Business Pulse
Exploring dual perspectives on the top 10 risks and opportunities in 2013 and beyond

Power and utilities report
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Introduction

How can you be confident that your company is well placed to meet the risks and challenges currently on the horizon? And how can you know that opportunities aren’t passing you by? This report will help you answer both of these questions. It explores the top 10 risks and opportunities for power and utility companies as they begin looking ahead to 2015.

Forecasting the future is risky, but businesses that fail to look forward will almost certainly be left behind in an increasingly competitive, globalized world. This report takes the pulse of current thinking, insights and expectations from industry executives and EY specialists. The results can be used as a benchmark for your business and can feed into strategic decision-making.

Based on a survey of companies in 20 countries, we identified a top 10 list of risks and opportunities, many of which are interlinked. Each ranked risk and opportunity was then discussed with relevant business executives and EY specialists, to gather the insights and perspectives on which this report is based.

Results reveal that disruptive energy policies, regulations and compliance demands are front-of-mind risks for utility executives in most regions, while economic volatility and unprecedented infrastructure investment requirements remain major concerns. Opportunities are, perhaps predictably, dominated by emerging markets, but acquisitions, alliances and ancillary services are key areas of interest for many power and utility companies around the world.

This year, we have chosen to present our results in the context of four key themes. These include: economic volatility, compliance and stakeholder confidence, business model evolution and operational challenges. The 10 risks and the 10 opportunities are divided over these four themes, based on their relevance to each, and discussed in that context.

These themes of risks and opportunities are previewed in the executive summary, to give an overview and a dual perspective on the themes contained within them. Ultimately, though, the purpose of this report is to provoke discussion and debate about how your company is meeting today’s, and tomorrow’s, challenges and opportunities. Are the items on the global lists similar to those you are monitoring? Are they your top 10?

Finally, we would like to extend our thanks to all our survey participants who took the time to share their thoughts and experiences with us. We look forward to discussing further the implications of these survey findings with our clients and prospects, regulators and governments, as well as analysts and universities.
Executive summary
A shift in thinking is evident in this year’s report of the top risks and opportunities of the world’s leading power and utility companies. It is clear that utilities recognize that their traditional business model is under threat and that new approaches are needed to ensure future success.

Since our 2011 update,¹ the risk surrounding the cost and accessibility of capital has eased while regulation and compliance obligations are now considered the sector’s biggest concern. Opportunities are seen mostly in emerging markets while acquisitions or alliances to gain new capabilities are also desirable, as is interest in new energy or ancillary services.

New risks this year include capital project execution, which vaults to number six, and aging generation fleet and network infrastructure, which comes in at ninth. Increased investment in generation capacity and delivery infrastructure in emerging markets enters the top 10 list of opportunities for the first time as does improving the onshore and offshore wind supply chain.

¹ Turn risks and opportunities into results: exploring the top 10 risks and opportunities for global organizations: power and utilities sector. www.ey.com/power/top10risks2011, EY, 2011.
<table>
<thead>
<tr>
<th>Risk ranking</th>
<th>2013</th>
<th>2015</th>
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<tbody>
<tr>
<td>Compliance and regulations</td>
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<td>3</td>
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<tr>
<td>Commodity price volatility and access to competitively priced long-term fuel supplies</td>
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<td>2</td>
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<tr>
<td>Political intervention in power and utilities (P&amp;U) markets</td>
<td>3</td>
<td>1</td>
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<tr>
<td>Uncertainty in climate policy and carbon pricing</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Significant shifts in the cost and accessibility of capital</td>
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<td>Capital project execution</td>
<td>6</td>
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<td>Economic shocks and resulting short-term energy demand shocks</td>
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<td>War for talent</td>
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<tr>
<td>Aging generation and network infrastructure</td>
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<td>10</td>
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<tr>
<td>Managing planning and public acceptance</td>
<td>10</td>
<td>9</td>
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<tr>
<th>Opportunity ranking</th>
<th>2013</th>
<th>2015</th>
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<tbody>
<tr>
<td>Rising emerging markets’ energy demand</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Acquisitions or alliances to gain new capabilities</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Growth in energy and ancillary services markets</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Enhancing relationships with external regulatory and compliance bodies</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Improving public perceptions</td>
<td>5</td>
<td>9</td>
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<tr>
<td>Increased focus on investor relations programs and communications</td>
<td>6</td>
<td>5</td>
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<tr>
<td>Integration of distributed energy resources</td>
<td>7</td>
<td>8</td>
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<tr>
<td>Increased investment in generation capacity and delivery infrastructure in emerging markets</td>
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<tr>
<td>Rising energy innovation in emerging markets</td>
<td>9</td>
<td>6</td>
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<tr>
<td>Improving onshore and offshore wind supply chain efficiency</td>
<td>10</td>
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EY risk and opportunity radars: risks and opportunities at a glance

To give you a snapshot of the sector’s top 10 risks and opportunities, we have created two “radar” diagrams (see page 9) showing the most significant risks and opportunities at the center of the radar.

Four key themes

The sector’s most significant risks and opportunities fall into four key themes:

► Economic volatility: the “new normal”
► Compliance and stakeholder confidence: tightening regulation
► Business model evolution: striving for reinvention
► Operational challenges: large scale and high risk

This report explores these themes, considering the risks and opportunities related to each. Thought-provoking self-assessment questions help utilities consider how prepared they are for these challenges and where key areas of improvement lie.

Economic volatility

The “new normal”

Economic volatility is more accepted among utilities; however, the associated risks remain significant.

**Risks:** commodity price movements, the rising cost and difficulty of accessing funds for investment, and managing the fallout of economic volatility threaten to drive up costs for utilities at a time when investment demands are substantial and growing.

**Opportunities:** utilities can take steps to mitigate this volatility. Those that invest outside their domestic territory might partially offset these risks through investment in high-growth geographies such as China and Latin America.

**Outlook:** we expect to see an increasing amount of cross-border operations and investment. With little doubt that investment must continue in both Organisation for Economic Co-operation and Development (OECD) and non-OECD energy-related infrastructure, operational agility and scenario planning are essential if utilities are to manage volatility, as well as economic and political shocks.

Compliance and stakeholder confidence

**Tightening regulation**

Governments and regulators favor low-carbon generation and energy efficiency, but public concerns over costs are weighing more heavily in the prevailing economic environment.

**Risks:** the fast-paced change of regulatory and compliance criteria make this the highest priority risk for the utilities executives interviewed for this report. And, as energy policy remains fluid amid the current economic environment, this threat is expected to only increase in significance. Consumer concerns over cost mean that public acceptance of utilities is also seen as a major risk now and into the future.

**Opportunities:** utilities can create opportunities through better management of these risks. Their primary focus should be on improving relationships with stakeholders, especially customers who influence policy-makers and regulators.

**Outlook:** more effort is needed to engage and educate consumers about expected rises in electricity prices due to investment in infrastructure. Without skillful handling, this could exacerbate already stressed public relations. With this in mind, utilities in all regions should continue to work on improving relationships with all stakeholders, while paying particular attention to consumers.

Business model evolution

**Striving for reinvention**

As the utilities sector transforms, so too must its traditional business model of supplying, metering and billing.

**Risks:** the demands of policy-makers, regulators and consumers are seeing the energy sector change forever. While the nature of this transformation varies among markets and sectors, we are seeing a clear shift from a focus purely on sale of energy to consumers, to instead selling energy efficiency or home services. Utilities around the world must develop new business models that are more capable of adapting to constantly changing stakeholder requirements.
Opportunities: utilities will need to seize opportunities arising from demand growth and innovation in emerging markets. New developments, such as smart and distributed solutions, will also offer additional revenue opportunities. Acquiring or developing capabilities in areas such as data analytics will provide a catalyst for new customer solutions and help drive operational improvements.

Outlook: expect to see new entrants in competitive retail supply markets. To protect future revenue, utilities must rethink their business model and be prepared to communicate why they believe it offers the best chance for long-term success in their market.

Operational challenges
Large scale and high risk
Securing the investment and delivering large capital projects will be a key challenge for all utilities.

Risks: the infrastructure investment needs of utilities are unprecedented. Completing these projects safely, on time and on budget will see companies compete in a fierce battle for in-demand resources and skills. Meanwhile, power and utility businesses must also ensure their approach to managing aging infrastructure – and related asset failure risk – is adequate.

Political intervention through energy policy changes is also a significant risk, given its potential impact on operations. We are seeing a real fear among utilities of ending up on the wrong end of short-sighted political action, even in markets previously considered stable and transparent.

Opportunities: integrating distributed energy resources and improving the onshore and offshore wind supply chain offer real opportunities for utilities to mitigate the risks of operational challenges.

Outlook: political intervention in utility operations is expected to continue as energy policy evolves. It is more important than ever that utilities make the commitment to educate consumers about the impact of policy changes and to build trust with their customers.

Emerging challenges
As well as the top 10 risks and opportunities, our research identified several emerging challenges for which companies must actively prepare.

One challenge is disruption to utilities’ value chains. Although the dominance of the vertical utility chain is being eroded by evolving regulatory regimes and new entrants, the time frame for change is unclear. Large utilities still control the majority of customers, but regulators may force change to encourage competition. And as consumers gain more control through technical innovations such as home energy management solutions, they may also vote with their wallets.

Another challenge is the question of energy storage to support renewable generation and smart grids. Whether large-scale rollouts will improve efficiency and effectiveness is far from certain, and decisions made by manufacturers and governments will shape the direction of storage options for utilities.

Meeting the challenges
While utilities face the prospect of value erosion in some areas, a robust forward view recognizes that these risks, as well as opportunities, are key to future success. Utilities are both resourceful and resilient and, in the face of the challenges ahead, they must draw upon these capabilities as well as enhance relationships, reduce costs and improve returns.

Thriving in a volatile environment is not easy, but companies that do so share several characteristics. They are more outward looking and focused on the market, they respond smartly – and quickly – to change, they understand what drives cost and value, and they engage closely with stakeholders and unleash their talent. All of these remain highly pertinent for executives trying to grapple with an uncertain future.
The risk and opportunity radars in this section present a snapshot of the top 10 most highly ranked risks and opportunities facing power and utility businesses around the world.

At the center of the radar are the risks and opportunities that our survey respondents described as having the biggest impact on power and utility organizations worldwide. Arrows indicate the extent to which the ranking is expected to increase, decrease or remain the same between 2013 and 2015.

We have grouped the risks and opportunities for power and utility businesses into four areas that correspond to EY’s Growing Beyond model:

▶ Customer reach: maximizing the potential market opportunity for products and services
▶ Operational agility: improving organizations’ ability to deliver effectively in a quickly changing market
▶ Cost competitiveness: sustaining companies’ economic viability
▶ Stakeholder confidence: allowing firms to build stronger relationships with their stakeholders

This provides a useful means of comparing risks and opportunities across other sectors analyzed by EY.
Top 10 risks

The figure opposite reveals the top three risks:

► Compliance and regulations: responding to an incessant stream of regulatory demands consumes resources and limits the effectiveness of long-term planning

► Commodity price volatility and access to competitively priced long-term fuel supplies

► Political intervention in power and utilities (P&U) markets, which survey respondents anticipate being the top risk by 2015

New risks this year include capital project execution, which enters the top 10 in sixth place, and aging generation fleet and network infrastructure, which comes in at ninth.

Top 10 opportunities

With risk comes opportunity. The figure opposite reveals the top opportunities that are forecast to remain the same in 2015:

► Rising energy demand in emerging markets

► Acquisitions or alliances to gain new capabilities

► Growth in energy and ancillary services markets

Increased investment in generation capacity and delivery infrastructure in emerging markets is a new opportunity this year, placing eighth in our survey, and is seen as a good strategy to partially offset falling revenues from reduced demand in domestic markets. Improving wind generation supply chain efficiency is also a new opportunity this year, reflecting the growing demand for wind generation and the need to minimize deployment costs.
Economic volatility

The “new normal”
Economic volatility — in commodity prices (risk 2), short-term energy demand shocks (risk 7) and shifts in the cost and accessibility of capital (risk 5) — is now a fact of business life. To succeed, power and utility organizations must plan around it and develop operational agility.

Managing the need for increased investment — due to energy policy, regulatory requirements and aging assets — amid a volatile economic environment is currently one of the key challenges for utilities worldwide. But while this economic volatility is likely to drive up the costs of investment, we are seeing a new acceptance from power and utility companies that this is now the “new normal.”

For those companies that can mitigate the volatility with flexibility, today’s economic environment offers opportunities as well. Some are increasing investment in emerging markets, with non-OECD geographies, such as China and Latin America, the most promising targets.
Commodity price volatility and access to competitively priced long-term fuel supplies

Table 1
Ranking from 2011 to 2015

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<tr>
<th>Risk</th>
<th>2011 ranking</th>
<th>2013 ranking</th>
<th>2015 expected ranking</th>
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<tbody>
<tr>
<td>Commodity price volatility and access to competitively priced long-term fuel supplies</td>
<td>5</td>
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Unconventional gas, the growth of liquefied natural gas (LNG) infrastructure and the wide geographic variation in natural gas prices have moved commodity price volatility up the rankings in 2012. Uncertainty over natural gas prices has also affected investment planning for all forms of generation and existing asset valuations.

In North America, low natural gas prices – typically US$3/million metric British thermal units (mmbtu) in 2012 – have seen more generators moving from coal to gas-fired generation to benefit from lower carbon emissions and greater operational flexibility. However, as natural gas prices have started to rise, so too has uncertainty regarding investment decisions.

In Europe, the price of natural gas has been higher (typically US$8/mmbtu in 2012), despite lower industrial demand in the face of economic slowdown. Faced with these higher prices and relatively low coal and carbon costs, utilities in the European Union (EU) continue to prefer coal to natural-gas-fired generation for base load purposes.

In Asia, more demand from Japan, China, India, Thailand and Malaysia is driving up natural gas prices (typically US$14/mmbtu in 2012). Asia’s LNG imports are already significant, but with the planned build-out of LNG liquefaction infrastructure in the US and the prospect of LNG export pegged to US gas prices, Asian buyers are hoping that the gap between US and Asia Pacific prices will soon narrow.

The global uncertainty around the future of natural gas prices is having a significant impact upon other commodity prices and will ultimately affect the investment plans of utilities and the tariffs of consumers. Managing this risk will require utilities to have a good understanding of exactly how commodity price volatility will impact their individual business’s future strategy.

“Five years ago, we thought LNG trains would be going through North America, and now, post-Fukushima, LNG might be going to Japan. So things have changed. This is an unstable world, which drives energy prices that none of us can predict. ... Scenario planning is key.”

Leading power and utility company, Europe

Significant shifts in the cost and accessibility of capital

Table 2
Ranking from 2011 to 2015

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<tr>
<th>Risk</th>
<th>2011 ranking</th>
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<th>2015 expected ranking</th>
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<tbody>
<tr>
<td>Significant shifts in the cost and accessibility of capital</td>
<td>1</td>
<td>5</td>
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How will you access new sources of capital for your projects?

How will you access new sources of capital for your projects?

While access to capital remains a key risk for the P&U sector, this year’s report reveals a more positive situation for utilities companies. Financial backing is now there for the right projects. Three key factors are contributing to this:

1. Higher appetite for investment in this sector: increased recognition that P&U assets, and particularly regulated businesses, can and will represent good investments.

2. Less urgency for immediate investment: with energy demand falling in developed markets or slowing in developing ones, generation capacity margins have tended to improve and some expected system constraints have not materialized. But the need to invest has merely been postponed, not disappeared.
3. Proposed market reforms: there is a belief that proposed changes to existing market structures will eventually decrease the risk of investing in the P&U sector. For example, much of the debate about the ongoing Electricity Market Reform initiative in the UK has centered on the need to create a stable framework for investment that is transparent and “bankable.”

Despite the better outlook, risks related to capital finance – both its accessibility and its cost – will remain a challenge for such a capital-intensive sector. In developed markets, aging infrastructure and the low-carbon agenda will require vast amounts of capital expenditure, while in developing markets, the growing demand for energy is the principal driver behind the need to invest heavily in capital assets.

The sheer scale of the required investment precludes financing from corporate balance sheets alone. Moreover, the cost of capital remains a key sensitivity in investment appraisal for most utilities projects. Companies will need to carefully consider how they will access new sources of capital – beyond the banks – to finance their future investment needs.

“The factors we anticipated are being demonstrated as true; we said it would be a global market for capital, and it is. This isn’t a new risk, but it’s now being played out. Unless you have certainty, you have to pay a risk premium, which makes it even harder for long-payback projects.”

Richard Postance, EY, UK

### Economic shocks and resulting short-term demand shocks

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<th>Risk</th>
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<tr>
<td>Economic shocks and resulting short-term demand shocks</td>
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<td>7</td>
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Is your business equipped for a continued economic slowdown?

Fallout from the global financial crisis in 2008, and subsequent sovereign debt problems, continue to affect many OECD nations. In Europe, ongoing debt crises and the deteriorating economic situation in the Eurozone weigh heavily on the region’s economic, financial and political prospects.

Western Europe is a good example of the challenge facing utilities in developed economies. Demand for electricity and gas in most markets is only now returning to the levels seen in 2008, with expectations of low or zero growth continuing through to 2020 or beyond. This has led to utilities talking of a “lost decade.”

Utilities have little choice but to plan around this global economic uncertainty. They will need to work an expectation for volatility into their decisions regarding investment and capital growth and ensure risk management strategies are adequate.

“In the US, times are tough. Demand is down while regulations are up. Utilities are in despair over earnings.”

Dana Hanson, EY, US
Increased investment in generation capacity and delivery infrastructure in emerging markets

Table 4
Ranking from 2011 to 2015

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>2011 ranking</th>
<th>2013 ranking</th>
<th>2015 expected ranking</th>
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<tbody>
<tr>
<td>Increased investment in generation capacity and delivery infrastructure in emerging markets</td>
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<td>8</td>
<td>7</td>
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Do you have the right advice to ensure your success in emerging markets?

Increased investment in generation capacity and delivery infrastructure in emerging markets is a new opportunity highlighted in this report. As many OECD-based utilities struggle with the impact of macroeconomic developments on local operations, some are looking to emerging markets where growth in demand could offset domestic slowdowns. Similarly, for utilities established within these newer markets, responding to local demand provides a strong case for investment directly or in alliance with other businesses, either domestic or international.

This opportunity is linked to the wider opportunities associated with demand growth in emerging markets (see page 28).

Investment in core competencies may be too good an opportunity to pass up; however, utilities investing outside their own service territories and countries may find that doing business overseas is fraught with difficulty and brings increased exposure to political shocks. Recent examples include turmoil in the Middle East and North Africa, the nationalization of oil company YPF in Argentina and repeated reviews of mining codes in western Africa. Mitigating these risks will require careful planning and the development of strong and trustworthy local relationships in the relevant regions.

Tightening up internal controls for a commodity trading business

The client situation:
During a merger, the global commodity trading business of a European energy group was keen to use the opportunity to streamline its operations and risk management and overhaul its internal control systems (ICS).

The solution:
EY worked with the client to assess current ICS practices, identify improvements and help design and implement new internal controls and processes. Our support helped the business get all relevant changes to the processes and controls ready for the new merged entity and comply with regulatory requirements. According to the client, our assistance with stakeholder management throughout the merger made it a success.
Outlook

Looking forward, investment in energy-related infrastructure will continue to be a priority in both OECD and non-OECD nations. For growing economies, available and reliable energy is a key factor in sustaining growth, while in more established economies, emissions policy and infrastructure retirement are driving investment.

We can expect to see an increasing amount of cross-border operations as non-OECD-based companies seek infrastructure business opportunities with regulated returns in OECD countries. Similarly, the extent to which utilities in developed markets invest in emerging-market opportunities should increase as local growth falters.

Political shocks across both mature and rapid-growth markets will continue to catch companies off guard if they lack adequate response strategies. Preparation and access to deep-sector, local expertise will be crucial to success.

“The Government has been working to attract private investment into the development of wind and solar energy and to explore opportunities with small hydroelectric plants. But there are still gaps between the planning and alignment of projects.”

Jose Ricardo Oliveira, EY, Brazil
“Utilities’ credit ratings are under pressure from environmental compliance costs, increased operating expenses, heavy debt loads of European utilities, cheap natural gas in North America, flat demand in developed markets and a renewed European debt crisis.”

Joseph Rodriquez, EY, US

Self-assessment questions

► Given the volatile economic environment, how do you manage the inherent risk and uncertainty in your investment decisions and capital allocation?
► How confident are you that your risk management strategies adequately cover liquidity, price, credit and exchange rate exposures?
► When speaking to investors to attract debt finance, do you have a good story to tell – including appropriate risk mitigation factors, such as power purchase agreements (PPAs)?
► How can you create new conduits to allow more direct investment in your assets by infrastructure funds, pension funds and sovereign wealth funds?
► How can you be sure that you are exploring investment and growth potential in areas with more positive economies or that are underserved in terms of energy infrastructure?
Compliance and stakeholder confidence

Tightening regulation
Governments and regulators may continue to pursue low-carbon generation and energy efficiency, but consumers are increasingly resistant to the rising energy costs that often go along with decarbonization. This conflict sees compliance and regulations top the list of risks in our latest report.

The frequent change in regulatory developments, whether energy or finance related, is the main reason for the high ranking of this risk, which is closely related to the need to increase public acceptance (risk 10).

Addressing these risks will require a commitment to strengthen relationships with all stakeholders – policy-makers and regulators (opportunity 4), investors (opportunity 6) and, most importantly, customers (opportunity 5). Power and utility companies will have to work harder to improve the way they identify, report and – importantly – explain these risks related to regulatory change. They must also enhance their approach to anticipating future regulatory changes and determining how they will affect their business and stakeholders.
Compliance and regulations

Could you manage your regulatory obligations better?

Globally, many utilities feel they are carrying a relentless and increasing regulatory burden.

In established markets, these regulations are driven by market reforms and a move toward competition in all aspects of utility operations. For example, in the US, order 1000 by the Federal Energy Regulatory Commission (FERC) aims to open transmission development to new entrants. In the UK, a push by the Office of Gas and Electricity Markets (OFGEM) to introduce mandatory auctions for up to 25% of the generated power from the big six utilities aims to increase liquidity, encourage new merchant entrants and stimulate competition at the retail level.

New financial markets regulations, most notably the Dodd-Frank Act in the US and Europe’s Regulation on Wholesale Energy Market Integrity and Transparency (REMIT), are also consuming utility companies’ time and money – because failure to comply costs even more.

In emerging markets, regulation will increase as demand grows. Maintaining reliable energy supplies, effective competition and governance all require regulation. In regions experiencing rapid infrastructure growth, regulation typically increases as wholesale and retail markets become more complex.

We expect regulation and compliance to remain a top risk for utilities going forward, particularly as increased investment in the sector forces up consumer prices. The challenge for utilities is to manage their regulatory obligations better. Keeping abreast of frequent changes in regulation is key, as is the ability to effectively communicate with all stakeholders about exactly how these changes will affect prices.

“In Australia, regulatory rules increased from about 600 pages to about 2,000 pages. Many of the changes are due to the regulatory instruments catching up with the complexity of the industry.”
Matthew Rennie, EY, Oceania

“Getting a favorable rate case from the regulator is a critical risk. If you look at the rate case performance over the last two to three years, US utilities have only been getting 40%-50% of what they asked for.”
Dana Hanson, EY, US
Managing planning and public acceptance

Table 6  
Ranking from 2011 to 2015

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<td>Managing planning and public acceptance</td>
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How does your public acceptance affect your ability to achieve your strategy?

Despite efforts by many to enhance customer processes such as metering, billing and complaint handling, people remain suspicious of their utility providers (see “Improving public perceptions” on page 22). This poor public perception can have many negative consequences for utilities, including increased regulatory intervention, delays in securing planning permission and reduced influence on energy policy.

While concern over this risk appears to have dropped since our last survey, improving relationships with customers and the wider public must remain a top priority for utilities as they plan for a future where infrastructure investment will drive up energy tariffs. As politicians and regulators are motivated by public interest, the success of utilities in building a positive public perception will directly impact their ability to achieve their business goals.

“Over the past few years in the US, a lot of rules have remained in development. We were in this squeeze where we knew it was coming, but we didn’t know exactly what it would look like.”

Todd Perkins, Southern Company, US

Enhancing relationships with external regulatory and compliance bodies

Table 7  
Ranking from 2011 to 2015

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<tr>
<td>Enhancing relationships with external regulatory and compliance bodies</td>
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Are you doing enough to build a constructive dialogue with regulators?

Regulators dictate the rules, and play a critical role in shaping utilities’ business models and determining their ultimate success. Utilities have a significant opportunity to foster stronger and more trusting relationships with these regulators and compliance bodies. Building this trust can help encourage regulatory approaches that emphasize outcomes, rather than focus on process. Regulators are increasingly willing to work with utilities – often the agents of their policy goals – and are becoming more appreciative of the challenges they face. Constructive dialogue can lead to positive outcomes for both parties, helping to identify and deal with issues early. Utilities that commit to building this relationship can minimize the risk of falling foul of regulators and enhance their ability to influence the rules.

“Getting planning permission is one of the top risks to building the infrastructure needed across the UK, including power and utilities assets.”

Alison Wood, National Grid, UK

“Making significant capital investment decisions without a clarified framework is difficult. Enhancing our relationships with external regulatory and compliance bodies can bring more certainty.”

Leading power and utility company, Europe
"Utilities must communicate with regulators, through both formal and informal channels. When regulation is enacted without consultation, changes can be unexpected and bring serious consequences to the sector."

Jose Ricardo Oliveira, EY, Brazil

Responding to the impact of major regulatory change

The client situation:
The Dodd-Frank Act is a significant piece of regulation for utilities, affecting the business models, operations and technology of companies seeking to hedge their energy price risk exposure via the over-the-counter derivatives market. A major US natural gas and electric utility asked EY to provide insight into Dodd-Frank and help assess its obligations under the act.

The solution:
Our experience supporting financial services companies in how they respond to Dodd-Frank helped us advise the utility on how “early movers” were dealing with the new regulations. We worked with the client to incorporate these lessons into its own proposed methodology and tools. Armed with a systematic and comprehensive evaluation of the potential regulatory impacts to its business, the client is now confident that it has a platform for compliance going forward.

Improving public perceptions

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<td>Improving public perceptions</td>
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How would a better relationship with customers improve your business?

Many of the risks facing power and utility companies are largely beyond their control and can only be mitigated by contingency planning and damage minimization. Other challenges — such as the relationships with customers — offer opportunities to make real change and reap a competitive advantage.

Historically, the relationship between utilities and customers has been dominated by pricing and marked by mistrust, even active dislike. EY research reveals the public sees power and utility companies as faceless, monopolistic and lacking customer focus. Changing this perception will require an innovative approach but is worth the effort. Gaining customer confidence and support will improve utilities’ engagement with regulatory bodies and may even lessen public opposition to capital expenditure plans.

“When people hear about utilities, it’s often to do with power cuts or tariffs going up. We should do more to influence perceptions. If we start key capital projects, we’ll become more visible in the eyes of the public in terms of execution.”

Leading power and utility company, emerging markets

The smart revolution will play a major role in improving public perception of utilities. Smart meters and related technologies provide clear opportunities to move away from a reliance on pricing alone to win customers. Access to near real-time data from smart meters opens the door for utilities to build better relationships and to move toward selling new services and solutions.

Smart technology offers huge opportunities to improve public perception but also brings risks through the added competition of new market entrants. Utilities should ensure they have the expertise, resources and strategies in place to deal with both.

“Energy companies need to reshape their relationship with consumers. In the UK, people don’t realize or recognize what is necessary to deliver such a highly reliable system.”

Tony Ward, EY, UK

Increased focus on investor relations programs and communications

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<tr>
<th>Opportunity</th>
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<tr>
<td>Increased focus on investor relations programs and communications</td>
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<td>6</td>
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</table>

Do potential investors really understand your strategy for success?

While ranked lower than in our 2011 report, investor confidence remains key to capitalizing on investment opportunities in today’s financial environment, where credit is relatively tight.

Utilities have responded to difficult economic conditions with a renewed focus on enhancing balance sheet strength and improving credit metrics. While this is important, it is now time to focus on presenting compelling investment stories. This is particularly challenging in regions where an economic downturn has depressed energy demand. Utilities may need to reassess existing business models and must be able to communicate clearly as to how their model will deliver long-term success.

Communicating their strategy for success will also help utilities attract new sources of finance for projects. Innovation and a simpler, more transparent approach to investment may be required to win over these non-traditional investors.

“Enhancing relationships with regulation and compliance bodies will reduce the cost of compliance and improve public ownership of compromises in this area.”

Richard Postance, EY, UK

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Outlook

The consumer is at the heart of the complex relationship between utilities, regulators and policy-makers. And, as electricity prices are expected to increase in line with new investment, improving the public perception of power and utility companies will enhance engagement with all three of these stakeholders. Significant opportunities are present for those utilities that make the most of smart technology to drive a shift in public perception and change how they interact with customers.

Communicating more effectively with potential non-traditional investors is also crucial if utilities are to attract the new sources of finance needed for large capital projects.

“There’s a whole opportunity to open up the financing market yet again to infrastructure. For example, Balfour Beatty has set up its own fund. I think the question of innovation in financing infrastructure is very interesting.”

Alison Wood, National Grid, UK

Listening to the voice of the consumer

The client situation:
Frustrated with a consistent ranking in JD Power’s fourth quartile, a regional US energy delivery company turned to EY to help it achieve top-quartile customer satisfaction and customer service cost performance by 2016.

The solution:
We helped the client transform into a more customer-centric organization. Using feedback from employee focus groups as well as customer research and leading industry practices, we developed a detailed vision of “premier customer experience.” Our team identified and charted the cultural changes and key performance indicators that would support the client in achieving its vision. The company now has a roadmap that includes quick tactical wins as well as mid- and long-term opportunities to maintain momentum. The tools, rigorous tracking mechanisms and customer satisfaction concepts are already being shared across the client’s sister companies.
“From the customer’s perspective, it’s no longer good enough to just keep the lights on and the gas flowing. By improving their experience we will also build regulatory goodwill.”

Brian S Hurst, EY, US

Self-assessment questions:

► How effective have you been in influencing regulatory developments affecting your business, and which areas do you need to focus on next?
► What capability do you have in scenario analysis and taking any pre-emptive action necessary to offset the impact of a change in government policy?
► How, and where, are poor public relationships impairing your planning and permitting processes, and how can you tackle this?
► What changes have you made in your culture to improve how you deal with changing customer requirements and expectations? What best practices could be implemented?
► What scenario analyses are undertaken against potential changes in energy policy, and how does this feed into business planning?
Business model evolution

Striving for reinvention
Utilities around the world are being forced to reinvent themselves. While the nature of these transformations will vary from market to market, all will bring risks and opportunities that demand a rethink in growth strategies.

Uncertainty in climate policy and carbon pricing (risk 4) makes it difficult for utilities to make long-term planning and investment decisions, while the push for energy efficiency throws into doubt the traditional “more product, more revenue” formula. Decarbonization is also driving change, from a centralized model with thermal or nuclear generation at the core, toward a more distributed model with much wider delegation of control and much broader ownership and control of assets.

These difficult conditions are challenging utilities around the world to make a fundamental assessment of their business models. They must show investors how they will develop and protect future revenue streams.

The business model evolution offers diverse opportunities for utilities, most notably in emerging markets (opportunity 1), but also in new alliances (opportunity 2), new services (opportunity 3) and more innovative practices, particularly in emerging markets (opportunity 9). Those utilities that can capitalize on these opportunities will be successful in making the shift from energy sales to energy efficiency.

The risks and opportunities shown above appear in the stakeholder confidence, operational agility and customer reach sections of our risk and opportunity radars (see page 9).
Uncertainty in climate policy and carbon pricing

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<th>Risk</th>
<th>2011 ranking</th>
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<th>2015 expected ranking</th>
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<tbody>
<tr>
<td>Uncertainty in climate policy and carbon pricing</td>
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Are your business models ready for a decarbonized future?

The risk associated with climate policy and the price of carbon has remained high on the agenda since the beginning of the economic downturn. Climate policy directly affects strategy and investment in all utilities in all regions. Where carbon markets exist, the price of carbon influences both generation optimization decisions and investment strategy.

But recession and sovereign debt concerns have had a double impact on climate policy – increasing the extent to which policy decisions are subject to political pressure and uncertainty. The most significant development since our 2011 study is arguably at the macroeconomic level, where we see opposing trends. Faltering economies and sovereign debt concerns adversely affected subsidies and incentives, while economic turmoil and a drop in the EU’s industrial output have led to a fall in demand for tradable carbon permits through the EU Emissions Trading System (EUETS).

These developments create uncertainty over the level of support governments will continue to provide to renewables. Despite this, global political focus remains firmly on the shift from fossil fuels to renewable resources, and from centralized to distributed power supply models. Wherever they are in the world, utilities must prepare for carbon trading, and where it is already in place, they should get ready for the wider introduction of floor prices as a means of addressing low market prices.

Rising emerging markets’ energy demand

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<th>Opportunity</th>
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<tr>
<td>Rising emerging markets’ energy demand</td>
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Can you realize the potential of emerging markets while mitigating the risks?

As in our 2011 report, utilities continue to see emerging economies – which offer real growth in energy demands – as their top opportunity. Of these emerging markets, the International Energy Agency (IEA) forecasts non-OECD economies, particularly China and India, to grow the most rapidly in coming years. China’s demand is forecast to rise 60% by 2035, while India is set to more than double.

Opportunities in emerging markets are not just of interest to utilities from developed markets. The sector is seeing utilities from one emerging market investing in another. For example, China has invested heavily in the infrastructure of Brazil (a key M&A destination for the utilities sector). A Chinese utility has bought stakes in Brazilian power transmission concessions and recently announced plans to increase the size of its overseas asset holdings from US$8b currently to at least US$30b by 2020. This may include purchasing existing assets and constructing new ones.

For example, in December 2012, the utility announced that it had won the tender to build and operate a transmission link to the south and southeast of Brazil, working alongside its minority partners.4

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As utilities move to capitalize on the potential of emerging markets, they face the challenge of mitigating the inherent risks of overseas expansion. These new markets can be complex to navigate, and a local presence is key to understanding the regulatory, political and cultural frameworks. Some utilities are making the most of existing ties to other markets, such as European utilities expanding into Latin America. For others, seeking local partners will mean the difference between success and failure in these emerging economies.

“Western utilities face moribund domestic markets. They have begun eyeing up emerging markets for the opportunities afforded by economic growth but often lack the financial strength to make the most of them. By contrast, Chinese utilities remain bolstered by strong demand at home. What’s new is that China is now looking outwards for opportunities.”

Duncan Coneybeare, EY, UK

“Western utilities face moribund domestic markets. They have begun eyeing up emerging markets for the opportunities afforded by economic growth but often lack the financial strength to make the most of them. By contrast, Chinese utilities remain bolstered by strong demand at home. What’s new is that China is now looking outwards for opportunities.”

Matthew Rennie, EY, Oceania

“The level of carbon tax in Australia is much higher than elsewhere, so the impact on business and investment is more acute. Further, the prospect of future changes to the carbon tax regime also adds a measure of uncertainty for business.”

Acquisitions or alliances to gain new capabilities

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<th>Table 12</th>
<th>Ranking from 2011 to 2015</th>
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<tbody>
<tr>
<td>Opportunity</td>
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<td>Acquisitions or alliances to gain new capabilities</td>
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Is an alliance the smart way to bring new opportunities, skills and technology to your business?

Using an acquisition or alliance to develop new capabilities is seen as a growing opportunity for utilities, rising from fifth place in the 2011 report to second in this report.

An acquisition – if planned and executed successfully – can be the smart way to open up a wide range of opportunities, including entrance to different geographies, access to new technology (including smart grid technology) and exposure to capabilities across the value chain, which may not be as straightforward as knowledge and experience in a particular locale or market. Partnering with retail specialists, telecoms businesses and technology providers also provides opportunities to extend customer relationships and offer new services.

As many utilities move into emerging markets, an acquisition can be an effective way to better understand their regulatory frameworks and cultural nuances. An example of this is the China Three Gorges (CTG) acquisition of a 21% stake in Energias de Portugal (EDP). CTG gained expertise in renewables and links to potentially lucrative markets in South America while EDP is expected to benefit from financial support from Chinese banks and access to opportunities in mainland China.

Increased collaboration across the sector may also be a strategy to tackle the challenge of investing in large-scale capital projects. Joining forces with other utilities can spread the cost as well as the risk.
Growth in energy and ancillary services markets

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<th>Opportunity</th>
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<td>Growth in energy and ancillary services markets</td>
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Could smart technology help your customers look beyond tariffs?

Utilities across the sector agree that growth in energy and ancillary services, enabled by smart technology, will bring major change – and opportunities – to the industry, confirming the findings of previous research by EY in relation to smart customers.6

The key feature of smart technology is its ability to move utilities from selling commodities based on price to offering services and solutions that provide real value for customers. Utilities will have the opportunity to pioneer a wider range of services, some of which are only loosely related to today’s energy market. These may include remote home energy management services, secure home access, mobility services (in conjunction with electric vehicles) and even health care provision – taking advantage of the data handling and communications networks that will be part of the smart revolution. Smart technology will also allow utilities to differentiate themselves with tariff packages more akin to the mobile telephony market than current pricing models.

As regulators and governments focus on reduced demand, services emphasizing energy efficiency and energy management are also expected to grow. Effective demand-side management (DSM) will be an important tool in the constant task of balancing supply and demand across highly complex systems.

Success in these new services is dependent on learning lessons from other sectors (such as banking and telecoms) and a utility’s ability to acquire the necessary competencies and expertise. Now is the time for companies to assess existing capabilities and determine how well they are suited to exploiting these potential new business streams.

“Smart meters alone will not be the solution. More interactivity between consumers and suppliers is needed to reduce energy consumption, grow consumer-side generation and provide additional services.”

Tony Ward, EY, UK

Improved decision-making on a smart metering program

The client situation:
The big six energy services providers in the UK are facing a negative net present-value business case for smart meters, based on the cost of meters, systems changes, customer engagement effort and likely reduction in billing value. One of these companies asked EY for help to select a smart meter program vendor amid uncertain regulatory obligations and within a tight time frame.

The solution:
We worked with the client to develop its vendor selection process (including delivery of best and final offer documentation, vendor response evaluation and creation of commercial negotiation approach and terms) and addressed whether its internal procurement team's practices and processes were adequate for a program of this scale and complexity. Our investment modeling solution helped the client make well-informed choices even in the midst of uncertainty, saving several millions of pounds and completing the project almost three months sooner than anticipated.

Client solutions

6 The rise of smart customers: how consumer power will change the global power and utilities business – what consumers think, EY, 2011.
Rising energy innovation in emerging markets

Table 14
Ranking from 2011 to 2015

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>2011 ranking</th>
<th>2013 ranking</th>
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<tr>
<td>Rising energy innovation in emerging markets</td>
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Will emerging markets lead the way in cleantech innovation?

The rising interest of emerging economies in cleantech innovation makes this a growing opportunity for utilities across the sector. Many emerging economies are exposed to the anticipated impacts of climate change and recognize that technologies such as carbon capture and storage (CCS), as well as modular nuclear power designs, smaller nuclear reactors and renewables may offer cleaner long-term generation solutions. These markets also offer strong incentives to innovate, as new networks grow quickly and are vulnerable to theft. Solutions across distribution networks and smart metering—as well as innovative developments in generation, such as increasingly efficient solar panels and wind turbines—are being used more widely in emerging markets.

Distributed generation applications also offer opportunities. The trend toward distributed generation in emerging markets is accelerated as it offers low-carbon electrification to remote areas where the cost and difficulty of providing a grid connection would rule it out. In these markets, cleantech solutions are expected to approach grid parity—that is, provide electricity at a cost equivalent to that delivered by the grid.

Utilities operating in emerging markets have an opportunity to build networks today that incorporate the most up-to-date technologies. In many ways, this parallels the development of mobile phone infrastructure in many emerging markets. Already we are seeing high-voltage direct current (HVDC) solutions being adopted for long-distance power transmission in emerging economies around the world, such as the advanced transmission solutions currently being deployed in the Middle East on the Gulf Cooperation Council Interconnection Project.7

In many ways, emerging markets offer utilities a rare opportunity to develop cleantech innovations in the regions where these technologies can have the greatest impact. Lessons learned here can be adopted across the globe and offer utilities a competitive advantage in energy efficiency initiatives.

“In Brazil, energy companies lose around 20% of their total output to electricity theft, particularly in big cities. Smart grid and metering solutions would help reduce this threat.”

Jose Ricardo Oliveira, EY, Brazil

Outlook

The energy utility sector is being transformed. The business model associated with the production and delivery of power to consumers is changing, as is how that power is used.

Smart meters and associated technology will drive much of this transformation. Energy services based largely on information provided from these meters are a natural extension for utilities. But new technology will also bring new competition. Large retail and telecommunication companies have already ventured into retail energy supply. In the UK – one of the world’s established competitive retail markets – regulatory action may soon force generators to compete with new entrants.

Alliances and acquisitions will feature highly in new models. As investment shifts from supply- to demand-side solutions, the hard-earned expertise of utilities in developing and integrating generation and load will be of value to new entrants. Collaboration or partnerships with others will also be a way for utilities to move into different geographies and functions to exploit growth opportunities.

Going forward, utilities will need a clear strategy to succeed in the “new normal” of economic volatility. Reassessing existing business models is essential – as is the ability to communicate why the chosen model offers the best opportunity for long-term success in their market.

Government agency evaluates investment potential of high-growth water markets

The client situation:
A government agency in Asia Pacific engaged EY to help evaluate how investors and plant engineering firms in its country could benefit from opportunities in high-growth Brazilian water and wastewater-related businesses, mainly through PFI (private finance initiative) and PPP (public-private partnership) projects.

The solution:
Our team conducted a comprehensive market survey that supported our analysis of the feasibility of the client’s entrance into the Brazilian market. We helped it better understand Brazil’s opportunities, legal framework, and the differences between PPPs and PFIs in both countries. The client now has a shortlist of three projects that it stands a good chance of winning and the knowledge and tools that will help it succeed.
“There are numerous potential services to do with integrating decentralized electricity generation into the network. This is a very diverse playing field, but one with lots of opportunities.”

Frank Fleischle, EY, Germany

Self-assessment questions

► What impact is sector decarbonization having on your revenues and business model, from re-fitting coal plant to renewable growth and emissions trading? Could you do more to encourage energy efficiency initiatives and derive benefit from them?

► How will decentralization of power delivery and supply model affect your business? Are you doing all you can to influence the development of policy in government departments in charge of climate change policy, from trade bodies to direct lobbying?

► What initiatives do you have under way to improve public relations and educate your existing and potential customers? Do you need to revise them in light of current developments?

► What capabilities do you need to make the most of opportunities provided through the use of smart metering and home automation solutions? What can you learn from the retail and telecommunication sectors?

► In what ways are you making appropriate use of demand-side management (DSM) solutions to deal with peaks in demand? Can you make better use of DSM to address intermittency issues related to renewable power generation?
Operational challenges

Large scale and high risk
Because the P&U sector faces numerous immediate operational challenges, it is useful to prioritize just where the greatest risks — and opportunities — lie.

Our report shows that political intervention through changes to energy policy (risk 3) is the most immediate high-impact risk. Policy changes can occur quickly and represent fundamental changes — for example, in support for renewable energy technologies. The implications for utilities are immense.

Other major risks are related to securing the investment, resources and skills for large-scale infrastructure needs, and delivering these projects safely, on time and on budget (risks 6, 8 and 9).

There are, however, significant opportunities within the context of these operational challenges, including integrating distributed energy resources (opportunity 7) and improving the onshore and offshore wind supply chain (opportunity 10).

The risks and opportunities shown above appear in the stakeholder confidence, operational agility and cost competitiveness sections of our risk and opportunity radars (see page 9).
Political intervention in P&U markets

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<th>Risk</th>
<th>2011 ranking</th>
<th>2013 ranking</th>
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<tr>
<td>political intervention in power and utilities markets</td>
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**How flexible is your business to adapting to energy policy changes?**

Political intervention in the power and natural gas markets is becoming a more pervasive risk for both the wholesale and retail sectors. Price rises, accidents and consumer concern over environmental and safety issues are prompting action from governments that can have wide-reaching, cross-border implications. This risk is one of the top three for the sector and is forecast to remain so in the future.

Perhaps the best example of how political intervention can completely alter a market’s energy sector is Germany’s unilateral abandonment of nuclear generation in 2011. Following the disaster at the Fukushima Daiichi nuclear plant in Japan, the German Government decided to replace its nuclear capacity with a mix of renewables and generation imported from within the EU. This was a significant blow to the utilities working to replace the nuclear fleet and, in the longer term, will adversely affect Germany's capacity margins, forcing a greater reliance on imported power. Germany’s nuclear exit also has ongoing implications for its European neighbors.

Elsewhere, economic volatility is behind many recent withdrawals of government subsidies for renewable generation, which is reducing investor confidence and hampering growth. Utilities should expect the risk of political intervention to continue and be prepared for the implications for their business.

**“Government intervention can cause project delays. We hope to minimize this risk by engaging with government as we make decisions on which projects to execute.”**

*Power and utility company, emerging markets*

**Capital project execution**

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<th>Risk</th>
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<tr>
<td>Capital project execution</td>
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**How will you secure the resources to deliver capital projects?**

Capital project execution has vaulted into the top 10 risks for the first time this year. This reflects growing awareness of the scale and sheer complexity of the investment in capital assets that will be required of the P&U sector over the next decade or more. According to the IEA, some US$17t (at 2011 values) will need to be spent, on additional and replacement power infrastructure alone, by 2035.

“After the Fukushima event in Japan, the German Government decided to prioritize renewables and phase out nuclear by 2022. This has had a huge impact on the sector. The industry and consumers are not pleased with increased energy prices.”

*Metin Fidan, EY, Germany*
A significant number of large-scale capital projects will involve new or unfamiliar technologies and sometimes take place in hostile physical environments. New nuclear plants, large-scale offshore wind farms, new HVDC transmission links and even the widespread rollout of smart meters are all highly complicated from a technical perspective, as well as big in size.

The need to complete the projects on time, on budget and to the right quality is accompanied by heightened public scrutiny and significant reputational risk. Other factors that make the task more challenging include:

► **Supply chains** are becoming increasingly international and subject to constraints. For example, in the nuclear sector, only a few companies in the world can forge the single-piece containment vessels required for the cores of new nuclear reactors. Supply chain issues are now expected to affect capital expenditures across the sector. This has led to responses such as “portfolio procurement” – placing orders for major components without knowing the exact project on which they will eventually be used.

► There is a real **lack of experience** in overseeing the delivery of large-scale projects in the P&U sector. For instance, South Africa’s Eskom is currently engaged in a program to double its generation capacity to 80GW by 2026. It is also expanding its transmission and distribution networks. However, its last major building program was completed in the early 1990s.

► There is significant **competition for skilled project managers** from other sectors. The oil and gas and mining and metals sectors both have huge capital expenditure requirements over a similar time frame to the P&U sector. Competition for skilled labor can escalate costs, as seen in current LNG projects in Australia.

“The US utility infrastructure has aged significantly over the past 20 years and many utilities plan to invest significantly to update and modernize their critical infrastructure. Being able to deliver these large projects on time and on budget is a big risk.”

*Dana Hanson, EY, US*

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“Political meddling and intervention creates investment uncertainty and is a much bigger risk as commodity prices and energy prices increase.”

**Leading power and utility company, Europe**

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Improving the financial performance of European nuclear power plants

The client situation:

Due to economic pressures, a European power company was divesting non-core assets. It engaged EY so that the financial performance of each retained power plant was forecast in an accurate and timely manner. Two nuclear power plants with recurrent problems staying on budget, required particular attention.

The solution:

We worked with the client to develop the right tools and processes that would support a culture of accuracy and control.

By interviewing technical and finance staff at all levels, our team identified overly restrictive procurement processes, a lack of training and inadequate technology. Through addressing these issues, the client gained better control over, and knowledge of, its expenditure and accrued expenses. The nuclear power plants are now better equipped to remain within budgets agreed to with shareholders.

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War for talent

Table 17
Ranking from 2011 to 2015

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<th>Risk</th>
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<tr>
<td>War for talent</td>
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**How are you planning to attract and keep a skilled workforce in a competitive market?**

The risk of securing talent is one we expect to become more significant as utilities make progress on their large capital projects.

An aging workforce is not a new problem for utilities, but it is certainly a more pressing issue now. The war for talent is driven by the lack of engineering graduates (at least in many OECD countries), fewer apprenticeships and the early retirement of many older employees in light of privatizations, deregulation and other market reforms, leading to a loss of institutional knowledge.

As major capital programs begin, the battle for scarce skilled resources will intensify. Unless utilities are competitive in the war for talent, they risk failure to execute their capital projects.

“*If this war for talent continues much longer, amid the backdrop of wage inflation and increasing salary expectations, these costs will be passed on to consumers.*”

Jose Ricardo Oliveira, EY, Brazil

Aging generation and network infrastructure

Table 18
Ranking from 2011 to 2015

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<th>Risk</th>
<th>2011 ranking</th>
<th>2013 ranking</th>
<th>2015 expected ranking</th>
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<tr>
<td>Aging generation and network infrastructure</td>
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<td>10</td>
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**How are you mitigating the risks of aging assets?**

It may be new to our report this year, but the risk of aging generation fleet and network infrastructure unexpectedly failing is one that has been in the making for a long time. According to the IEA, by 2035, more than half of the global transmission and distribution infrastructure will be at least 40 years old. Much of the existing coal and nuclear fleet across the OECD is also approaching retirement age.

Beyond the unplanned economic impact of an asset failure, the environmental, health and safety effects of such incidents can be catastrophic. The loss of life associated with a natural gas explosion in the US in 2010, and other incidents, has brought this risk into sharp relief for utilities, regulators and legislators.

Asset management is also complicated by the use of aging thermal generation assets as backup for intermittent renewable generation. These assets were not designed for this use, and this, together with emissions reduction equipment such as CCS and flue gas desulfurization (FGD), complicates their management.

For utilities, asset management may not be a new skill, but it is one that will become more important than ever as they extract as much operational life as possible from an asset while balancing safety and economic considerations. Going forward, utilities will need to ensure their approach to asset management is continually evaluated and optimized.

“Aging infrastructure coupled with changing operating models increases risks associated with asset failure. The potential physical consequences of such failure range from outages to fatalities; the financial consequences can be enormous.”

Keith Harrison, EY, UK
“We have hired some very good talent ... but, with the amount of infrastructure the UK wants to build, the battle for project managers is huge. Our ability to secure these people is very much linked to the success of our capital execution.”

Alison Wood, National Grid, UK

Integration of distributed energy resources

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<th>Opportunity</th>
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<tr>
<td>Integration of distributed energy resources</td>
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How can your business make the most of distributed energy opportunities, while protecting revenue from market newcomers?

Power supply and delivery is moving from a centralized model (predominantly large, schedulable, thermal or nuclear plant) to a distributed model (a hybrid that encompasses much more significant renewable capacity and other technologies connected to the distribution network). This new model provides utilities with new opportunities in distributed energy deployment, integration and support services.

The market for distributed energy solutions looks sound given the network management issues associated with renewables, solar photovoltaic (PV) arrays, small wind turbines, fuel cells, micro-combined heat and power systems, internal combustion engines and small gas turbines. In some EU countries, the extent to which renewable generation can contribute to a reliable national supply may be nearing a maximum under current operating conditions — widely thought to be around 7%-10% of total production. But this has not discouraged deployment of renewable generation such as PV — indeed, 60% of total 2011 global PV additions were in Germany and Italy, reflecting these countries’ ongoing commitment to renewables.

The good news for utilities is that they have a critical role to play. From the production of power, to its distribution and retail supply, utilities have developed capabilities that will be required, regardless of how the power provision evolves. Looking ahead, utilities will find many opportunities for distributed energy applications related to the design, development and operation of the supporting infrastructure for electric vehicles and in the associated services markets. They will need to be aware of the risk of competition from small developers and intermediaries providing both plant and associated services to commercial and residential markets.

Improving onshore and offshore wind supply chain efficiency

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<th>Opportunity</th>
<th>2011 ranking</th>
<th>2013 ranking</th>
<th>2015 expected ranking</th>
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<tbody>
<tr>
<td>Improving onshore and offshore wind supply chain efficiency</td>
<td>–</td>
<td>10</td>
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Which parts of your wind energy deployment process could be improved?

With the exception of hydroelectric facilities, wind is the dominant renewable generation technology. According to the IEA World Energy Outlook, in 2010, wind accounted for approximately 8% of global electricity production from all renewable resources. IEA forecasts see production from wind at 2,681TWh in 2035, about 23% of the total from renewables or renewable generation.

The opportunity to improve onshore and offshore wind supply chain efficiency, while not applicable to all utilities, reflects the desire among those with a large wind component to drive down the costs of deployment. While comparing the costs associated with the deployment and operation of power generation resources is complicated, data from the US Energy Information Administration’s 2012 Levelized Costs Annual Energy Outlook shows wind remains more expensive than coal and natural gas. Narrowing the gap in these costs continues to be a key challenge for wind generation.

Reduced deployment costs will lessen wind’s dependency on government subsidies while savings across the supply chain will enhance the technology’s attractiveness to investors.

The wind energy sector has come a long way since the early 2000s, with more efficient turbines and declining manufacturing costs. However, more improvements are needed if it is to realize its true potential. Utilities will need to consider which parts of their deployment process could be improved — key areas of focus include wind resource assessment, permits, financing, construction, operation and decommissioning.
"The urgency to deploy new wind capacity needs to be tempered by consideration of the rate at which deployment costs are reducing."

Tony Ward, EY, UK

Outlook

Utilities should expect ongoing – and even increasing – political intervention in their operations. As price rises hit consumers and governments juggle competing needs of system reliability, costs and environmental considerations, any action is likely to impact the ability of most power and utility companies to execute their strategies successfully. Mitigating this risk will require a commitment to communication programs aimed at educating and building trust with consumers.

Aging infrastructure is bringing the risk of related asset failure to the fore. Increasingly, assets are being operated beyond their intended life spans or, in the case of coal-fired generation plants, are being used in ways not envisaged at the time of construction. The economic, environmental and health and safety impacts of asset failure are extremely high, and utilities’ asset management plans should be regularly reviewed to avoid potential catastrophic events.

Wind generation is one of the most promising renewable technologies. As the industry matures, utilities that make operational improvements across the entire supply chain and beyond will drive down deployment costs and increase their attractiveness to investors.
“In Germany, we will see big opportunities in storing and transmitting wind, solar and biomass energy generated from an increasingly decentralized network.”

Metin Fidan, EY, Germany

Self-assessment questions

► How can you improve your ability to influence energy policy? How do you address the uncertainties and possible outcomes in business planning cycles?
► What methods do you use for monitoring and controlling key variables over the project life cycle to avoid cost escalation?
► How are you ensuring that you have enough people with good skills and experience related to planning, strong governance and oversight, and robust program assurance? Have you considered looking outside your industry to gain these skills?
► How have you incorporated leading practices into your operational risk management programs? Would your risk management and analysis on aging assets pass regulatory scrutiny?
► Which aging assets in your portfolios carry the most risk, and what are you doing to mitigate them? What crisis management plans do you have in place, and do the right people know what to do, and when, in the event of an asset failure?
Emerging challenges
The challenges faced by today’s power and utility companies are plentiful and diverse in scope. Our report has profiled the top 10 risks identified by utilities, but many other emerging challenges warrant attention. Two that are likely to have the most significant impact on utilities are disruption of the traditional value chain and inefficient and ineffective energy storage solutions.

**Future disruption of the traditional utilities value chain**

The traditional energy utility value chain of generation, transmission, distribution and supply is changing. This transformation is being driven by an evolving regulatory and market framework for energy provision, particularly aimed at building competitive markets at all levels and encouraging new entrants; changes in technology for supply, delivery and demand; and the changing behavior and expectations of consumers.

The dominance of the traditional vertical utility is being eroded by new entrants, ranging from retail competitors to new renewable generation developers and operators, and the opening up of transmission networks to new developers (e.g., FERC order 1000 in the US). Consumers in competitive markets are becoming more willing and able to compare offers between utilities, and to combine offers with other services to secure better deals. Their experience in other markets has raised expectations of energy services and prices, a trend that could be reinforced by concerns over utility performance and price.

However, the time frame for these changes is unclear. Market concentration remains high in most EU Member States; even in countries such as the UK, where the competitive retail market is relatively mature, the six largest utilities still hold 98% of customers. But proposed regulatory developments, including the mandatory auction of forward production, would encourage asset-light new entrants by reducing wholesale market exposures – a key reason behind the lack of any significant competition to date.

Technical innovation will continue to place more power in the hands of consumers. With new technologies such as home energy management systems, smart meters, residential renewable technologies and electric vehicles, consumers could have a much more interactive relationship with suppliers. They will also become more willing to look to service alternatives such as demand aggregation or alternative suppliers. The latter, including manufacturers of home energy management equipment, providers of other home services (other utility sectors) and major retailers, will seek to develop or expand their market presence.

For utilities, the risk of disintermediation will increase as consumers become more concerned with prices and seek alternatives – and as policy and regulatory measures encourage competition to drive down the prices charged to consumers. Utilities must focus on building trust and customer satisfaction levels, because this will provide a platform for further service offerings and ensure they remain competitive as the market evolves.

**Inefficient and ineffective energy storage solutions**

Beyond pumped hydro, the economics of energy storage remains uncertain. And while potential exists to expand hydro in Europe, this is hampered by site limits and lack of public acceptability. Other existing technologies (such as various battery designs and flywheel technologies) are expensive and are likely to discourage any large-scale rollout that may have reduced costs.

Market conditions may also affect rollout of storage in the short to medium term. Its development was premised upon fossil-fuel-based electricity becoming more expensive through tightening market conditions and carbon prices. In this context, and aided by renewable development, storage would become more competitive. If, however, fossil fuel and carbon prices do not increase, this may make utilities and others less willing to invest in storage.

Some have questioned whether a major expansion of energy storage is even required – demand response programs or reserve capacity could resolve many of the relevant issues. And, as the structure, operation and regulation of electricity markets will ultimately shape incentives to build storage, this creates a significant political or regulatory risk for potential developers or funders of these projects, and in future research and development support for storage.
Methodology

Risk and opportunity identification
The initial stage of the process involved identifying key risks and opportunities, both for global businesses across industries and within the P&U sector.

For this report, we spoke to at least five experts in each field, asking them to identify what they thought were the leading risks and opportunities for the 2013-15 period.

We asked the interviewees to focus particularly on risks and opportunities for multinational, global organizations within their sector. We narrowed the final list down to 15 risks and 15 opportunities per sector, which we used as a basis for ranking in the next stage of the process.

Ranking the top 10
This stage involved a global survey of 110 power and natural gas utilities across the world. For the survey, we asked whether individual risks and opportunities within the report were important for their organization both now and in two years’ time.

Respondents to the survey rated each risk and opportunity between 1 (not important) and 10 (extremely important). The results were then aggregated. The 10 risks and opportunities with the highest mean score then became the top 10 risks and opportunities.
Understanding the impact of the top 10 and how companies respond

We then interviewed a number of senior executives at major organizations within their field, to understand how individual firms expect these risks and opportunities to affect them, and how they go about responding to individual risks and opportunities.

The interviewees were asked to identify three risks and opportunities particularly relevant to them. They were asked five questions for each of those they identified:

► What has been the impact of these risks and opportunities on your organization?
► Have they increased in importance over the last two years? If so, why?
► How has your organization dealt with these risks and opportunities? What approach have they taken?
► What would your advice be to others facing these risks and opportunities?
► Are these risks and opportunities likely to become greater between now and 2015?

We also asked firms about the nature and structure of their risk management functions, and whether or not this had changed recently.

Additionally, we interviewed EY practice professionals to get their take on the impact of these risks and opportunities, and how they see firms responding to them.
How many employees does your organization have?

- 500 to 999: 24%
- 1,000 to 4,999: 37%
- 5,000 to 9,999: 14%
- 10,000 to 19,999: 10%
- 20,000 or more: 15%

What was the sales revenue (roughly) worldwide?

- Below 1 billion USD: 62%
- 1 billion to 5 billion USD: 9%
- More than 5 billion USD: 29%

In which function do you work professionally at the moment?

- CFO/Vice president finance: 24%
- CRO/Head of risk: 15%
- Head of business unit: 14%
- CEO/President/Managing director: 14%
- SVP/VP/Director (Senior vice president/Vice president): 10%
- Head of strategy: 10%
- Other function: 4%
- Chief development officer: 5%
- COO (Chief operating officer): 2%
- Other C-level executive: 1%
- Board member/Non-executive director: 1%
What was the sales revenue (roughly) worldwide?

- 1 billion to 5 billion USD: 62%
- More than 5 billion USD: 9%
- Below 1 billion USD: 29%
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