Preparing for carbon-free competition

Less carbon and more choice is only the end of the world as we know it – not the end of the world, says AGL’s Andy Vesey

Creating a different customer relationship
SSE’s Will Morris on three steps to transform retail

CSP promises 24-hour solar power
Resurgence of interest in new solar technology to power the future
It’s time for bigger, more innovative thinking around utility business models, says Benoit Laclau.

The power and utilities industry will be completely redefined in the next decade. How energy is produced, distributed, stored and consumed is changing, opening the market for innovative products and services.

Disruptive technologies are pushing utilities to rethink business models, change financial structures, establish new partnerships and fundamentally change the value proposition to customers.

In the past five to six years, power and utility companies have consistently underperformed global stock markets. This is a clear warning that change is hitting the industry hard, and the time to act is now. We need all the fresh thinking and innovation we can get.

But EY has identified a hole in the leadership skill set associated with change. In a new survey, we found that the top 600 utilities think strategic innovation and business model change is the key skill they need. But less than 20% are confident that this skill exists in their company.

This is alarming. The sector urgently needs the best strategic thinkers to navigate the current upheaval — there won’t be a second chance to get it right. In my view, there are two key areas where new strategies and models are most urgently needed:

1. **Around distributed generation and energy storage.** The combination of privately owned generation and storage is potentially the biggest disruptor for the sector. Utilities need to find a role in a decentralized energy world, where the focus will increasingly be on flexibility rather than rigid capacity. Consumers are excited about controlling their own generation, and more affordable batteries are coming within easy reach from the likes of Tesla and Germany’s E.ON. Are utilities prepared for the speed of this transition? If they don’t stay ahead of the change, they risk being left behind. New strategies need to reach out for innovation beyond straight technology, to encompass new processes, products and business models. If utilities get it wrong, the risk is that their distribution channel to customers simply walks away.

2. **Around digitization and big data.** We have a first-time opportunity to use new data sources to really understand energy customers and elevate the business to a new dimension. But utilities need to focus on the huge opportunities that are opening up, beyond the physical rollout of smart meters and the smart grid. My fear is that utilities don’t recognize the extent to which they lack the necessary analytical skills to convert the resulting data deluge into actionable insight. There is no guarantee of getting this right, and there is huge potential for costly mistakes. Misinterpreting the data could lead companies to create the wrong new products and services, while smarter new entrants steal the real new markets.

This issue of *Utilities Unbundled* contains lots of information on new directions to stimulate your thoughts on transformation. Please feel free to contact our authors or visit our website www.ey.com/powerandutilities to continue the conversation.

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1. 66% of utilities underperformed global stock markets from 2009-14, according to EY analysis.
2. E.ON has started construction of a 5 MW large-scale battery storage system in Aachen.
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In a world of uncertainty, changing regulatory frameworks and environmental challenges, utility companies need to maintain a secure and reliable supply, while anticipating change and reacting to it quickly. EY’s Global Power & Utilities Sector brings together a worldwide team of professionals to help you succeed – a team with deep technical experience in providing assurance, tax, transaction and advisory services. The Sector works to anticipate market trends, identify the implications and develop points of view on relevant sector issues. Ultimately it enables us to help you meet your goals and compete more effectively.

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Power & Utilities insights from EY

#UtilitiesUnbundled
Once considered an also-ran, concentrated solar power is getting a second look. A level market playing field and new advances in CSP technology may make it an essential form of renewable energy. Chris Tattersall reports on the technology’s resurgence.

The power tower at KAM’s demonstration CSP plant in Jülich, near Cologne, Germany
By the numbers, concentrated solar power (CSP) looks like a technology that never really made it: the global installed base of photovoltaic solar power (PV) is 200 GW and growing by double digits every year while CSP has a global installed base of only 4.5 GW.

In the beginning of the 2000s, many CSP projects were built. But around 2005, things changed: PV and wind took off, and investor interest in CSP lagged.

Now CSP’s fortunes may be on the verge of a major shift. Looking forward to a future when PV and wind are likely to be more exposed to market prices and carbon pricing should slowly increase, CSP’s storage capacity may well lead it to a renaissance.

The USP of CSP

The case for CSP begins with the fact that both PV and wind power have no built-in storage and generate electricity at irregular intervals. This creates a major challenge for system operators. “The correlation of wind and PV energy means that, as they produce, they force down the wholesale price — just look at German wholesale prices over a sunny and windy lunchtime,” says Reinhold Frank, CEO of Kraftanlagen München GmbH (KAM), a CSP technology developer and EPC provider to the energy industry, and a wholly owned subsidiary of Alpiq Holding AG, where Frank is a member of the Executive Board.

Feed-in tariffs mean that PV and wind energy producers don’t need to be concerned with this problem right now; they get paid no matter when and how much they produce. However, if these two renewables are eventually exposed to market prices, they will be much less economical as power producers would need to install massive batteries to delay the sale of their electricity until after sunset, when electricity market prices are higher.

Enter CSP with storage. CSP generates power more steadily by superheating a medium that stays hot enough, for long enough, to store heat far into the night, making it possible for the turbines to keep on spinning at a steady rate around the clock. The (approximately 6–12 hours) storage capabilities of CSP give utilities the ability to provide their grids with a much more even power load — and without the investment in battery storage other off-hour renewable systems require.

This reserve power can be managed minute by minute, and dialed up or down in a way that helps keep the overall load well balanced and system costs down. A 2011 study by the European Academies Science Advisory Council (EASAC) found that CSP had the same characteristics as a mid-level, mid-load fossil fuel plant. In Spain, CSP generators can deliver 30% power ramps in less than an hour, enabling REE, Spain’s grid operator, to treat it as just another dispatchable energy source.

The fact that CSP operates on a thermal principle, similar to most traditional power plants, also means it can be integrated more easily with gas power plants than can wind and PV stations. If its superheated core is still not powerful enough to generate all the electricity needed, the fact that CSP is thermal makes it easy to incorporate a fossil-fuel generator that kicks in when needed — a huge advantage over PV and wind, EASAC analysts note.

Spain leads the way

Despite all these advantages, CSP is not yet getting its due outside of Spain, currently home to half the world’s CSP capacity (2.5 GW). Two factors are making it more successful there than in most other countries, including such renewable energy giants as Germany. First, Spain has more sunny days than many other countries. Second — and more important — the Spanish feed-in tariff structure encourages evening production.

As more PV and wind power are added to the energy mix, these advantages should become increasingly attractive. Globally, up to 50 GW in PV capacity is expected to be added in total this year, according to German solar association BSW-Solar, and as more PV is added to the grid, the need for more demand-responsive generation will certainly rise.

KAM executives predict that when the renewable share reaches 30%, grid operators will begin to face load management issues. Operators will seek either to rely on traditional fossil fuel-generated power with a short deployment time to compensate for renewable energy’s night deficit or to invest in greater grid flexibility and capacity to handle the large decentralized power generation fluctuations.

In places as varied as South Africa, Morocco, Saudi Arabia and Chile, most of the new CSP projects in recent years have included power storage features, often to take advantage of high evening power prices. In some countries, storage is now required by legislation. “Storage is the only way we can avoid investing too much into the grid because nobody has the money,” says Frank.

**Understanding CSP**

CSP systems use mirrors to heat a thermal fluid, usually water, oil, molten salt or a gas. The hot fluid either produces a high pressure or it passes on its thermal energy via heat exchangers to a secondary thermal fluid that produces a high pressure. The high pressure fluid then pushes a piston or drives a turbine. Most of the world’s 90+ CSP plants are designed in one of three ways: with an array of mirrors that superheat a central tower, a large dish of mirrors focused on a central receiver, or long troughs that superheat thermal fluid in pipes (see Figure 1).

Of the three technologies, the dish appears to be least attractive because of its high cost and relatively poor economies of scale. Its installed base is almost negligible.

The two more common forms of CSP, linear and central receivers, have advantages and disadvantages. Developers select one form or another depending on solar irradiation conditions, terrain (topography), size of plant and the target application.
Until recently, linear receivers (particularly parabolic troughs) constituted the majority of the installed capacity. Looking at the project pipeline, however, it is clear that the use of central receivers seems to be rising, perhaps because energy storage can be integrated more easily into a central receiver system.

**Breakthrough in power tower CSP technology**

KAM engineers say the innovations they are making at their demonstration plant in Jülich, near Cologne, Germany (see photos, page 4 and above), make CSP more efficient in energy production, less costly to build, cheaper to maintain, safer to use and more environmentally friendly. Their secret: a lot of hot air.

Current CSP designs use a variety of fluids to transfer the heat the system generates, usually water, molten salt or oil. Any leaks in oil- or salt-based CSP can pollute the environment, such as the surrounding soil or atmosphere. Performing maintenance work around moving hot salt or oil is dangerous, normally requiring the whole plant and piping to cool before any major maintenance work can be done.

KAM’s design uses unpressurized air instead of oil or salt as its heat transfer medium. “Using air as the transfer medium greatly reduces the safety issue since the chances of serious burns caused during maintenance are much lower than with water, salt or oil,” explains Stefan Linder, Head of Technology and Innovation at Alpiq, KAM’s parent company. It also solves the environmental issue since a leak simply means air escapes rather than salt or oil polluting the environment.

Using air as the transfer medium makes a plant quicker and easier to maintain as it takes less time and effort to cool down. Nor does air get stuck in the piping as the plant cools down: “When you have molten salt, you must under all circumstances avoid solidification in the piping, which would cause major damage to the system. Hence, you either need to keep pumping hot salt around at all times or you must fully discharge the salt from the pipes and fill them with an inert gas during extended operation interruptions. This results in risky, expensive and time consuming scheduled maintenance and emergency shutdown procedures,” explains Linder. The air approach also reduces costs.

“During a normal maintenance shutdown, the molten salt is usually pumped into a separate storage tank, which takes several hours. This means that a large part of the year the plant cannot produce any energy. But when using air as the transfer medium, we can simply use a small energy storage capacity and maintain the plant at a low temperature,” explains Linder.

KAM’s design is also more energy efficient due to the high achievable temperature (680 degrees centigrade) of the heat transfer medium, air. This is made possible by the very high concentration of solar radiation on a small focal point on the top of the receiver tower (approximately 1 MW/m²), which heats the absorber surface to approximately 1,000 degrees centigrade, Linder explains.

KAM is not content with the simplification of air and is exploring a variety of additional ways to minimize the levelized cost of energy of its CSP technology. “We are looking at how we can keep the function, quality and reliability, but make it as inexpensive as possible,” Frank says.

As with most other renewables, CSP is not yet cost-comparable with fossil fuel plants. But Linder predicts that it will eventually be competitive without...
subsidies as more costs are squeezed out of the system and assuming the price of carbon dioxide rises.

Opportunities in water-constrained locations

Beyond power, CSP may also create some other interesting opportunities for dry and sunny places. Like every thermal power plant, CSP turbines throw off a lot of exhaust heat, which can be incorporated into a desalination process.

Desalinating water is one of the world’s fastest-growing and most pressing power needs.

Depending on the process, desalination consumes as much as 2.5-3.5 kWh per cubic meter of water, according to a 2012 study by the International Renewable Energy Agency (IRENA). Even now, about 0.4% of global electricity is consumed in desalination, and demand for water continues to grow. In the MENA – Middle East and North Africa – region alone, desalinated water capacity is expected to rise to nearly 110 million cubic meters in 2030, up from 21 million in 2007, according to IRENA.

IRENA found that the flexibility CSP offers because of its two signature features – its capacity to store energy and its easy integration into a hybrid system – could make it an attractive power source for the process.

Utilities hold the key to future development

Ultimately, technological advantages will take CSP only so far, Frank believes. Utilities will need to lobby their regulators and governments to realign market designs in a way that allows CSP to compete on a level playing field with PV and wind: “The arguments have to come from a utility, not a vendor,” says Frank.

“CSP will eventually be cost-competitive without subsidies as more costs are squeezed out of the system.”

Stefan Linder, Alpiq

Reinhold Frank
CEO, Kraftanlagen München (KAM)

Reinhold Frank is an Executive Board member and head of Energy Services of Alpiq Holding AG. In 2013, he was also appointed CEO of Kraftanlagen München GmbH, a wholly owned subsidiary of Alpiq. His career has encompassed board and executive roles in European utilities and construction, including Germany’s RWE and Hochtief AG and Vychodoceska Plynarenska in the Czech Republic.

Stefan Linder
Head of Technology and Innovation, Alpiq

Prior to joining Alpiq in 2014, Stefan Linder held a variety of R&D, operations management and business development roles at ABB, the power and automation giant.
Irish wind innovation powers ahead

Irish TSO EirGrid now ranks among the world’s leading operators – developing and testing transmission smart grid technologies and innovating to deploy high levels of renewable energy today that the rest of the world could be using in 10 years’ time.

Report by Ian Venner

Integrating renewable energy is key to building the Irish power grid of the future. EirGrid, the island’s sole transmission system operator (TSO), is responsible for managing the power system and is addressing a major shift in electricity generation from traditional sources to renewables.

Robin McCormick, EirGrid’s Director of Operations, Planning & Innovation, explains: “We are seeing growth in renewables that we weren’t expecting even two or three years ago. Today, over 20% of our electricity is from renewables, mostly onshore wind. Our grid routinely runs on 50% wind power, which is already more than any other system in the world. By 2020, we aim to increase that to 75%.”

This means a vast quantity of new renewables will have to be connected to the grid in the next five years. The work EirGrid is doing to meet this ambitious target has attracted interest and investment from global players and made Ireland a popular test bed for new ideas in renewables integration, research and development.

Irish energy policy is deeply committed to renewable energy as a route to improving energy security and becoming less dependent on fuel imports. “Ireland is not connected by a synchronous link to any other system, so although our power can be balanced from the UK, we have to be capable of maintaining a stable system independently,” says McCormick.

“This is particularly important for EirGrid as Ireland is home to a number of intensive energy users, including Google, Intel and Microsoft, who need a secure electricity supply to run their data centers, as well as manufacturing and research facilities.”

To manage high levels of instantaneous renewable generation on the grid and guarantee supply to some of the world’s most advanced companies, EirGrid is dealing with two main challenges, says McCormick.
“Our grid routinely runs on 50% wind power, already more than any other system in the world. By 2020, we aim to increase that to 75%.”

Robin McCormick, EirGrid

“The first is developing technology so that, by 2020, the grid can operate at up to 75% instantaneous wind while maintaining secure supply – something without parallel on any modern electricity system.

“The second challenge is to upgrade and build physical infrastructure able to cope with the vast influx of new renewables, balancing demand growth in large cities with the shift to generation in less populated areas.”

These goals have to be achieved without excessive capital and operational outlays, and with minimal social, community and environmental impacts and greater system reliability. To this end, EirGrid is introducing a suite of new solutions to provide better analysis, better monitoring, better control systems and better utilization of existing assets.

**Strong progress to date**

The program to date has combined new build (the utility has seen construction of more than 330km of new circuits since 2008) and upgrading of existing lines with new technology to increase their capacity. Installing advanced control center tools and new system service

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**€3b**

value of Ireland’s wholesale electricity market

**2.5 million**

electricity consumers on the island

**25%**

since the beginning of 2015 wind energy has met a quarter of Irish electricity demand

**1,967 MW**

Ireland’s highest wind record - on 7 January 2015 - was enough to power over 1.27 million Irish homes

**4,800 MW**

projected installed capacity of wind in Ireland by 2020 - which means

**2,000 MW**

needs to be installed in the next five years
products will allow the transmission system to safely accommodate a huge amount of new wind power.

“New grid technologies include dynamic line rating, series compensation and high-temperature low-sag (HTLS) conductors. HTLS conductors can run hotter without expanding as much, so they sag less than conventional lines,” explains McCormick.

“Installing this technology has enabled EirGrid to double capacity on around 1,200 km of existing overhead lines, reducing the need to build new ones.”

Series compensation, a technology already used successfully on longer transmission lines in the US and Russia, is being tested on EirGrid’s much smaller systems to boost capacity on some existing lines.

“This technology gives us a viable alternative to resolve one of the more contentious projects that was proposed – the Grid Link project. Grid Link was originally envisaged as EirGrid’s largest new high voltage overhead power transmission line, to be built at a cost of €500m. Following public concerns about the potential impact of the project on health, tourism, the environment and the landscape, we are seeking alternatives to engaging in extensive new build,” says McCormick.

EirGrid is also the first utility outside the US to pilot Powerline Guardian technology, which resolves congestion by diverting power flows away from overloaded lines to those with capacity available. This allows more effective use of the existing grid.

A new voltage uprating technology, which increases line capacity, involves fewer structural modifications than conventional approaches, is quick to install and reduces overall costs, is likely to be technically and economically viable before 2025.

EirGrid owns the East-West interconnector, which began operation in 2013. McCormick says it has contributed significantly to integrating renewables: “When wind generation exceeds 50%, the interconnector allows us to export some of the surplus to Great Britain. This has had a very significant impact in reducing the amount of curtailment we need to do.”

Overall program investment is currently estimated between €2.7b and €3.9b, depending on which options are used to develop the grid (see Figure 1, page 14). Following revised estimates anticipating lower energy demand on the island, the grid development strategy was relaunched in mid-2015.

“The new strategy moves away from identifying traditional engineering solutions, to a much more inclusive consultation that puts the community at the heart of the process and is more

Integrating wind under extreme weather conditions

As an island electricity system, Ireland faces technical challenges not encountered in larger synchronous systems such as mainland Europe. Increasing the percentage of small “light” generators, compared with the conventional large “heavy” generators, presents challenges to maintain a stable system. For example, when a large conventional generator trips, EirGrid needs to ensure the remaining generators are able to respond quickly to bring generation and demand back into balance. The company is working with the industry to set new standards of performance and provide a competitive mechanism for provision of more flexible system services.
ambitious in seeking out new technology to meet their needs. For example, for some of our major projects, we have options that don't involve new overhead lines, and it's our intention to adopt this approach for all new projects in the future,” says McCormick. Public reaction to the new strategy has been positive, he adds.

**Fostering innovation**

EirGrid encourages innovation and originality in technology entrepreneurs and manufacturers from all over the world, offering them the opportunity to test ideas at industry scale that could transform the future of electric power systems.

“It’s important for new technology ideas to be solution-led and service-led, rather than simply technology-led,” says McCormick. “If we point innovative people in the direction of a problem, they will come up with products to fix it. We act as an enabler: we don’t tell people what R&D to do, but we give them insight into what we see as the opportunities.”

In 2012, the company set up the Smart Grid Innovation Hub jointly with Ireland’s National Digital Research Centre, an early-stage investor in technology companies, to foster entrepreneurship and trial new products and processes.

One project that has emerged is RealValue, a collaboration among Glen Dimplex, Intel, EirGrid, ESB Networks, SSE Airtricity and other European partners. RealValue will install Glen Dimplex’s new Quantum smart storage heaters in Irish, German and Latvian homes. The heaters respond automatically to changing weather conditions and take advantage of cheap-rate electricity at any time of day. Intel intelligence built into the heaters allows them to communicate with the grid, explains McCormick.
Case study  Networks

“So the project is a play on energy and the Internet of Things. It goes a step further than just ‘When is it cheap to consume electricity to maximize my individual users paying less?’ We’re asking ‘Can we tie in the logics and the distribution control system so we know we’re not overloading lines in the local network? Can we use the storage units to provide system services back into the power system operators?’ That’s an incredibly exciting project, and it has a lot of interest because if we get that one cracked, the technology translates very nicely into any consumption control in a house and applies to things like electric cars.”

Policy and communication are key success factors

EirGrid has positioned itself as an innovator with the mettle and willingness to take on difficult tasks. What factors does McCormick believe underlie its success to date?

“One major advantage is Ireland’s policy commitment to a low-carbon economy with clear targets for renewable energy,” he says. “Policy certainty gives us a green light to innovate with confidence and drive value for customers. It is also highly attractive for international investors.”

Clearly, achieving the massive wind-use targets Ireland has set is only possible because of the island’s unique energy characteristics. But EirGrid’s innovations are not unique to Ireland, McCormick emphasizes: “The solutions we’re looking at are absolutely transferrable and will become mainstream,” he predicts. “The work we are doing is attracting significant interest from countries including Japan, the US, Germany and the UK. If you want to see what onshore wind turbines will be capable of in 10 years’ time, come to Ireland today.”

By taking things that are already known and understood, and thinking about how we might apply them differently, we find new answers. We just have to open our minds and throw the net a bit wider,” McCormick remarks.

The deliberate way EirGrid has gone about sharing information with the public, encouraging consumer feedback on policy plans and communicating in plain English is another key success factor, he adds.

“Consumers want to know the lights will stay on, and that renewable generation won’t cost the earth. They want to see value in lower energy bills and secure energy supply. We recognized this from the outset and worked hard to ensure that the public is informed, involved and part of the solution. Those that used to say ‘we don’t want this’ now come to us with a

Figure 1. EirGrid investment in grid development by region

Source: EirGrid

<table>
<thead>
<tr>
<th>Region</th>
<th>Investment Range (€)</th>
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<td>North West</td>
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<td>€180m</td>
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Table: EirGrid investment in grid development by region

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Robin McCormick has extensive experience in the power industry in a regulated utility environment. He was jointly responsible for establishing the Single Electricity Market Operator, an all-island wholesale electricity market in Ireland. The current focus is to establish a new market, i-SEM, in compliance with the European Energy Directive. He has recently been appointed EirGrid Group Executive Director responsible for Operations, Planning and Innovation. He has participated on the board to establish ENTSO-E — the transmission system operators’ regional association.

Robin McCormick
Direction for Operations, Planning and Innovation, EirGrid Group and General Manager, SONI Ltd.

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“We'll continue working to deliver secure, affordable electricity and build dialogue about a grid that is smarter than before, meets the needs of communities and the wider society, and gives people the opportunity to have input at the right time,” says McCormick.

“It’s an exciting time for us. What we’re doing now is what others will need to be doing in the future. Ireland is a forum for innovation where developers, manufacturers and utilities from all over the world can share knowledge, test ideas and understand how we design our control systems to provide the stability you need in these new conditions with 50%-plus penetration.

“We can prove the system works so that when a turbine manufacturer is approached by others in five or six years’ time, they can demonstrate five years of running experience in Ireland. Manufacturers are seeing that as a big commercial advantage.”

What next?
The new grid strategy will be finalized at the end of 2015. In the meantime, EirGrid continues to roll out projects, aiming to reinforce its position as a world-leading TSO.

“What is the best outcome of advanced research engineering? By taking things that are already known and understood, and thinking about how we might apply them differently, we find new answers.”

Robin McCormick, EirGrid

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“What is the best outcome of advanced research engineering? By taking things that are already known and understood, and thinking about how we might apply them differently, we find new answers.”

Robin McCormick, EirGrid
“It’s often said that customers don’t care who supplies their energy, but I think they will if we change how we engage with them.”

Will Morris, SSE Retail
What is the value of strong customer satisfaction levels if you don’t use them to create a real difference in the market? That was the question we asked SSE’s Group Head of Retail Will Morris as the UK retailer undergoes a “transformation within a transformation” designed to build a new customer-centric brand.

SSE’s strapline “proud to make a difference” is not the result of any customer research group but rather an authentic reflection of who we are. Given my background, when I joined SSE in 2012, people could have been forgiven for thinking I’d been charged with bringing in great customer service. But it was already here.

Instead, my focus has been on helping SSE capitalize on its strong performance. I’ve worked at companies known for their warm approach to customers, including Disney, British Airways and the Intercontinental Hotel Group, and have never found such genuine care for customers as that which I discovered at SSE. We consistently top the industry league tables for customer satisfaction and were voted number one for customer service by (UK energy comparison website) uSwitch seven years in a row.

But it’s important to distinguish between customer satisfaction and customer relationships. We had never managed to turn the former into the latter and build a genuine brand difference. It is important that we establish SSE as a company that clearly differentiates between these two customer positions if we are going to create a long-lasting brand.

**The last frontier**
Energy is the last of the retail sectors to create a clearly differentiated proposition for customers that encourages genuine loyalty based on more than just price.

While we have to accept that energy is an essential product, and it is therefore only right that we are under scrutiny, this makes us a far easier target for attacks about pricing than other big-brand retailers – for example, UK department stores like John Lewis or Marks & Spencer – which have established a greater level of trust with customers.

With this in mind, a key part of transforming SSE is to take the wonderful raw material of our customer-centricity and develop trusting customer relationships. We can either make something of our culture of customer satisfaction – invest in it, communicate about it, build the brand and manage our reputation – or not bother at all. Do we want to create a customer experience that would inspire loyalty or do we want to make what we do all about price – to be the Ryanair of energy retailing?

SSE made a decision to create a real difference for customers that would transform us into a market-leading retailer, not just of energy but of all life’s essential services, such as broadband, security and maintenance.
Three steps to transformation

Such a fundamental change in a company is always difficult. Marketing had not previously been a significant part of SSE’s business model. However, businesses need to change and evolve to continue to be successful, and we have worked together to find a new direction for SSE. I believe in three steps to successful transformation:

1. **Plan.** Cultivate the ability to “soak up” the issue you are tackling and then articulate it into one simple plan of action. What do you have to do? The single biggest barrier to success in business is getting lost in a tangle of data. Too many details confuse people, leading to wrong decisions.

2. **Proximity.** Get close to what the business really does and to the people who are doing it. This means listening to customer phone calls, going out with meter readers and engineers, listening to staff and talking to customers — all the time. Management reports and research studies are important, but they can’t be relied upon to provide the full picture.

3. **Purpose.** What are you known for — numbers, vision, strategy, brand? Whatever it is, it is helpful to define your core purpose early, and in collaboration with your leadership team. This is particularly important in these changing, and sometimes unstable, times — understanding yourself and your team and the core purpose you share will keep you united during the highs and lows of transformation.

It’s also good for us to look outside our sector to other companies that have transformed their business models in the face of change. We’ve visited the Ritz Carlton, John Lewis, Pret A Manger — where we took turns serving behind the counter — and First Direct. First Direct is a particularly notable example of successful adaptation to the digitized world. Once an essentially telephone-based service, the bank has become an online business without losing its market-leading reputation. That’s exactly what SSE is aiming for.

Seeing what other businesses do keeps you fresh. There’s always the danger that you think you know it all. You don’t. You can always improve.

Connecting emotionally with customers

While SSE’s high levels of customer satisfaction put us in a good starting position, we need to move customers from being content, as they are now, to being loyal over the long-term.

It’s often said that customers don’t care who supplies their energy, but I think they will if we change how we engage with them. If our communication with customers is focused solely on price, their focus will always be on price too, and on finding the cheapest supplier. But what if we connect on an emotional level and make energy about keeping your family safe and warm and cared for when something goes wrong? Suddenly the relationship changes.

Most of our customers value peace of mind the most. While we have a few that read their six-page bill from cover to cover and are interested in their calorific conversion calculation, most simply want to trust that their energy is reliable and that they are getting a good deal. They want to know we’ll keep their children, parents and elderly relatives warm.

We have made a strategic choice to attract these customers rather than to compete purely on price (although we will always work hard to keep prices as low as possible). We have more than 20 energy suppliers in the UK market now. This competition is good — it brings innovation and keeps us on our toes. But with so many competitors, if we made our offering all about price, we would not have a particularly sustainable business model. Maybe this decision has cost us some new customers, but having introduced this strategy in 2012, the impact on loyalty seems to have been positive. By understanding what customers want, you can build a more sustainable and trusted platform that will ultimately earn you the right to sell them more products and services.

Future of the energy world

I believe that the future for SSE Retail, and for the retail energy world generally, is a bright one. There are, however, several key issues that must be addressed if we are to earn the legitimacy to fulfil our real potential:

1. **Delivery** of the basics. Pricing must be clear, bills simple, and customers should receive the service they deserve. Without the basics in place, we cannot earn the right to go further.

2. **Decarbonization.** A huge amount of money needs to be invested in the energy sector if we are going to hit our decarbonization targets. To do this we need to be able to have an honest dialogue with our customers about how we are going to balance decarbonization with the equally important challenges of affordability and security of supply — and, critically, how this will be paid for.
3. **Digitization.** Digital platforms will allow us to do our core business more efficiently and be more accessible to customers. But even as you switch to web-based services, customers want to know that they can still call, talk to someone intelligent and feel connected. SSE’s new web platform, underpinned by smart metering data, will increase our ability to respond to customers and engage with them 24/7, on their terms and in a personal way.

4. **Diversification.** The potential for utilities to diversify into other products and services is virtually untapped. I think the sector has yet to find the “sweet spot” that makes customers ready to engage with their energy supplier in this way. But if we pay attention to delivery of the basics, customers will trust us to deliver other services, such as broadband, maintenance and home security, either directly or in partnerships.

Diversity is also an issue for the leadership of our sector. When I first joined SSE, the percentage of women on the leadership team was zero. Three years later, the figure stands at about 35%. Diversity, not just in gender, but in background and experience, brings a different balance to the conversation, a different energy and different dynamic, and innovation as a result. It’s something I feel the sector vitally needs as it continues to transform.

**Don’t fall flat**

Transforming a business as big as SSE Retail is a huge task, and we are probably at the mid-point of our journey. During these large change programs, there is the risk that you go uphill for so long that you can fall flat at the halfway mark.

Staying on track means focusing on delivering a vision while being willing to change course if needed – you must have a degree of agility in what you do. The big challenges we’re navigating now include establishing a new digital billing platform, strengthening our brand and, ultimately, building a robust business model. This is where our future lies and where we can create the most value over the next 10 years. We are doing well in the energy sector, no doubt about that. But, personally, I don’t think that’s enough – we have to be one of the best across any sector. It’s like we are trying to win the Olympics, delivering outstanding levels of service, and that keeps driving us to get better.

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**Will Morris**

Group Managing Director, Retail, SSE

Will Morris joined SSE Retail in 2012 from Intercontinental Hotels Group and has more than 20 years of experience in blue chip customer-facing service businesses, including British Airways and the Walt Disney Company, both in the UK and internationally.

At SSE, Will leads the business in energy supply and energy-related services and aims to establish SSE Retail as the number one supplier of energy and related services.
“The end of the world as we know it doesn’t necessarily mean the end of the world. If we can change our concept of the industry and our understanding of the value we bring to the customer ... we can build an even better business than we had.”

Andy Vesey, AGL
Preparing for carbon-free competition

All over the world, the power and utilities sector is undergoing a transformation driven by two forces. First, a carbon-constrained future is clearly on the way, leading us away from the conventional coal power stations that have been the dominant form of power generation for 125 years. Second, plain-vanilla electric service will soon be a thing of the past. Consumers will have a number of choices about where they get their energy and how they use it — not only in terms of their ability to produce and store energy themselves, but in usage-monitoring, metering and analytics.

The combination of less carbon and more choice is going to lead to a radical change in the entire value chain of our industry, one that is almost certain to flip the balance of power in the electrical energy business away from the utility and toward the consumer. Some people think that means the end of the industry as we’ve known it, and they’re right about that — my home market of Australia is already feeling the heat of this shift.

How do you transform an energy business away from carbon without sacrificing customer service or investor value? AGL’s Andy Vesey outlines his approach.
Unlike the US, for example, where the economic pain of this transition is being mitigated to an extent by its shale gas discoveries and the number of integrated utilities in the market, the Australian market has seen rising electricity prices — even though we have one of the most competitive retail energy markets in the world.

All in all, the outlook seems very challenging for Australian power companies. But fortunately, the end of the world as we know it doesn't necessarily mean the end of the world. If we can change our concept of the industry and our understanding of the value we bring to the customer, I believe we can build an even better business than we had.

Making this transition, however, will be a challenge as it will require a change not only in how we produce our products and services but in how we engage with our customers. In the end, no link in the energy value chain will be untouched.

A look in the mirror
At AGL, we began our transformation earlier this year with a good look in the mirror. We asked ourselves what, in the long run, would be best for our company, our customers and our shareholders. Having faced up to the challenges ahead, we made some hard decisions.

The first was a refreshed greenhouse gas emissions policy and a commitment not to extend the life of any of our existing conventional coal-fired stations. We also decided that we were not going to acquire any or finance any, full stop.

The decision to get out of the CO\textsubscript{2} emissions business by 2050 (at the very latest) wasn't just a matter of our commitment to sustainability. We concluded that a carbon-constrained future is a reality, and if we did nothing, we would risk waking up one day to realize we owned some stranded assets or had caused other dislocations that might hurt our shareholders or our customers. The fact is, as a fiduciary — and a company owned by investors — you need to think

“The customer’s move toward premises-based options doesn’t have to cut us off. Instead, it will only cut us off from the economic cycle and the vagaries of commodity prices.”

Andy Vesey, AGL
about carbon as a portfolio risk. And, as with any unmanageable risk, you need to find ways to reduce your exposure to it as much as you can.

I see this shift not just as sound risk management, however, but as a tremendous opportunity. Putting a stake in the ground allows us to engage more with others to see how we can get this done.

There is a lot of talk in the industry now about viewing consumers who want access to distributed energy resources or a rooftop solar power system as lost market share. I don’t see it that way. We aren’t losing customers, we’re just shifting how we need to compete for them and how we serve them: they’re the future clients of our distributed power business.

That’s why AGL has created a business unit that focuses only on distributed resources and the customer, from the meter into the premises. Its job is not just to integrate the customer seamlessly into our systems, but to help the customer use these new distributed systems and technologies. This unit makes us indifferent to the question of rooftop versus old fashioned generator-to-meter power and has made us a leader in the distributed power segment. We were the first major Australian energy retailer to offer a zero dollars up-front solar opportunity, the first to introduce a solar and battery combination, and the first to offer a home-storage battery product. We are also the only retailer that has a fully certified digital-metering subsidiary.

Tomorrow’s energy market is only a zero-sum game if you view the changes happening in the industry as lost market share. My core belief is that with some imagination and an intense focus on meeting the customer’s needs, AGL can continue to succeed. We see the customer’s energy experience as the focal point of our business – not the network, not our large-scale grid investments and not even the retail business in general. We define our business as harnessing insights to enrich the customer’s energy experience.

My feeling is that electric power will soon start to look like many other consumer products that once only came in one flavor. We will start to see electricity for the consumer as not only an essential service, but as a lifestyle product. People will buy the right energy mix for their home – a mix of features that offer the right comfort level, the right level of independence, at the right price – a bit like the multiple-tiered telephone and data services that are available to consumers.
Such tailored services won’t be only for the adventurous first adopters; I believe they will better meet the needs of families on a budget as well. Digital meters and other new technologies will give people greater control over their energy consumption. In addition, locking in their power costs for the long term with renewables such as solar may actually be a better way to meet the needs of price-sensitive customers.

All in all, I see a bright future ahead for utilities. The customer’s move toward premises-based options doesn’t have to cut us off. Instead, it will only cut us off from the economic cycle and the vagaries of commodity prices. While the electric load once grew only when the economy grew, now we’ll grow whenever people become more enthusiastic about our products.

Of course, building a better energy environment won’t just be up to our industry. The distribution sector also needs to play an important role, as do public-policymakers, in supporting the development of a sustainable grid and policy frameworks that reward innovation.

Building an “anticipatory culture”
How quickly AGL builds this new kind of energy company will depend a great deal on the evolution of carbon policies and advances in technologies like renewables and energy storage. But it will also depend on the degree to which we can create what we call an “anticipatory culture” — a business that is good at listening to its customers, understanding its technological options, inspiring its employees, knowing when it gets it wrong and quickly pivoting to get back on track.

An anticipatory culture incorporates six dimensions of management:
1. Intimate knowledge. We need to have a bone-deep understanding of the needs of our customers and our stakeholders. At the same time, we need to understand the capabilities of emerging technology to project how those capabilities will allow us to meet those needs.

2. Scenario planning. We should not just extrapolate along one future path. We need to model many, many futures and come up with a path that incorporates not just the most likely macroeconomic and geopolitical scenario but the probability that other events might drive a different future. We then weigh the likelihood of those possibilities and choose the path that
“The only successful companies in this space … will be those that know how to innovate and, when they get it wrong, have the ability to regroup and innovate again.”

Andy Vesey, AGL

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In my view, anticipation is not about being the first to offer a zero dollars up-front payment system for rooftop photovoltaic power (although we were), nor about promoting one form of renewable over another. Instead, it’s about the degree to which we can lead with customer-centric offerings in times of uncertainty and change – placing the bets on the future we believe to be right, but always being prepared to move away quickly when they’re wrong, where the arbiter of right and wrong is the customer.

The power business has changed, is changing, and will continue to change for a very long time. My view is that the only successful companies in this space (and there may be many of them) will be those that know how to innovate and, when they get it wrong, have the ability to regroup and innovate again. We have to be agile, we have to anticipate our customers’ needs, and we have to foresee where technology is going. For the next five years at least, creating a culture that operates this way will be one of our most important challenges.

People ask me sometimes if AGL intends to invest globally. For us, the answer is, not now. Australia might be thought of as a small market, but it offers us some tremendously large opportunities. For the time being, we have our work cut out for us right here, and I feel our customers and investors are best served by keeping this focus.

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Andy Vesey
CEO and Managing Director, AGL Energy Limited

Andy Vesey took up his role with AGL in February 2015. He has more than 30 years of experience in the electric and gas utility industry, including stints as CEO of CitiPower and COO of AES. His broad experience includes generation, transmission, distribution, customer service, retail sales, corporate support functions, international project development, business start-ups, product development assignments, change management and process re-engineering.
Growing momentum for reform in many of the world’s energy markets is creating significant investment opportunities for global utilities.

Report by Matt Rennie
In today’s globalized economy, deciding just where to deploy capital is an issue that international utilities and investment funds must constantly consider – and reconsider. Knowing where the best returns on investment can be found is especially critical for those utilities in mature markets, such as in Europe and the US, where returns are under pressure from lower demand and grim growth forecasts.

This push for growth is turning attention to new markets, particularly those where governments are embarking upon energy sector reform. Momentum for reform has increased at a rapid pace over the past 12 months, with more than 30 countries now considering, commencing or continuing the process of breaking up long-standing integrated utilities and allowing private investment into their electricity and gas sectors. With its ability to offer “once in a lifetime” opportunities to establish a foothold in markets previously off limits, reform offers the potential to deliver the type of opportunities that open up for new entrants.

The three types of reform that present particular opportunities for new investors are:

1. **Electrification reform** – when government announces it will facilitate the construction of new power stations to increase capacity and drive economic growth

2. **Wholesale market reform** through unbundling – when government announces it will disrupt the traditional bilateral contracting arrangements between generation companies, or even particular power stations owned by a company, and the off-taker

3. **Retail market reform** – when government announces it will open the market to new retailers, giving customers the benefit of choice and innovation

I’ve had several CEOs ask me, “So if I have US$1b, where should I invest right now?” Answering this billion-dollar question starts with knowing which type of reform is happening where (see heatmap, Figure 1).

**Electrification set to boost demand growth**

In many ways, the best investment opportunities lie in electrification reform. The push to bring electricity to the millions of people living without access to reliable and safe power is one of the most urgent priorities of the sector and a big driver of reform in many regions. In Africa, where about 700 million people have no access to electricity, we expect to see approximately 30 GW of new generation installed before 2030 while Indonesia (70 million people without electricity) has announced plans to install 35 GW during the same time frame.

These ambitious electrification agendas will boost rapid demand growth in these countries as industry begins to see the benefits of greater and more reliable power. For example, in the Middle East and Africa, where much of the current reform activity is taking place, the forecast demand growth from 2010 to 2050 is a staggering 114%. In India, where the Government’s strong support for reform is built around new renewable energy capacity and where about 390 million people do not have access to power, the figure is 123% from 2012 to 2040.

Compare that to Germany and Italy, where projected energy demand growth rates are -8.9% and 5.2% (for 2012 to 2024), respectively, and it is clear why utility powerhouse such as E.ON and Enel are making large investments in new markets. The backing of global financing agencies, such as the World Bank and International Monetary Fund, only adds to the appeal.

**Prized assets coming to market**

Wholesale market and retail market reform in established markets are also worth consideration. For example, current reforms in Mexico provide opportunities to build new generators and compete with established plants, which may have higher costs. The Mexican Energy Ministry predicts public and private investment in its energy sector will top US$62.5b over the next three years. For new retail entrants, entering a newly opened energy market allows businesses to target those customers with the highest profitability that, until now, have not had the ability to choose their suppliers.

Reforms driven primarily by the desire to raise capital through asset privatization

“More than 30 countries are now considering, commencing or continuing the process of breaking up long-standing integrated utilities and allowing private investment into their electricity and gas sectors.”

Matt Rennie, EY
### Current state of reforms

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Source: EY analysis; *Other reforms refer to developments that drive more private and foreign investments into the sector

Figure 1. Governments worldwide opening up the energy sector to competition
While many reforming markets offer excellent investment opportunities, I believe Japan warrants particular attention right now. With the Japanese Government committed to a suite of significant and detailed reforms, Japan’s attraction lies in the huge scope of opportunities on offer, and the disruptive change that these reforms will imply.

**Figure 2. Japan’s three stages of energy reform**

**Most interest in retail and generation**

While investment opportunities exist across the value chain, it is generation (particularly in renewables) and retail that are creating the most interest:

- **New generation capacity** – We’ve already seen close to 500 new generation companies and several new non-conventional players register in Japan over the last year. These include Nippon Paper Industries, which is building a new woodchip-fired biomass power plant, and solar-panel manufacturer Suntech Power Japan Corp, which is planning to sell solar energy generated by its own plants. The different rationales behind investment in Japan illustrate how reform can be used strategically to achieve a company’s overall, long-term goals.

- **New retail entrants** – The rapid emergence and registration of more than 600 potential new retailers bode well for a competitive initial market opening in April 2016. For many of the potential new investors, precisely how they plan to enter the market will depend on the nature of the wholesale market rules, which are still being developed.

**Incumbents look to other markets**

Meanwhile, Japan’s 10 vertically integrated utilities are starting to reshape their own investment strategies as they prepare for an open energy market. Reforms will remove traditional geographic monopolies for incumbents, which may lower returns in domestic markets.

To make up for potential losses, Japan’s electricity providers are ramping up their generating capacity overseas, with a focus on high-growth Asian and Middle Eastern markets. For example, J-Power (Electric Power Development) now has capacity of 16.3m KW in overseas markets – five times as much as a decade ago and the equivalent of 16 nuclear reactors.1 About 75% of this is in Asia and the Middle East. Altogether, we expect the overseas generation capacity of Japan’s electricity utilities to top 47m KW by 2030.

We are also seeing interest in infrastructure opportunities, with Japanese companies set to invest about US$244b in such projects via public-private partnerships in strategic countries, including Brazil and Mexico.

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offer the chance to acquire rarely available regulated assets, sought after by strategic investors for their reliable long-term returns. For example, we are seeing enormous investor interest in the upcoming sales of regulated grid assets in the Australian state of New South Wales.

Common guidelines for investment

But while there's great potential to capitalize on the opportunities provided by reform in both emerging and developed markets, there's also huge scope for costly missteps. While any inbound investment decision should be evaluated carefully, the requirement for appropriate due diligence before entering a newly reformed market is even greater. As well as considering the usual criteria for investing, potential investors in markets in the midst of reform must also understand a wide range of political, social and regulatory aspects, as well as the complexity added by the very dynamic nature of reform.

This dynamism and fast pace of energy reform is one of the reasons it is so fascinating. Another is the diversity of experience. As widespread as energy reform is now, each country's experience of the process is as unique as its own government, market and culture. That said, despite the differences, some common guidelines for potential investors include:

1. Be sure of government commitment — reform is almost always long, costly and politically difficult. Look for strong signals from the government that demonstrate its long-term vision and commitment to realizing the full benefits of reform, even if this means making some unpopular decisions along the way. Without strong political leadership, reform often stalls, and early-stage market entry investments can be larger than anticipated.

2. Know the framework before making decisions — the features of the new market design will have significant implications for those planning to enter it. As governments work out the details, it can be wise to adopt a “wait and see” attitude while being prepared to move fast once key announcements are made.

3. Go local — consider partnerships and on-the-ground advisors. Well-developed partnerships or joint ventures are a proven strategy for newcomers to mitigate risk and optimize success. In any market, pre-existing business and personal relationships play a role, and this is particularly so in the fast-paced, complex and political arena of market reform. Engaging local advisors is critical to gain an on-the-ground awareness of risk and identify the best and fastest way to enter the market.

Driving innovation

The reforms transforming global energy markets are driving an influx of new investment, innovation and a range of economic and social benefits that can only bode well for the long-term sustainability of the sector. There's no doubt that the resulting investment opportunities for utilities and other international companies are some of the biggest and most promising we have seen in the power and utilities industry for many years. But, despite the potential, entering markets in the midst of fundamental transformation carries a high level of risk. Success will require rigorous preparation beyond that required for most other investments. A deep understanding of the market, the government’s framework for reform and level of commitment, and constant vigilance of breaking developments are critical elements of any company’s entry strategy.
Women in leadership
In a recent EY survey, leaders of the top 600 power and utilities (P&U) companies overwhelmingly agreed that the P&U sector is in the midst of a transformation. They also agreed diversity of thought and experience could help meet significant challenges.

However, practical steps to achieve that diversity – in particular, to get more women into leadership – are lacking. Radical change is needed, including an honest look at how leadership candidates are being identified. Only with a shake-up of how the sector currently promotes future leaders can it reach the diversity it needs to survive and thrive in these changing times.

**Key findings from EY research**

From June to August 2015, EY conducted research among the top 600 P&U companies globally, representing 62 countries. From the 400 executives (52% male, 48% female) taking part, a powerful consensus emerged on the following (see Figure 1):

- The P&U sector is in the midst of a transformation (96% agree).
- Diversity of thought and experience will be key to helping navigate change (92.1%).
- Dramatic change is needed in how talent is attracted, retained and promoted (78.1%).

The survey also revealed that the sector is not taking the steps necessary to achieve the dramatic change it acknowledges it needs. So is this consensus on the value of diversity just lip service?

“Practical steps to achieve diversity – in particular, to get more women into leadership – are lacking. Radical change is needed, including an honest look at how leadership candidates are being identified.”

-Alison Kay, EY
Where we are today: 14% women on P&U boards

It is worth providing some context before we talk about change. The EY Women in Power and Utilities Index tracks the number of women on the boards of the top 200 utilities globally. In the 2015 Index, women represented 5% of board executives and 14% of board members (both executive and non-executive).

While significant leaps are unlikely year on year, from 2014 to 2015, there was actually a decrease in the number of female board members (see Figure 2).

Moving to a gender-balanced board – from the current 14% to 40% (where many targets for gender parity on boards are set) – would require 553 women to be appointed to P&U boards. That’s 553 female candidates to be identified and chosen.

As the Index demonstrates, doing more of the same will not get us there.

The gap between agreement and action

Based on the research, I believe the low percentage of women on P&U boards is a result of two circumstances:

1. Few utilities have a structured approach to developing and promoting women (see Figure 3).
2. Few measure and report progress on women in leadership or track the impact of diversity on business performance (see Figure 4).

Closing the diversity gap begins with measurement. The simple truth is that progress is unlikely to be made until these gaps are addressed.

In terms of reporting, only 39% of utilities formally measure progress on improving gender diversity in the leadership team. Developed market companies, particularly in North America, are almost twice as likely (47%) to formally measure progress as those in emerging markets (26%).

Of those who measure progress, reporting is even more limited – see Figure 4.
“Closing the diversity gap begins with measurement. The simple truth is that progress is unlikely to be made until these gaps are addressed.”

Alison Kay, EY

Figure 4. Reporting on women in leadership

26%
The most common reporting is on the proportion of women on the board

3%
Report on the impact of diversity on financial performance

7%
Report on the impact of diversity on non-financial performance

Source: EY research
Identifying and promoting female leaders

Our survey found widespread agreement on the financial (63% of participants agree or strongly agree) and non-financial (83% agree or strongly agree) benefits of diversity.

What is lacking is action to create that diversity.

So what’s holding the sector back? When asked to name the top barrier to getting more women into leadership, there was a significant gender gap (see Figure 5).

It is interesting to note that while 38% of men believed the main barrier was “Shortage of available female candidates” (versus 13% of women), female participants rated “Organizational bias” as the top barrier (34% of women versus 14% of men).

What 90% of men and women did agree on was that their organizations had not been effective at promoting women into leadership or identifying future female leaders over the past five years.

Radical change is needed. To put it simply, utilities can’t keep recruiting and promoting in the same way: 59% of utilities have a leadership program that treats men and women equally (see Figure 3). While on the surface that seems the fairest way to operate, it won’t address current gender imbalances. There is a legacy of imbalance, and current methods won’t get us anywhere close to gender parity in this generation – or even the next.

At current rates of progress, the World Economic Forum estimates it will be another 80 years before women achieve gender parity. That’s too long.

Taking action now

So what should utilities be doing? They need to take action on many fronts, from finding ways to encourage girls not to drop out of STEM (science, technology, engineering and mathematics) fields at university level to seeking, attracting, retaining and promoting women in P&U companies.

In the immediate future, for every new board appointment that comes up, utilities need to seriously challenge how they draw up their list of candidates and to seek out new sources for names of qualified candidates. There are global initiatives such as the Global Board Ready Women searchable database. Many countries have set up databases of qualified candidates (male and female) for board appointments: the Canadian Board Diversity Council selects 50 candidates from diverse backgrounds and circulates their details to all FP500 Chairs and Nominating Committees. In the US and Europe, a number of specialist recruitment companies that focus on female board appointees have been set up. So there are resources out there; you just have to look for them.

Figure 5. What are the top barriers preventing women from reaching senior leadership positions in your organization?

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shortage of available female candidates</td>
<td>28%</td>
<td>38%</td>
</tr>
<tr>
<td>Organizational bias against women</td>
<td>25%</td>
<td>14%</td>
</tr>
<tr>
<td>Lack of female role models in the</td>
<td>21%</td>
<td>22%</td>
</tr>
<tr>
<td>organization</td>
<td></td>
<td>20%</td>
</tr>
<tr>
<td>Lack of flexible working arrangements</td>
<td>21%</td>
<td>13%</td>
</tr>
</tbody>
</table>

Source: EY research
Questions for your board

In my opinion, it’s not a lack of female candidates but a lack of fresh thinking that is preventing the sector from accelerating progress. To fast-track your organization’s progress toward realizing the benefits of diversity, here are some questions for your board to consider at its next meeting:

1. Given our current approach to developing and promoting talent, how long will it take us to achieve 30%-40% women on the board?

2. What new steps have we taken to improve on the status quo? Where else can we look for qualified female leadership candidates?

3. When and why do women leave our company? Are we losing women with leadership potential?

4. Given the current imbalance, what are we doing to support women’s career progression?

5. In terms of diversity performance, what do we measure? What should we measure? How do we share this information?

For more information on EY’s Women in Power and Utilities Index, go to our website ey.com/womeninutilities

To learn more about EY’s programs for women, share your ideas and get involved, go to ey.com/womenfastforward

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Reshaping the world’s energy markets

More than 30 countries are currently working on restructuring their energy markets to reduce bills, improve service and encourage investment. EY’s dedicated web page presents the latest points of view and insights on energy reform challenges, investment opportunities and lessons learned from programs around the world, including a deep dive into Mexican market reform.

ey.com/energyreform

Global Capital Confidence Barometer: Power & Utilities – Issues 12 & 13

The Global Capital Confidence Barometer is a unique biannual study of corporate and boardroom confidence conducted for EY by the Economist Intelligence Unit (EIU). Use the link below to access the current P&U report: a new edition (13) will be available from November 2015.

http://www.ey.com/powerandutilities/CCB

Power Transactions and Trends Q2 & Q3: 2015

EY’s quarterly Power transactions and trends analyzes mergers and acquisitions (M&A) and key market trends in the global P&U sector to help clients make informed, strategic decisions about capital investment. Use the link below to access the current reports: the Q3 edition will be available from November 2015.

http://www.ey.com/ptt
Offshore wind in Europe: walking the tightrope to success

Benchmarking European power and utility asset impairments: testing times ahead
EY has tracked the rise and fall of asset impairments in the European P&U sector for the past five years. Our latest annual report explores the story behind the 2014 asset impairment exercise, which saw the region’s utilities writing €22.9b off their balance sheets. We seek to understand the main drivers of impairment, scrutinize 2014 annual reports to compare how companies tackle the issue, and take a close look at the factors likely to trigger further big impairments in the future. ey.com/assetimpairment

Digital Australia: State of the Nation - Power & Utilities sector report
Digitization presents a major opportunity for utility players to significantly change their competitive positioning and drive important improvements to the business. But they must take an innovative and holistic approach to transforming the way they operate. EY’s Digital Australia: State of the Nation - Power & Utilities sector report explores the drivers of disruption, the trends aligning to create a burning platform for change, and the opportunities big data, analytics and digital connectivity can provide utility retail and network businesses. http://www.ey.com/Publication/vwLUAssets/EY-digital-australia-state-of-the-nation-power-and-utilities-sector-report/$File/EY-Digital-Australia-Power-and-utilities-sector-report.pdf

Competition and Markets Authority investigation into the UK energy market
The UK energy sector was referred to the Competition and Markets Authority (CMA) in 2014 by the UK energy regulator Ofgem. The resulting inquiry delivered provisional findings in July 2015, highlighting a range of problems hindering competition in the market. This EY report considers the likely impacts on the UK market and the operational changes energy suppliers will have to consider as they switch focus from regulatory response to operational readiness and action. http://www.ey.com/UK/en/Industries/Power—Utilities/CMA-investigation-into-the-UK-energy-market
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