

Tomorrow's Power Strategies

Global Top 40 Utility Actions

By Tom Flaherty, Paul Nillesen, and Mark Coughlin



In the past thirty years, electricity and gas markets around the world have been radically transformed as market forces played an increasing role in energy supply and distribution. Markets opened, competitors emerged, businesses rationalized, incumbents combined, technologies advanced, and customers experimented.

Traditional strategies centered on regulatory policy, capital investment, and customer service. These strategies typically reflected regulatory accommodation rather than market intention. Consequently, utilities acted cautiously rather than accepting unfamiliar risk.

But advances in the structure of the power and gas markets, and acceleration in the pace of technology change mean that conservative strategy design approaches may not effectively position the utilities sector for a future still being mapped.

Tomorrow's strategies need to be intentional, aggressive, and consequential, even in the face of uncertainty. They need to recognize that imperfect knowledge about direction and outcome does not limit the ability to embrace the challenges that the sector's future evolution will pose.

Strategy& (part of the PwC network) recently undertook and published an analysis of the strategies of the Global Top 40 (GT40) utilities – peer group scale and shifts, what they are accomplishing and where these companies are positioning themselves to pursue growth. This Strategy Index describes how the largest global utilities have reshaped themselves to meet unfamiliar challenges.

The Strategy Index

Our study of the GT40 provides both a snapshot of strategies currently adopted by the peer group and a baseline from which to conduct ongoing comparison of strategy design and execution. These individual strategies provide the bases to develop comparative dimensions framing the Strategy Index – the relative market positioning and emphasis of the GT40.

The GT40 utilities are located in North America, Europe, and Asia-Pacific, but the reach of some of these peers extends across a much wider geographic footprint, covering both developed and developing areas

See Figure One.

Although a number of approaches are available to define a peer set, such as scale, reputation or presence, market capitalization as of the end of 2017 (latest full year data at the time) was adopted. This metric indicates a market value scale range of twelve billion to seventy-three billion dollars for the peer group and reflects a relative ranking for the GT40 generally consistent with other measures of scale.

However, successful market strategies are not the domain of

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only the largest utilities; plenty of smaller utilities are strategically well-positioned. But the actions of the largest peers provide a glimpse into how the utilities sector is evolving and the levers available to ensure valued and enduring market and financial outcomes.

These strategies indicate that utilities around the globe are extending the contours of their business into natural adjacencies. The study suggests that future strategies will continue to expand as utilities prepare for a more

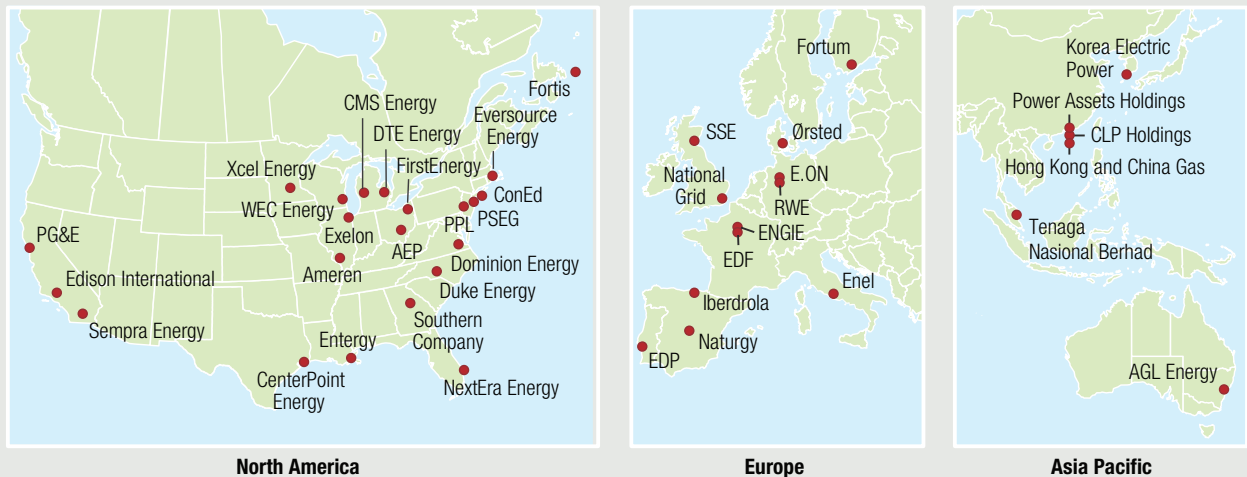
complex and less predictable energy marketplace with many market archetypes from which to choose.

We complemented our analyses with two additional sources of insights and perspectives: interviews with the chief executive officers of seven GT40 companies and a global survey of more than a hundred utilities. The results illuminate the ways utilities are navigating the road ahead and forging a new industry, and they provide a valuable adjunct to the quantitative and qualitative analyses conducted.

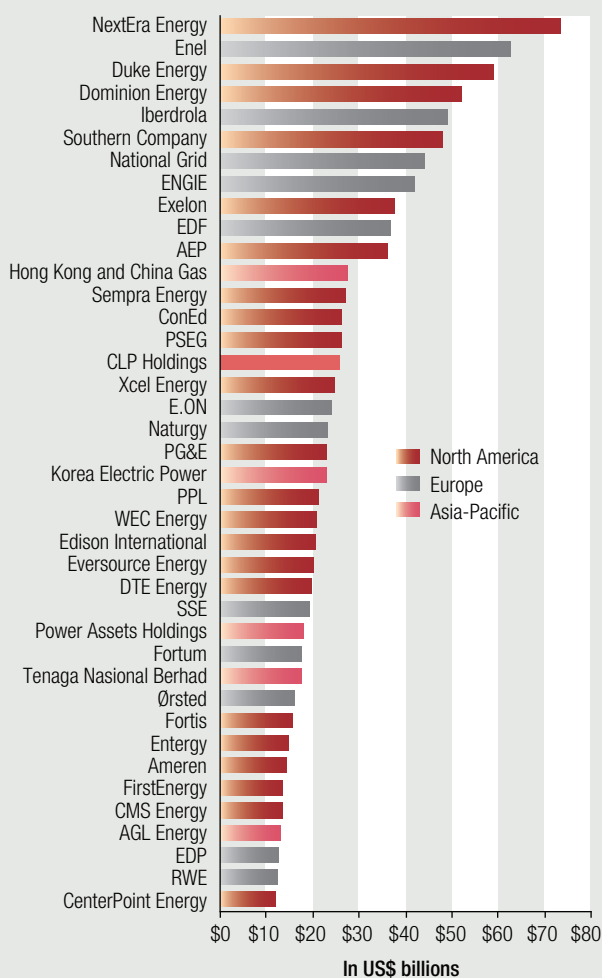
The future marketplace is well on its way to becoming increasingly contestable, both for new entrants – either those that are crossing over from adjacent industries (such as telecom or oil and gas) or start-ups disrupting incumbents – and for consumers as they seek more control over energy consumption and move toward active market participation.

Global Presence, Scale, and Performance

The GT40 represent a total market capitalization of \$1.1 trillion, with fifty-five percent made up of North American utilities, thirty-four percent European utilities, and eleven percent Asia-Pacific utilities. Although the average European and North American utilities in the GT40 are similar in size in terms of market capitalization, their Asia-Pacific peers are smaller on average.

FIG. 1
GLOBAL PEER SET


Locations reflect company headquarters location

FIG. 2
GT40 MARKET CAPITALIZATION


See Figure Two.

The highest market value growth occurred in North America, where the largest utilities grew by more than ten percent annually. Conversely, the market value of the GT40 European utilities declined by an average one percent per year since 2014, amid increasing costs for conventional power production and intensifying retail competition.

Market capitalization for the leading utilities in the U.S. is generally much higher today than for European and Asia-Pacific players because of larger asset bases (after certain European utility restructuring), more stable market structures, constructive policies, and dividend payouts, all of which have driven stock prices and sector stability.

GT40 utilities generated annual revenues of eight hundred and fifty billion dollars in 2017, a decline from nine hundred and sixty-five billion dollars in 2014, which reflects highly stressed energy markets and restructuring. European utilities generate more than half of the GT40's total revenue. Électricité de France (EDF), ENGIE, and Enel generate the largest annual revenue levels, with more than seventy billion dollars each.

European utilities are significantly larger in terms of annual revenues because of customer scale. On average, European players have revenues of thirty-seven billion dollars, compared with thirteen billion dollars in North America. In Asia-Pacific, revenues are similar to those in North America, but Korea Electric Power Corp. (KEPCO) skews the average with turnover of fifty-three billion dollars.

Since 2014, most leading European utilities have experienced revenue decline of about seven percent annually, primarily due to divestments and lower dispatch of conventional production capacity.

In North America, revenue has remained somewhat stable because of low sales growth. Most leading North American utilities

are seeing revenue growth because of sustained capital expenditures exceeding a hundred billion dollars for the past several years.

Revenues have risen across Asia-Pacific during the past five years, because of both expansion into new geographic markets and high levels of customer growth in this rapidly developing economic region.

GT40 utilities have pursued geographic expansion, particularly those in Europe, where operations extend across multiple geographies. European GT40 utilities typically are active in six or more geographies. ENGIE, Naturgy, Energy, and Enel are by far the most geographically diversified players – each is active in more than twenty-five countries.

See Figure Three.

Some of this country presence reflects nascent investment, such as generation in small developing countries. This presence also includes participation in adjacent energy sectors, such as LNG or gas pipelines.

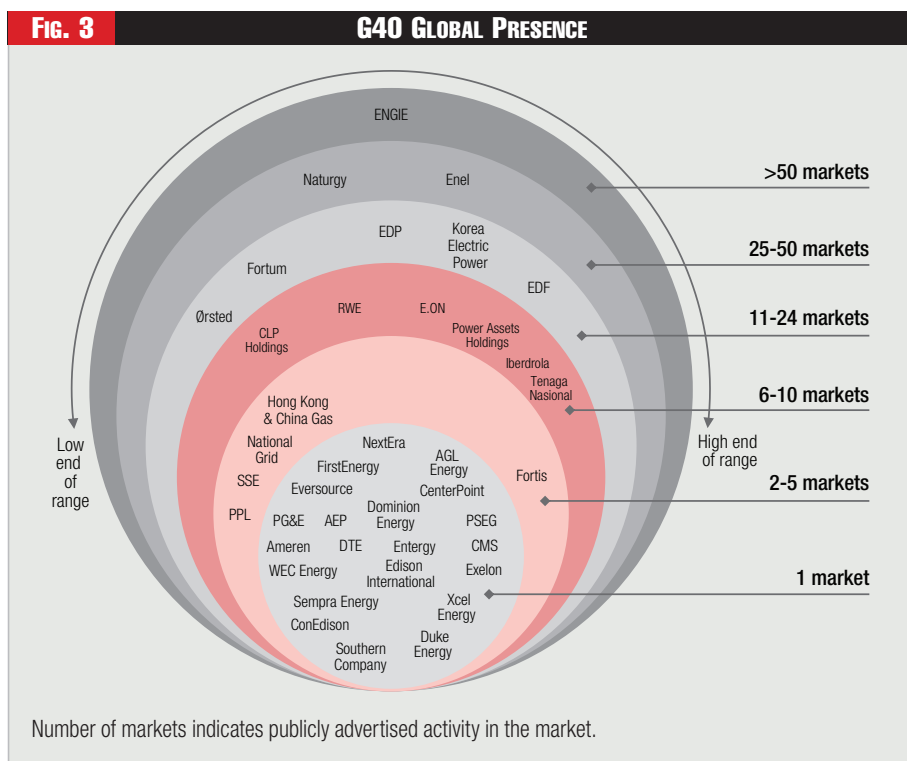
Iberdrola has achieved the largest European organic and inorganic changes since 2013, with six million customers added, and National Grid is growing by about three million. In North America, Southern Company added about five million customers, and Exelon and WEC Energy Group about two million each. In Asia-Pacific, Power Assets Holdings added about four million customers.

Despite this customer growth, major change and rapid transition in the European market appear to have damaged investor sentiment, resulting in poor share price performance and volatile market multiples over the past decade.

Price–earnings (P/E) ratios for GT40 utilities have not always paralleled local exchange levels across the regions. The financial ratios for European utilities generally have increased since 2010, exceeding local exchange levels through 2017 and indicating an improved outlook, increased earnings, and market acceptance of several restructurings.

In North America, GT40 P/E ratios have increased at a slightly lower rate than the overall local exchange. These P/E ratios have been historically high, suggesting some concerns over sustained earnings sustainability and natural trade-out of investment. P/E ratios in Asia-Pacific consistently exceed local exchanges.

North American and Asia-Pacific utilities appear to be more profitable, with average earnings before interest, taxes, depreciation, and amortization (EBITDA) margins of thirty-five percent



and thirty-two percent, respectively, compared with about twenty percent for European players. Asia-Pacific rebounded well in 2016 from a major correction in 2015.

Low costs of capital have sustained borrowing while shifting

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capital structure ratios. Leverage ratios for North American GT40 utilities have followed an upward trend as equity levels increased slightly to recognize increased business risk and lower returns on equity. Several GT40 utilities have been able to achieve a more balanced capital structure.

Leverage at leading European GT40 utilities is higher than at other regional peers, with equity ratios typically well lower in some countries because of asset write-downs.

Asia-Pacific utilities, which can face higher capital costs, are less leveraged, with equity ratios above those of other markets.

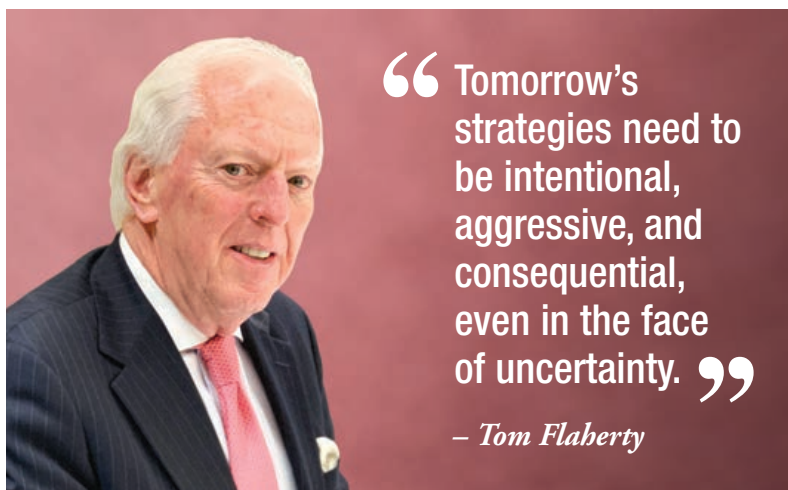
This financial snapshot illustrates the breadth, scale, and outcomes for the regions comprising the GT40 utilities. The market positioning supporting these results enable a foundation for growth and on pursuing strategies that can sustain and enhance these fundamentals.

Strategy in Context

The optimal model for strategy design and execution is not externally derived and portable across utilities. Rather, the optimal strategy model is tailored to fit philosophies of the executive leadership team, the aptitude of the organization, and the capabilities of the utility. In short, it is unique and forged in the DNA of the business.

In this industry environment, the investment community looks for answers to two primary questions about a utility's strategy: is it differentiated and is it sustainable?

Investors and analysts are aware of the strategies of multiple utilities – more so than utilities themselves – and need to dissect these strategies to understand consistency or uniqueness. They understand that industry strategies can appear similar, with little daylight between them.



Utilities need to communicate that their strategies are not perishable and can sustain themselves beyond the near-term. The investment community knows that strategies are designed to meet anticipated requirements for the future. It also recognizes that industry unpredictability is high, and strategies regularly come under stress.

Detecting differentiation among utility strategies is difficult when industry trends tend to obscure unique actions. Determining whether strategies are sustainable requires even greater investor acuity. Challenges from investors or analysts cause utilities to constantly sharpen their strategies to establish a premium valuation for their strategy quality.

Utilities' customers are traditionally slow adopters. But behaviors are changing as they recognize new factors that drive energy consumption, such as choice, control, comfort, convenience, and communication. These behaviors are enabled by greater availability of information about supply, software, platforms, and energy management options opened up through new technologies.

Generational behavioral shifts signal that customers are more demanding in their preferences and expectations than in the past.

Customers are learning how emerging technologies create new choices and opportunities for facility management, equipment monitoring, consumption control, billing simplicity, and overall energy cost control.

Utilities need to respond to this heightened customer awareness and expectations by developing offerings and advancing goals relating to the environment, costs, flexibility, and simplicity. Strategies need to embrace a move from passive interaction to responsive engagement that anticipates, rather than reacts, to customer needs.

This new nexus of disruptive technologies and changing customer behaviors also creates an opportunity for nontraditional entrants to the utility marketplace to displace incumbents.

Whether technology original equipment manufacturers (OEMs), software developers, solutions providers, platform companies, or players from adjacent markets seeking to incorporate energy into their market proposition, these competitors recognize that fundamental changes to markets open doors to opportunities at the expense of incumbents.

Technology OEMs are well-placed to compete because they produce assets or equipment that customers seek to install. Software developers are well positioned because they offer an expertise-based product that utilities can't replicate. Solutions providers fill the gap between technology and software and act as integrators and optimizers.

Platform companies, such as the FAANGs – Facebook, Apple, Amazon, Netflix, and Google – have taken visible positions in energy supply

and have built capabilities in development, procurement, and trading. Also, they already possess customer innovation capabilities that are admired and envied.

Additional players from adjacent markets, such as telecom, infotainment, oil and gas, and electric transport are already integrating energy as part of a larger strategic value proposition.

Building thoughtful strategies to preserve and extend a utility's competitive position requires consideration of how competitors view future utility markets for penetration. It necessitates understanding how non-traditional competitors approach competing in contested or emergent markets.

An appreciation for the dichotomy in utility perspectives on the pace of market engagement underlies strategy design and execution. Utilities tend to think about action and commercialization in three- to five-year windows, whereas industrial and consumer companies think about one- to two-year horizons as a maximum.

Five primary positioning characteristics frame the capacity for strategy design. They reflect what utilities have emphasized in building current market positions and are pursuing to fortify or reposition themselves to differentiate from competitors.

Growth levers: Utilities have a wide range of options regarding where and how to play. The levers employed need to address the evolution of relevant markets and match an organization's capabilities. The diversity of investments companies make in their core business, as well as emerging adjacencies, typify how GT40 companies are pursuing strategic positions.

Financial capacity: A company cannot be strategically successful if it is not first financially successful. The ability to execute a strategy depends on the utility's financial fundamentals. A range of cash flow, earnings and capital metrics frame the financial positioning of the peer group and the level of financial performance.

Organizational adaptability: Utilities adapt operating models and organizational structures to enhance market success. These models allow them to deploy resources effectively against their strategies. GT40 organization models offer insight into how utilities are optimizing resource and capability alignment.

Innovation adoption: Embedding innovation within the business has been a challenge for utilities. Some utilities emphasized applied R&D activities, but this often drove technology application, over development and breakthrough strategies. Commitment to sustained innovation across multiple dimensions is indicative of a utility's ability to pursue its strategies.

Market resiliency: Flexibility is necessary to ensure stability and enable execution of core strategies. Insights into factors influencing strategy design, understanding disruptive technologies, perishability of opportunity, priorities for positioning, capabilities gaps in readiness, partnering for execution, and alignment of innovation with strategy create a backdrop for action.

These elements capture both internal and external dimensions of utility strategies and outcomes and provide a natural framework to consider the actions that the GT40 have taken.

Business Models

Recognizing growth options and positioning characteristics are good predicates for future definition and design of business strategies. However, these need to be translated into paths that can turn value pools into value capture. This is accomplished through business models.

GT40 utilities traditionally have been active across the entire value chain, from generation through transmission, distribution, and retail. Full vertical integration contributed to scale and simplicity of power markets within their territories.

As the utilities sector has evolved through a combination of increasing deregulation, decreasing individual asset scale, growing competition, and the growth of intermittent resources, the value of full vertical integration has become less apparent.

Some GT40 utilities have reorganized or are reorganizing themselves around specific value chain segments, and in some cases specific generation technologies, such as renewable versus conventional. These utilities seek business model clarity and more certain returns.

Others, including Dominion Energy, DTE Energy, Sempra Energy, ENGIE, Hong Kong and China Gas conduct business in adjacent energy sectors, such as oil and gas.

The strategic paths utilities elect to follow establish the competitive model for the business. This requires a choice of a commercial market approach, such as a business model, which is the linking mechanism between a strategy and its economic outcomes.



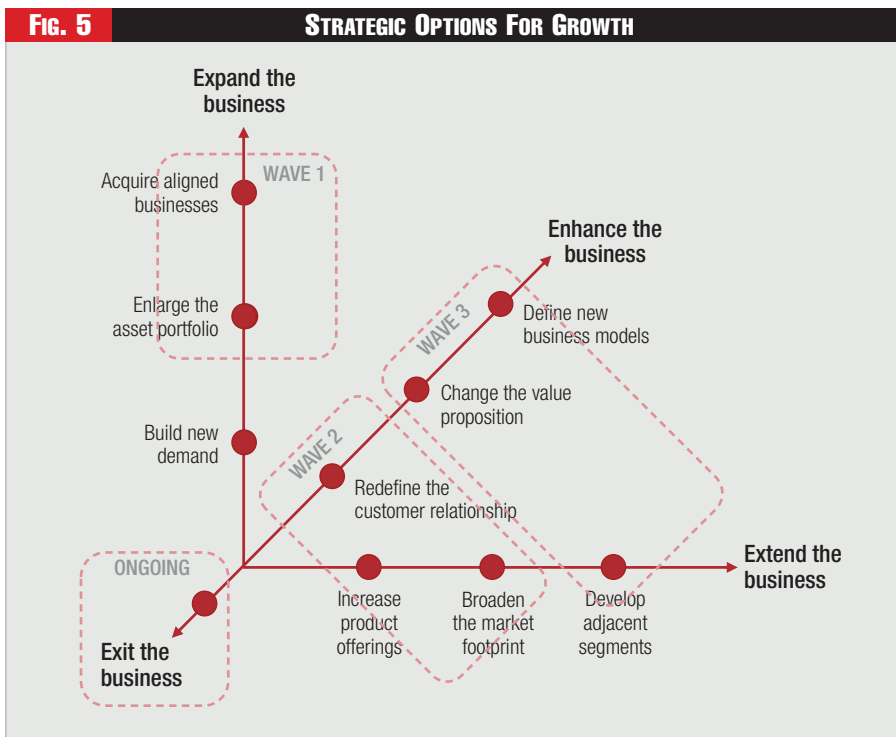
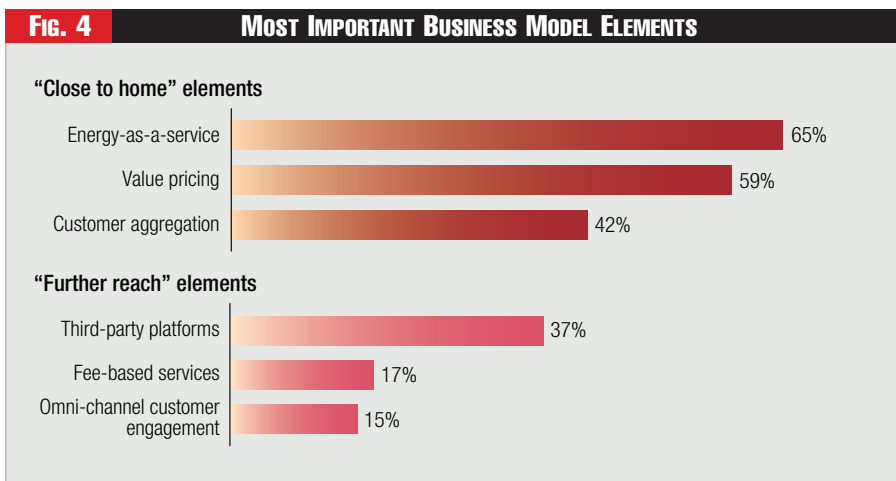
Business models are a form of art, since no blueprint exists for how to design, construct or execute one. The business model establishes the basis for how an entity will compete once it defines where it chooses to participate, and involves where to play, how to play, and how to win.

These key positioning elements frame the market roles a utility could perform, the portfolio composition to align, the capabilities to leverage, the partners to engage, the market channels to adopt, and the business and profit models to employ.

The utilities sector has little experience with non-traditional business models, employing simple models – such as integrated and regulated, or separate and nonregulated, depending on the value chain segment. No need existed to refine these models to address non-uniform emerging markets or shifts in roles and offerings.

Nonetheless, utilities have conceived and adopted different business models to drive participation along the value chain and within discrete segments or activities. However, these business models typically have been traditionally role-based, such as an asset owner, or broadly defined, such as a pipes and wires company. Now the emphasis is on evolving to a services and solutions provider.

Eight business model choices emerge – and companies can occupy space in each underlying value chain area: pure play



merchant; gentailer; grid developer; network manager; product innovator; partner of partners; value-added enabler; and virtual utility. Companies will pursue these models for different purposes, but they represent ways to play in the new energy services and solutions marketplace.

Business model redesign is accelerating with the increasing speed of energy technology advancement and the introduction of non-traditional competitors into the sector around the globe. The range of potential business models offers an expanded view of the nature of future utilities roles and challenges conventional norms for value chain participation.

A single business model is not likely to be sufficient to succeed in future markets. It is more likely utilities will maintain multiple business models tailored to the needs of where they compete. Accordingly, utilities will need to be adept in managing across

multiple value chain segments, each of which could adopt one or more business models to meet discrete market requirements.

Business model success depends on how it is conceived and implemented. Respondents to the 15th PwC Global Power and Utilities Survey in late 2018 identified the leading elements attributable to market success across those they could easily envision, such as conventional extensions, and those where new innovation is needed to enable success, such as radical changes to market models. These vary but align to shifts in models already underway. See Figure Four.

Value Pool Shifts

The energy sector is in a state of fundamental transition. Decarbonization, decentralization, and digitalization are creating challenges for industry participants, including increased conventional production costs and future market uncertainty.

New value pools are also emerging in areas such as energy management, home and building automation, e-mobility, and micro-scale energy solutions. These pools increasingly reside behind-the-meter as customers take more control of their energy usage. Some of the

GT40 have already placed large bets on the energy services market to create new revenue streams as customers seek expanded solutions to their energy challenges.

In light of these market drivers, aggressive business composition restructuring has been essential in allowing several GT40 utilities in Europe to achieve strategic priorities and future-proof their market positions. Other global utilities have not been faced with similar strategic challenges and have not changed their business composition – yet.

European utilities have been active in the past twenty-four months in rationalizing their businesses and repositioning their business models to reflect strategic challenges and position themselves for market opportunities, with several major restructuring programs in progress.

E.On and RWE (asset swap), SSE (retail merge and spin),

Enel X (energy solutions stand-up), ENGIE (line-of-business rationalization) and Ørsted (divestment and renewables concentration), have all developed market responses designed to enhance their market competitiveness and positioning.

These moves indicate that a number of strategic themes have emerged over the past several years, with some degree of commonality across the North America, Europe, and Asia-Pacific regions.

For utilities seeking to devise growth strategies, the options can be broad, depending on their positioning objectives and risk tolerance. Growth strategies typically follow four waves of activity over time.

See Figure Five.

A useful framework to assess potential growth paths aligns available options across primary paths. This type of model facilitates evaluation across types of complementary choices.

Five key themes related to GT40 utilities have emerged;

Merchant market and upstream risk reduction: The power markets have absorbed continued price stress, and future oil and gas commodity markets remain equally uncertain. This appears unlikely to stabilize soon. Consequently, GT40 utilities have sought to reduce their exposure to conventional power generation, particularly coal.

Five years ago, coal represented forty-seven percent of the utilities' power generation mix in North America, thirty-seven percent in Asia-Pacific, and eighteen percent in Europe. But government policies, alternative technologies, and life-cycle risks have caused a dramatic shift. In Europe, coal now represents only twelve percent of the generation mix. The trend in North America and Asia-Pacific has been less pronounced, declining to forty-one percent and thirty-five percent, respectively.

The share of gas in the generation mix has increased from fifteen percent to twenty percent in North America and from thirty-one percent to thirty-nine percent in Asia-Pacific. In Europe, the share of gas power production has declined from thirty-one percent to twenty-six percent as government policies and improved performance of new technologies have combined to make gas less attractive than expected.

Some North American and Asia-Pacific utilities are turning to gas-fired production capacity as a bridge to the future while they also pursue large- and small-scale renewables development or acquisition. However, gas peakers are already under stress as renewables costs have fallen sharply and batteries deployment and economics will further exacerbate the flagging attractiveness of gas plants in the near future.

GT40 utilities in all regions are expected to maintain much of their nuclear power generating capacity, beyond announced phase-outs. But little growth will occur in North America or

Europe. Non-GT40 Asia-Pacific utilities in China and Russia will see the largest additions of nuclear power. New local capacity build-out does not appear to be a high priority for GT40 Asia-Pacific utilities, although KEPCO is seeking to export its nuclear expertise as advisors, builders or investors.

Investment redirected to networks and renewables: As the GT40 utilities seek to reduce risk in their asset positions amid uncertain market conditions and declining revenues from power generation, investments in regulated networks and subsidy-protected renewables have gradually increased.



A growing share of GT40 capital spend for system resiliency, grid modernization, and distributed energy resources (DERs) is allocated to grid and network activities in North America and Europe. In North America, this amounts to seventy-eight percent of total capital expenditures, up from seventy-two percent in 2012. In Europe, transmission and distribution attracts thirty-eight percent of total capital expenditures, up from twenty-nine percent in 2012.

Global investment in renewable generation in 2017 was more than double the investment in fossil fuel generation – three hundred and three billion dollars versus a hundred and thirty-two billion – with nuclear additions of forty-four billion dollars that same year. European utilities are far more active in renewables investment, deploying thirty percent of capital investment into renewables, compared with only seven percent in North America.

Continued growth in renewables capacity is expected over the next five years. In Europe, leading utilities will add up to about a hundred and twenty gigawatts of capacity, with almost sixty percent from renewables. Additions of five gigawatts or more are expected from EDF, Iberdrola, Naturgy, Ørsted, and others. Similar addition levels are expected in North America.

Asia-Pacific utilities have made it clear their future will rely on increased proportions of renewables. For example, AGL Energy has announced it will replace its coal-fired generation within two

decades and has already announced plans to replace an aging coal plant in 2022 with a hybrid facility comprising renewable and gas units, plus utility-scale battery storage.

Entry into energy services: Across all regions, GT40 utilities are actively building out their go-to-market positions with behind-the-meter B2B and B2C products and services in an attempt to deliver growth in a stable market segment and improve customer stickiness. Related products and services typically extend across four value pools: DERs, e-mobility, smart home, and energy services for commercial and industrial customers (ESCI).

European utilities are well along in developing their market offerings, often through major investments in third-party acquisitions, including ENGIE's acquisition of EV-Box and Enel's acquisition of EnerNOC, both in 2017. Most utilities here are still developing their ESCI offerings, with some exceptions – E.ON's Connecting Energies already has developed offerings.

North American GT40 utilities face a different competitive dynamic than do European utilities and generally believe they have more time to prepare to offer value-adding products and services to meet competitors. Consequently, behind-the-meter product and service offerings are typically less developed for leading U.S. utilities.

Some North American utilities though, including Southern Company, AEP, and DTE Energy, have developed targeted ESCI offerings addressing customer needs such as energy management.

Asia-Pacific has a similar tale of regulated and unregulated retail markets, although many are progressively deregulating, and doing so, on average, more quickly than in North America, but slower than in Europe.

Increased innovation capacity and capabilities: Innovation has been a common strategic theme for most GT40 European utilities. Seven of the top ten GT40 utilities most committed to innovation and R&D are European players, whereas North American utilities are still establishing their innovation capabilities. See Figure One.

GT40 European utilities in particular clearly state their ambitions to be the recognized innovation leaders in the global energy sector and have ambitious investment plans and growth expectations. European utilities are active in establishing at-scale

innovation labs, R&D centers, and startup incubators.

EDF has the greatest presence, with ten regional innovation hubs, followed by Enel, Energias de Portugal (EDP) and, E.ON with eight each, and RWE and ENGIE with five each. These innovation centers collectively address micro-grids, smart cities, e-mobility, digitization, and batteries, among other specialized technologies and applications.


North American and Asia-Pacific players typically have a single dedicated innovation capability supporting business operations. Several utilities, such as Southern Company, Ameren,

and Exelon, have stand-alone innovation centers or hubs to work with external solutions providers.

In Asia-Pacific, KEPCO has created an Energy Valley with a one-billion-dollar investment, where it is expected that hundreds of energy innovators can collaborate. CLP Holdings has a stated strategy of using its Energy Australia gentailer business as an innovation incubator for its utilities businesses.

In Europe, coal now represents only 12% of the generation mix. The trend in North America and Asia-Pacific has been less pronounced, declining to 41% and 35%, respectively.

These trends illustrate GT40 utilities have been active in responding to the external drivers affecting industry direction and managing their way through financial challenges precipitated by market shifts. But these actions to-date are often more about dealing with contemporary issues rather than positioning for over-the-horizon market shifts.

This introduction to the Strategy Index provides a glimpse into the drivers, directions and priorities of the GT40. In the next Strategy Index synopsis, we will delve more deeply into specific GT40 strategies adopted. This article will summarize the growth options, directional headings, and strategy paths of these large companies around the globe. 

EVERY HALF OF A FORTNIGHT

From J.K. Rowling's *Harry Potter and the Sorcerer's Stone*, "I've decided to call him Norbert, said Hagrid, looking at the dragon with misty eyes. He really knows me now, watch. Norbert! Norbert! Where's Mummy? He's lost his marbles, Ron muttered in Harry's ear. Hagrid, said Harry loudly, give it a fortnight and Norbert's going to be as big as your house."

Hagrid's baby Norwegian Ridgeback dragon, illegal in England, will probably become too large to hide in even a half fortnight. Which is also the time it takes to get your next issue of *This Half Fortnight* from PUF.

You're likely as fond of PUF as Hagrid is of Norbert. When Harry warned, "Malfoy could go to Dumbledore at any moment ... Hagrid bit his lip. I- I know I can't jus' dump him, I can't."

Tomorrow's Power Strategies of Global Top 40 Utilities Directional Headings

By Tom Flaherty, Paul Nillesen, and Mark Coughlin



he utilities industry is in the midst of reshaping itself, retaining its heritage of reliability, but forging a vastly different future for itself and its stakeholders. Evolving energy policies, rapid technology advances, shifting customer behaviors, and aggressive competitor proliferation are creating an environment where the strategies of the past no longer point the way to the future.

In the August *PUF* issue we introduced the Global Top 40 (GT40) and provided a snapshot of key drivers framing the future direction of the utilities industry, its financial profile, and shifts in go-to-market models. Here, we further describe the strategies being adopted by these global companies and the positioning moves they are pursuing.

Some global utilities have evolved into entities that dramatically diverge from their legacies. These utilities are introducing new business models, creative approaches to pricing, broadened channels-to-market, and expanded roles with customers. Their view of the future differs dramatically from the past and offers a competitive model unlike any the industry has observed.

Still, the GT40 utilities have maintained a line of sight to the need to expand the business and grow its scale. Specific utilities are seeking to build a distinctive market presence and enhance how to compete through both traditional and non-traditional entities, and they intend to convert this differentiation into discernable market recognition.

Strategy Execution

Utilities across the globe are at different stages of market action through redirected investment and breakthrough innovation. Nonetheless, creating a distinctive strategic market position takes time, and the industry is still early in its evolution.

Utilities are immersed in strategy design for future market success while still defining the most appropriate paths to pursue, and it's not uncommon that customers are not at the forefront of strategy design. Improvements in technology and responding to changes in government policy are still predominant strategic drivers for the GT40 utilities.

Five elements capture how utilities are seeking to position themselves to compete in the future.

Differentiated Strategy: Utility strategies across the industry often read very much alike, given the similarities of the integrated and segmented businesses. In the past, utilities generally tended to move at the same pace and in the same direction regarding strategy definition.

Most utilities are leveraging several common strategies, seeking to increase renewables generation, customer engagement, innovation, modernization, and resiliency. All of these are relevant, but none is truly distinctive.

Strategy separation among the GT40 utilities reflects management's foresight and an ability to act rapidly and aggressively regarding the range of businesses that utilities are entering, the expanding channels to market and the willingness to be early adopters of emerging technologies. These drivers have created a

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distinct movement and separation among utilities making up the GT40.

Thus far, European utilities are outpacing their North American and Asia-Pacific peers. These utilities view themselves as energy services providers and customer

partners with a broad portfolio of offerings and beyond a traditional utility.

Differentiation occurs in how these utilities segment the value chain into addressable elements such as backup supply, energy services, electric transportation, distributed energy services, and behind-the-meter offerings.

European utilities, like Enel, ENGIE and EDF, address customers globally, even as local market factors create a need for tailored delivery solutions. Consequently, they are becoming more innovative in product design and placement, and more agile in shaping go-to-market strategies for development, origination, pricing, and channels.

North American utilities are also engaging in these markets, albeit more narrowly than their global peers. Southern Company, Edison International, National Grid USA, and AEP are pursuing new energy services markets and enhancing their customer value.

Certain Asia-Pacific utilities, such as Hong Kong and China Gas, play in natural resource activities such as natural and liquefied gas, and others have increased their natural gas footprints.

The strategies the GT40 employ are still formative but have common elements woven through them, such as value of the customer and leveraging natural local assets.

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Inorganic Growth: The global utilities industry has been consolidating since the early 1990s, when country, province, and state policies dictated functional unbundling and separation of certain assets and customers. This consolidation contracted the number of industry players and the scale of individual utilities, such as in Europe.

The number of electric and gas utilities in North America declined by about sixty-five percent since 1995 from market policy design and the perceived need for market readiness. The number of major European utilities has declined for similar reasons and created even larger national champions.

Utilities pursue inorganic growth for several reasons: a buying opportunity presents itself; the current asset portfolio needs rebalancing; or gaps exist in resources to successfully go to market and satisfy customer expectations. Dominion Energy, Exelon, Fortis, and Duke Energy in North America, Iberdrola in Spain, and Power Assets Holdings in Asia-Pacific have been serial utility acquirers through opportunities that enabled scale and strength.

Beyond simpler and smaller transactions related to supply assets, the utilities sector is acquiring new capabilities to meet emerging customer needs. These capabilities-based strategic moves address new technology offerings, and channel requirements. They occur through a mix of partnering relationships, equity investment, and outright acquisition.

Again, several European utilities are out in front of their North American and Asia-Pacific peers, having committed more financial resources and conducted transactions aimed at building a capabilities portfolio in new energy services. Enel and ENGIE in particular have been aggressive in their pursuit of inorganic growth outside the core utilities business.

In North America, Edison International, Southern Company, and National Grid USA were early movers in acquiring startups and solutions providers that bring capabilities to the energy services space.

A dozen utilities in North America, Asia-Pacific, and Europe have also committed funding to Energy Impact Partners, an energy-focused venture fund that finds and nurtures early-stage technology-based companies to market scale. This has led to investment in emerging disruptors such as Ring, Ecobee, Greenlots, and Tendril. Other members of the GT40 engage through similar private or internal venture funds.

Utilities recognize they cannot organically stand up the capabilities necessary to build these kinds of service and solutions providers within the observed market window. Expansion of these types of inorganic actions will occur simply because the need for technology and digital capabilities is fundamental to future offering portfolios.

Organization Adaptability: Traditional utilities models were designed to meet operating rather than market needs, centering

on natural segments such as supply or transmission, rather than on markets, customer types or verticals. These models served a historical need to ensure utilities achieved system reliability and asset performance objectives.

Legacy models are beginning to evolve from asset segments to repurposed positioning, elevated visibility, and market attention. Only a few GT40 utilities have broadly embraced these organizational shifts, but they offer a glimpse into the future of how resources and capabilities may be realigning.

Several fundamental areas are emerging where utilities are realigning resources to meet new market requirements: strategy, innovation, digital, networks, and customers.

Several utilities, among them AGL Energy, EDF, Sempra Energy, Exelon, and ENGIE, include the strategy function as a direct report to the CEO to signal the importance of its role to enterprise growth. The same is true for innovation, where senior

officers at Dominion Energy, Xcel Energy, and Enel are responsible for instilling an enterprise view in the operating businesses.

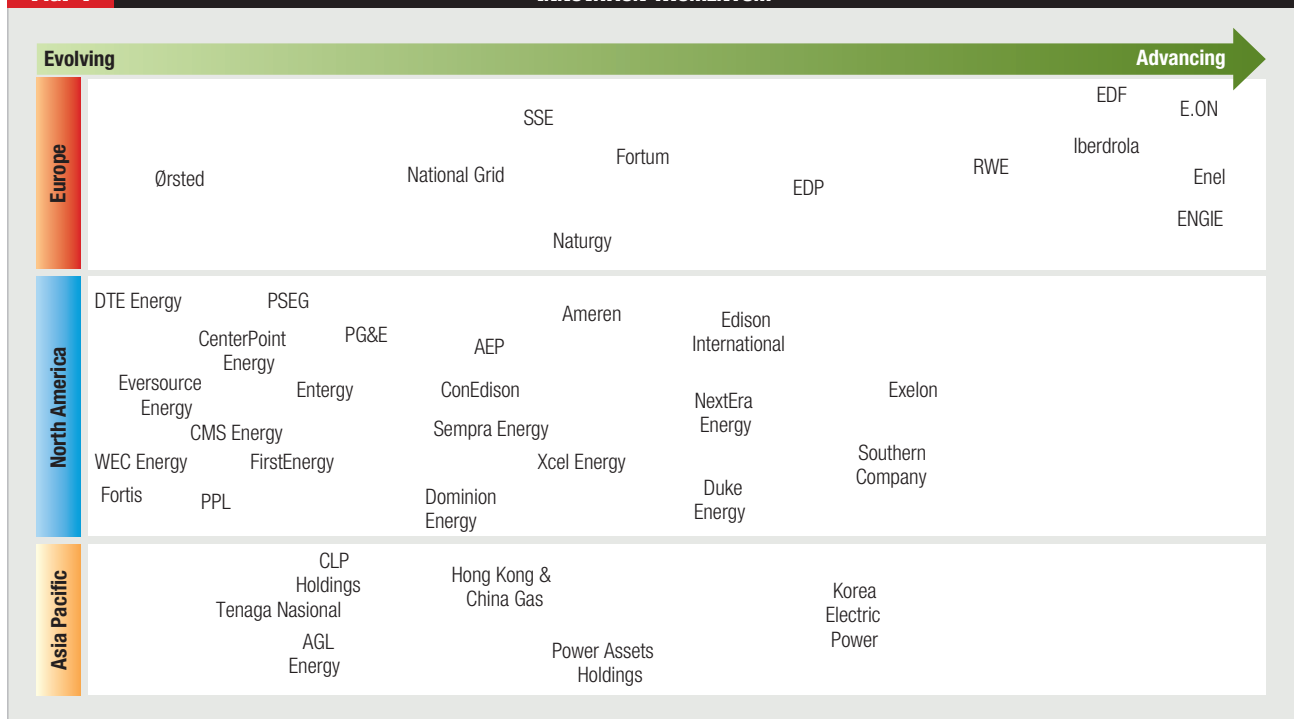
Most utilities are pursuing digitization to recast their positioning from standard information technology deployment to the repurposed deployment of leading-edge technologies in support of operating and customer applications. Utilities such as Exelon, E.ON, and ENGIE exemplify this realignment and have elevated digital to a direct report to the CEO.

Dominion Energy, Exelon, Fortis, and Duke Energy in North America, Iberdrola in Spain, and Power Assets Holdings in Asia-Pacific have been serial utility acquirers through opportunities that enabled scale and strength.

European utilities such as RWE (through Innogy) and EDF have shifted their thinking from a customer service-based model to one that emphasizes customer solutions, the customer experience, and the creation and offering of services to meet customer needs. In the U.K., National Grid is exploring plans to build a countrywide network of direct-current fast charging hubs for electric vehicles, bringing it much closer to customers.

Several utilities in North America also are rethinking their legacy segments. Duke Energy and PG&E are emphasizing grid and infrastructure value. AEP, Xcel Energy and CenterPoint Energy elevate the visibility of the customer beyond simple meter-to-cash and contact center roles to solutions delivery.

Asia-Pacific GT40 utilities also elevate the focus on infrastructure modernization (Power Assets Holdings) and customer

Fig. 1
INNOVATION MOMENTUM

Sources: Based on data provided by Strategika

engagement (AGL Energy) to enhance enterprise visibility and market emphasis.

Structural shifts are just now beginning within the peer group and reinforce the organization model as a valuable element of enhancing go-to-market strategies. Organization evolution and adaptability will likely become key strategic enablers for how utilities succeed and change employee thinking in the future.

Innovation Advancement: Most of the GT40 utilities have created formal messaging focused on how they intend to become innovative competitors. But there is a chasm between simple statements and achieving their objectives.

Innovation comes in several flavors, and ultimately, is in the eye of the beholder – the customer. Most utilities focus on operational innovation through technology adoption. Others frame the challenge as new revenue creation, a broader value proposition to the customer or clear market positioning.

See Figure One.

Innovation is directed at incremental, radical or breakthrough accomplishment, though utilities can pursue all three simultaneously. Achieving a culture of innovation takes time, and utilities often don't have the patience for multi-year education, demonstration, and platform development that typically follow piloting and slow experimentation.

European and North American utilities have been active with innovation programs. These programs have ranged from one-time executive officer-led initiatives intended to galvanize employees to sustained efforts to engage the organization through visible innovation continuity.

A dozen utilities in North America, Asia-Pacific, and Europe have also committed funding to Energy Impact Partners, an energy-focused venture fund that finds and nurtures early-stage technology-based companies to market scale.

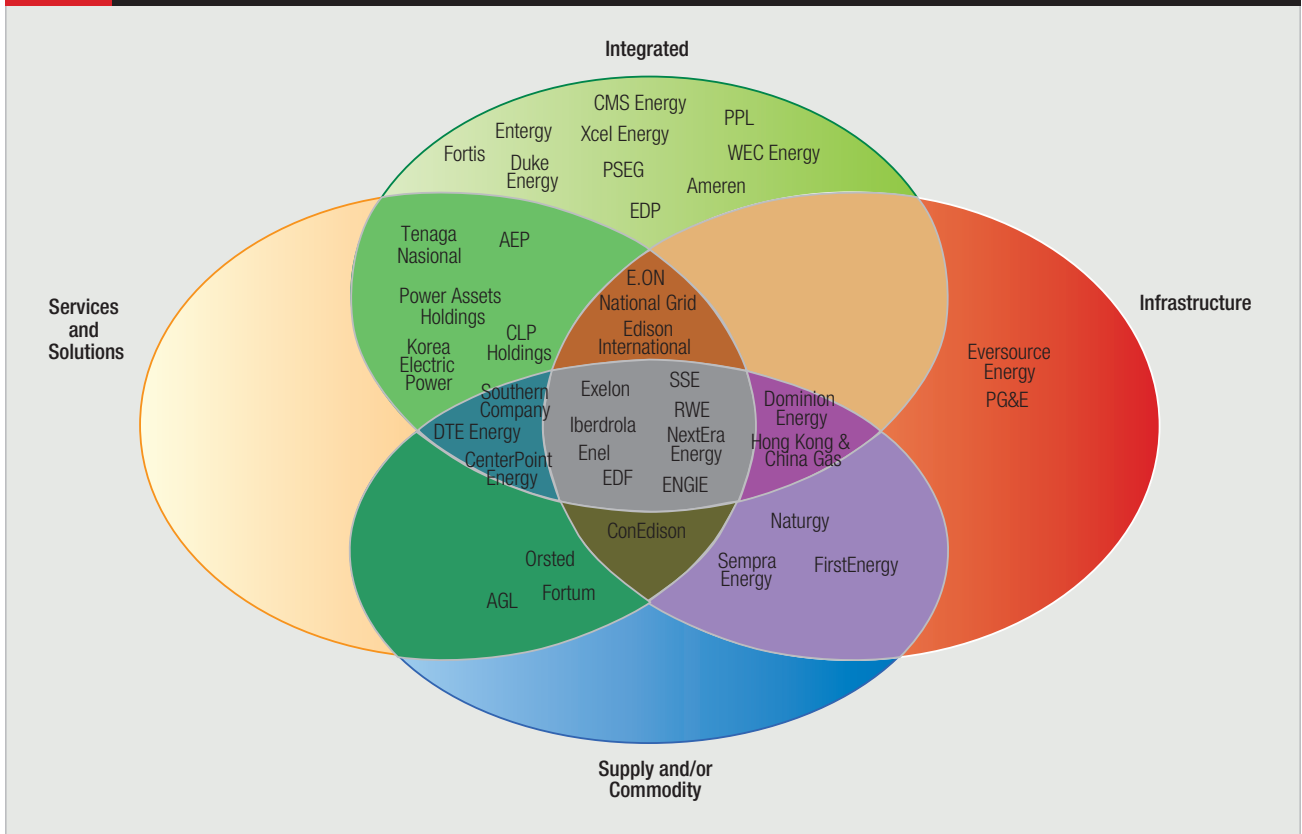
Several peers in North America, such as Southern Company, Duke Energy, NextEra Energy, and Exelon, have used formal events to engage employees in ideation and showcase intellectual capacity inherent in their organizations.

In Asia-Pacific, KEPCO is the stand-out innovation player. It has clearly stated objectives for innovation and has commenced investment in an Energy Valley to engage more than a hundred companies

Innovation as a capability is still gaining traction among utilities and will take

years to fulfill its promise. Savvy managements are already finding ways to set their companies apart through adoption of various models and techniques to embed innovation within their organizational DNA.

Business Model Agility: The range of business models that pure-play utilities have adopted has historically been narrow, given the nature of how they chose to organize and compete. However, the applicability of new and broader models

FIG. 2
MARKET POSITIONING EMPHASIS
Source: Based on data provided by S&P Global


is increasing as utilities see themselves positioned differently in the future marketplace.

Business model design is slowly advancing as utilities gain experience with new businesses, offerings, channels, and customers. The roles that utilities play in these businesses will define how to play, and the offering mix will extend into non-traditional options for pricing to customers.

As the sector rethinks its where-to-play choices by moving up and down the energy value chain, it is finding there are natural roles for it to fulfill, and consequently there are related economic rents for it to capture.

Pricing options are now expanding to include more negotiated value-for-service and fee-for-service approaches tailored to match roles, activities, outcomes, and risks.

Electric transport provides an opportunity for utilities to redefine how to think about value chain participation and the role a utility should play in advancing the market and supporting customers, particularly at the commercial fleet level.

For instance, the electric transport value chain can be thought of as consisting of nine elements: promotion, financing, infrastructure, fleet services, mobile charging, grid exchange, energy services, aftermarket services, and information management.

Business model options exist for all elements, and pricing models can vary across all value chain elements, excluding

Utilities such as Exelon, E.ON, and ENGIE exemplify this realignment and have elevated digital to a direct report to the CEO.

promotion. Utilities can create customer, OEM, dealer, and supplier relationships that leverage their infrastructure management, customer knowledge, energy management, and capital raising skills.

Pricing options, such as service contracts, click-through charges, fixed fees,

variable prices, leasing rates, and value-based rates, all provide unique forms of value for utilities to capture.

Utility business models historically have been extremely stable. But new market dynamics require creation of new business models – some of which may succeed and some of which undoubtedly will fail. An entrepreneurial mind-set will take time to become universal across the GT40, let alone the broader industry.

See Figure Two.

Finding the optimal approach to capturing future value sources will necessitate applying innovation to pricing – an area in which utilities applied little imagination in the past. Recognizing that macro-business models (where to play) are complemented at the micro-level (how to win) will make the difference in securing available value.

Strategic Positioning

Policy and government pressures in Europe have caused GT40 utilities to undertake strategic repositioning, structural change, or both. As power sourcing shifts from centralized to distributed, more attention is being focused on the network, where batteries and storage are similarly advancing in economics and performance to offer a compatible virtual power plant offering.

With the availability of customer-side technologies such as software, sensors, and controllers, utilities are recognizing that their role in energy intelligence and management is expanding. Similarly, customers are searching for partners to support their energy decision-making, and utilities are stepping into this role more aggressively.

In Europe, some utilities have emphasized the creation of revenue streams from services and solutions businesses. Others, like Iberdrola, invested about seven billion dollars in the U.K. with a focus on innovative operating technology solutions. Ørsted, Fortum, and SSE have emphasized supply and/or traditional network-based models.

Most integrated utilities in North America are forging some form of a services and solutions model. Among infrastructure utilities, CenterPoint Energy, Edison International, Consolidated Edison, and National Grid USA are actively pursuing services and solutions for customers.

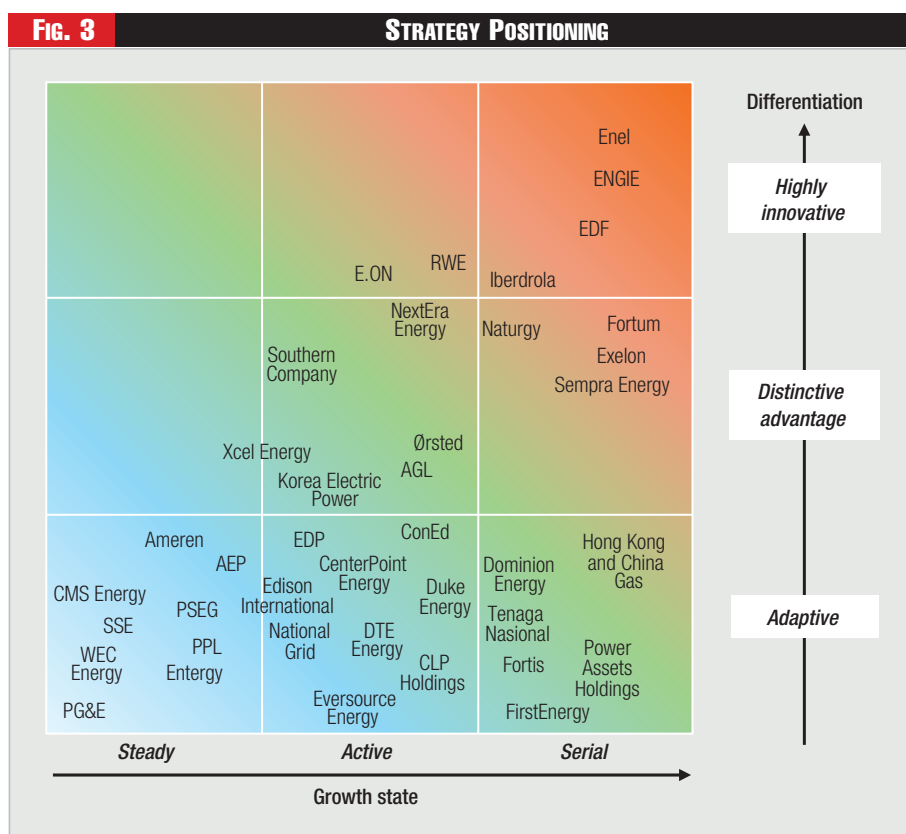
Asia-Pacific utilities are generally similar to integrated North American utilities, with a focus on services and solutions. AGL Energy in Australia specifically focuses on supply and commodity, with attention now directed toward services and solutions that can enhance value to customers.

As the macro drivers of policy and technology push utilities away from their heritage business models and customer behavior pulls them toward a services and solutions culture, the GT40 are positioned to leverage unique capabilities to enhance their value as incumbents.

See Figure Three.

Sharper Externalities

The utilities sector has gradually shifted course over the past three decades. Legacy supply models were disrupted, and new retail models emerged. These models broke the stereotype of integrated



Policy and government pressures in Europe have caused GT40 utilities to undertake strategic repositioning, structural change, or both.

and downstream in commodity sales. Customer choice was born, and the economics of supply was the beneficiary of competition.

Now, technology evolution and customer preferences are creating a second era

of disruptive models. These new models are characterized by emergence of micro-markets within the sector – storage, rooftop solar, e-mobility – and the awakening of individual customers to the control of energy sources and consumption through advanced technology.

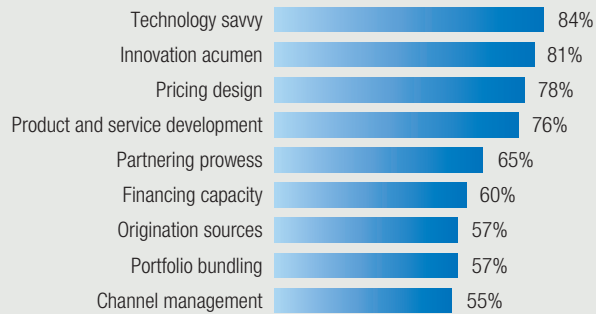
New capabilities will need to be introduced, enhanced, or obtained to support a new market paradigm centered on platforms, services, and solutions. Our recent global survey asked respondents to rank the capabilities believed to be most important to their ability to compete.

See Figure Four.

Respondents identified capabilities they believe core to their success to meet a future built around emerging technologies and sophisticated customers. These capabilities are not prevalent in legacy utilities and are centered on providing go-to-market and

FIG. 4 CAPABILITIES FOR COMPETING

Survey respondents identifying most important capabilities



Source: PwC Global Power & Utility Survey 2018

business skills essential for success, such as becoming technology-savvy, mastering innovation, and building a product development and pricing engine.

Emerging capital market influences, continued technology advancement, accelerating customer actions, and nontraditional competitive brands are disrupting the global utilities sector. These influences create risks and opportunities for utilities and those that are looking to intrude into traditional utility markets. All these externalities create more instability in traditionally stable markets and require tailored approaches;

Capital Markets: Over the past several years, new market issues have appeared that affect how utilities will respond in the near- and longer-terms. These issues emanate from government fiscal policies and market participants. Costs of investor capital have remained abnormally low as governments have constrained interest rates to encourage economic growth.

A number of utilities in North America, such as Sempra Energy and FirstEnergy, have recently experienced targeted activism by market funds seeking to influence management's strategies and boost shareholder value. These investors are disruptive by design, and they can radically alter asset bases and management growth plans and actions.

When capital costs increase, so too will investment costs and, ultimately, prices to customers. As activist investors seek to capture greater shareholder value, utilities will need to recognize that future growth is not enabled just by the elegance of a strategy, but through an unrelenting focus on shareholder financial outcomes.

Technology Advancement: GT40 utilities have closely watched the development and introduction of disruptive technologies over the past five years. They understand this technology revolution is not abating and is a natural product of unmet customer needs meeting targeted provider imagination.

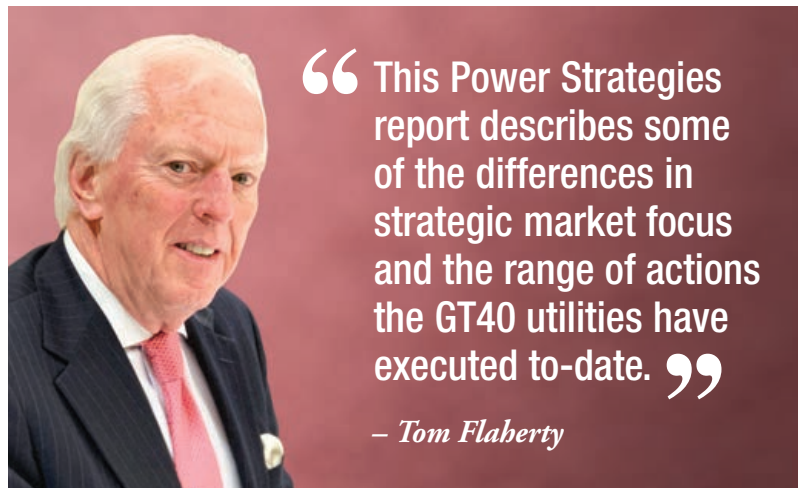
The technology landscape is moving from one that is analog,

centralized, and standardized to one that is digital, distributed, and personalized. Technologies are rapidly becoming miniaturized and deployed to meet specific needs of the utilities sector and its customer base. These technologies are also becoming more versatile, allowing utilities to deploy them to meet multiple operating requirements.

As these emerging technologies proliferate, utilities will need to become more adept at deployment and configuration. The value of technology adoption will become a particularly critical metric that enables utilities to understand how technology is optimized.

Customer Actions: The global utilities sector finds itself outpaced by both its customers and its competitors. Customers seek new solutions, whether from incumbent providers or other sources, and competitors see market opportunities where traditional providers leave unfulfilled needs.

Customers have shifted from slow market adopters to rapid market initiators and are no longer satisfied with waiting for their traditional utilities to offer the products or services they desire. As customers change – for example, from digital adopters (baby boomers) to digital natives (millennials) – their impatience will increase to demand real-time solutions to their challenges. Traditional responses that do not offer timely satisfaction will be seen as indicators of low innovation.



The GT40 need to understand that customers are becoming aware of solutions options that exist and who best provides them. They are finding this information from open internet sources and a constant barrage of new entrant marketing and social media. The utilities sector will need to consider this accelerated market pace, so its future strategies do not become perishable.

Unnatural Competitors: The competitors of the future are not the same as those the GT40 has come to understand over the past twenty-plus years, and they are not limited by the historical rules of engagement. Some of these new competitors are globally branded, ubiquitous, and highly admired, and they thrive on creating or exploiting new markets.

Established brands such as Shell, BP, Total, and AT&T recognize the scale of the global utilities sector, and other brands such as Nest, Tesla, and Bloom have powerful market recognition and have become active niche players or more in just a few years.

Utilities will need to understand how these players are shaping markets and whether they are market enablers, suppliers, competitors, or partners in the future marketplace.

Directional Headings

The paths the GT40 will take in the coming years will naturally vary and match the policies, requirements, and potential of the localities where they operate. Numerous countries have already paved a road for open markets, technology substitution, and more competition.

Many of the GT40 operate in multiple countries or service territories, so market solutions they offer and opportunities they capture in one location can quickly travel to others where comparable conditions exist. Unique strategic moves will become more common, and broad market presence will become more attractive.

In PwC's global survey, one response in particular stood out regarding the window of opportunity for utilities. Almost half of the respondents believe that this window may last for only three years, yet eighty-two percent are not ready now, and forty-four percent won't be ready in 2020. An opportunity for natural growth could easily be squandered or be too complicated to capitalize upon.

See Figure Five.

The GT40 utilities' future strategies and priorities can be expected to accelerate and evolve toward a few key market opportunities even faster than market observers anticipate, including market shaping, virtual supply, platforms and solutions, home hubs, and value models;

Market Shaping: It will be strategically inadequate to respond passively to markets, as the sector has done historically. Rather, it will be critical to consider how companies such as the FAANGs (Facebook, Apple, Amazon, Netflix and, Google) and their very different approach to creating markets and building enterprise value could be applied in the utilities sector.

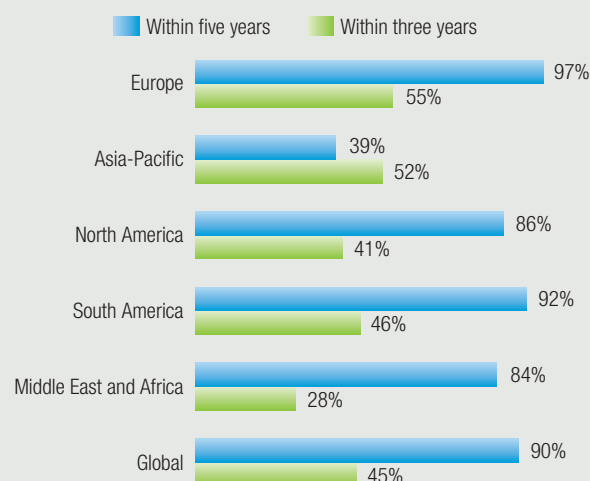
To develop great ideas and take them to the commercial market, utilities will have to think more like the FAANGs. They will need to engage in continual market sensing and constant innovation, adopt a commercial mind-set, pursue aggressive branding, and make decisions speedily. Utilities generally possess few of these traits now.

Utilities can develop these capabilities to compete if they visualize future technologies, markets, and customers the same way as the FAANGs. Utilities such as Enel and ENGIE are already acting in this manner in anticipation of potentially competing directly with them.

Virtual Supply: Many utilities recognize generation capacity

FIG. 5 READINESS FOR THE ENERGY TRANSITION

When do industry participants think the window of opportunity for readiness will close?



Source: PwC Global Power & Utility Survey 2018

Emerging capital market influences, continued technology advancement, accelerating customer actions, and nontraditional competitive brands are disrupting the global utilities sector.

of the past won't fit a market environment where sustainability is paramount at the political, financial, and social levels. The near-term bridge to new conventional and unconventional supply sources will be storage in combination with renewables as a virtual power plant that fulfills power supply, resiliency, and security needs.

The Big Battery in South Australia combines Tesla battery technology with Neoen wind farm performance to deliver a supply security solution while allowing the asset to invigorate an emerging frequency control market in Australia.

The virtual power plant harnesses the power of distributed generation and creates a new frontier aggressively pursued around the world. Traditional players such as E.ON, AGL Energy, and NextEra Energy all are investing in this space.

These utilities are partnering with other companies including Tesla, Sunverge, and Next Kraftwerke. More utilities will enter this space as storage technologies and required data management solutions become more common and sophisticated.

Platforms and Solutions: For years, the utilities sector considered its network assets to be a mosaic of discrete, but connected equipment, rather than as intelligent, integrated networks. Now the network is being configured to interconnect with multiple

devices and equipment that did not previously exist, such as sensors, monitors, and controls.

Although digital asset development is now fundamental to enabling network value, it is not optimized through this activity alone. Optimization is accomplished through deployment and application of software in the network – such as full digitalization.



New suppliers – both traditional OEMs and startups – are bringing their products to the network to enhance its value through equipment monitoring, data extraction and analysis, predictive analytics, and intelligent control. The integration of software into a platform that provides critical technology-based services enables solutions to be created that match customer needs for operating insights.

Digitalization platforms will enable energy brokers, aggregators, demand managers, and price comparison services to proliferate and provide services that customers value. Enel's 2017 acquisition of EnerNoc's demand response business for approximately three hundred million dollars further globalizes a platform for advanced offers for customers, such as flexibility services.

Home Hubs: Behind-the-meter technologies and related services are the next frontier enabled by digitalization, and the home is the next domain to benefit from this evolution. However, this area will not be the domain of the utility alone. Many homes already have the latent capability to start this movement through digital assistants or concierges from companies such as Apple, Amazon, and Google.

E.ON Home is an offering directed at monitoring and controlling energy use and informing consumer decision making. This platform allows utilities to offer services that address fundamental customer needs of comfort, convenience, communication, choice, and control – not just for power and gas, but potentially for telecommunications, entertainment, information, security, domotics, and other areas.

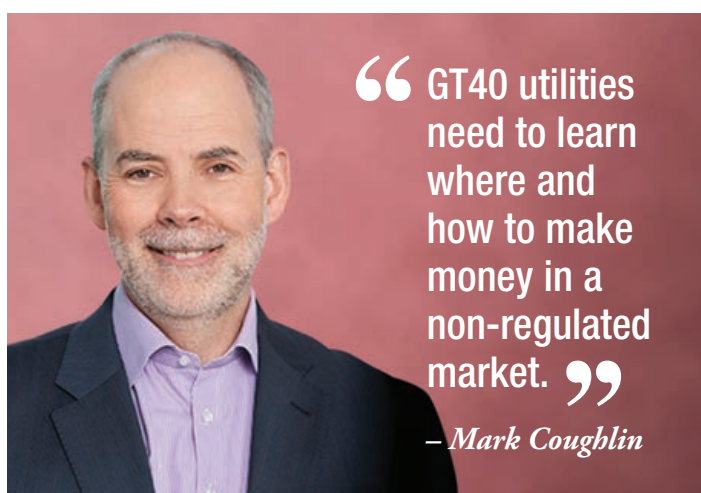
The FAANGs already serve tens of millions of residential customers daily with convenience services that meet basic individual needs, such as information. Beyond the FAANGs, AT&T and Comcast in the U.S., and other global telecom and infotainment companies in Europe and Asia-Pacific, are also engaged in elements of this market space.

The pure size of the global utility marketplace suggests it will be attractive to companies that already know the mass market space. Their ability to apply existing platform ecosystems and customer capture strategies will create formidable competition. This suggests that GT40 utilities need to create attractive partnerships with these competitors soon to secure a viable market position.

Value Models: As GT40 utilities learn to compete in what looks to be a broad products and services marketplace, they will find that many products and services customers need do not fit in a traditional regulated business.

GT40 utilities need to learn where and how to make money in a non-regulated market. These utilities also need to acquire new acumen to price based on a market-back sense of how customers think about value produced.

New competitors are well-versed in non-formulaic pricing, such as non-tariffed or outcomes based. These competitors are experienced in creative pricing approaches and in aligning revenues, costs, and value into tailored pricing models, and their pricing models are already embedded in their business models.



As a practical matter, utilities will not just offer products and services but will bring a portfolio of offerings to customers. This means they will need to become adept at packaging multiple offerings and pricing as a bundle, where beneficial. Risk-adjusted return determination will become a critical skill. This will enable utilities to create business models that link the prices of their offerings to customer value requirements.

Future Actions

This Power Strategies report describes some of the differences in strategic market focus and the range of actions the GT40 utilities have executed to-date. Unsurprisingly, strategic actions pursued have high degrees of similarity, as often happens in the utilities sector. But the degree of strategic shift and relative investment levels vary greatly.

Over the next several years, it is likely that a degree of separation will occur between the most aggressive and innovative GT40 utilities and the rest of their peers, and the degree of separation will likely enable investors to value utilities differently on the basis of their strategies and market accomplishments.

Over the next several years, the GT40 will likely advance their strategic initiatives to include more capabilities-based acquisitions, more partnering with OEMs, platform builders and solutions providers, and more innovation in business model agility.

The GT40 utilities' strategies offer deep insight into where the sector is heading. Although directional headings seem clear, the

The near-term bridge to new conventional and unconventional supply sources will be storage in combination with renewables as a virtual power plant that fulfills power supply, resiliency, and security needs.

possibilities of unexpected policy changes, accelerated technology availability and customer-driven market evolution will refine these strategies – sometimes as planned and sometimes quite unexpectedly. Utilities historically received a multiple premium for the quality of their regulatory environment, management reputation, or financial acumen. Tomorrow, it may be how shareholders perceive the quality of these strategies that enables utilities to monetize their strategies into a higher valuation. **PUF**

Seven Women CEOs Look Forward

(Cont. from p. 39)

to be around carbon, and low carbon, and when it will get there and will enable the traffic lights, the energy efficient buildings, and more.

Navigant: The relationships are important.

Pat Vincent-Collawn: It's key. It's different because if you look at Santa Fe, the character of the city is colonial style, so if they got electric charging infrastructure and electric buses, they're skeptical. But we have to try to figure out how to work with them on solar and other technologies because you don't want to change the character of the place.

The whole idea of cities, if you were going to build one from scratch, it would be theoretically easier. It's sort of like if you go to Africa and other places, they're all on mobile phones and they're all on solar because they never went through that wires, stranded-asset kind of stuff.

PUF: What advice would you give to rising women in our industry?

Pat Vincent-Collawn: I always tell this to anybody, no matter what industry, is get some operational experience.

Get some line experience, when I was in Quaker Oats, it's good P&L experience. So, get some operational experience, you don't have to be an engineer to have operational experience. I'm a journalism major by training.

Second, is know how the company makes money. There are a surprising number of folks that don't know how a company makes money, and I don't just mean put assets in the ground and have a ratepayer, but it's how it works, how the depreciation works, how ADIT works.

Understand how the company makes money.

Find a mentor. It does not have to be a female. Condoleezza Rice

When we look at this Energy Transition Act, we are going to be one hundred percent carbon free by 2040. We're all going to jump off this cliff together.

spoke at the finance convention in November, and I got to interview her. She said, if I was still waiting for a mentor that looked like me, I'd be waiting. Her mentor was Ambassador Madeleine Albright's husband.

The other thing that I always say to women, is take care of your health, your finances, take care of yourself because you can't do a good job unless you're healthy. And you can't

move around in companies and take risks unless you have a financial plan that says hey, if this doesn't work out, I'll be okay.

This is a generalization, but women tend to do most of the housework, take care of the kids, take care of everybody else before themselves. **PUF**