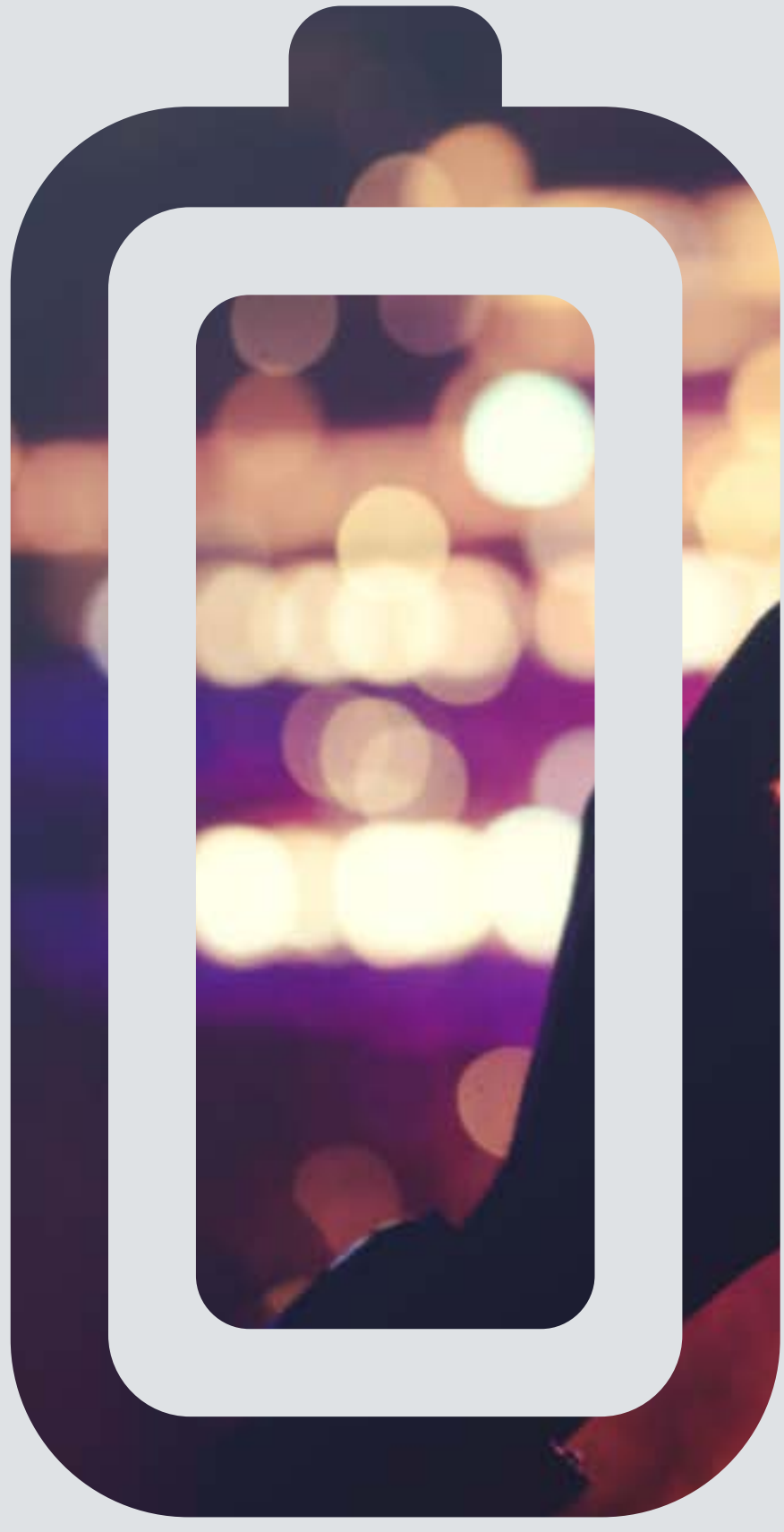
SONNY GARG, CHIEF INFORMATION AND INNOVATION OFFICER, EXELON

TRYING IT ALL TOGETHER

The next generation utility will balance business model innovation, technology innovation, and cultural innovation all at once within the organization. The greatest potential for success exists when all three are actively pursued as a tenant of corporate strategy.

Each pillar relies on the successful implementation of the other. For example, business model innovation is best enabled by strong technology development and the expertise and ideas of the workforce. Technology innovation needs to bring products to fruition that solve exceptional business problems and can draw on the expertise and ideas of the workforce for the right balance of functionality and applicability. Cultural innovation is somewhat aimless without a strong endorsement of technology goals, and will require that incentives are tied to improvements to the corporate bottom line.

Utilities are best positioned to execute across all three innovation tenants and transition the industry to a new era. By following the guidelines of these innovation principles, electric utilities can be the leaders in the coming Dynamic Energy transition.



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