

New perspectives
on power
and utilities

Utilities Unbundled

Issue 13 | December 2012

"We must come together and forge an energy policy rooted in innovation, independence, access and affordability."

Tom Fanning, Southern Company

Roadmap to recovery

TEPCO talks about nuclear decommissioning at Fukushima Daiichi

Water on the fast track

Major capital program for Saudi Arabia's National Water Company

Keeping the lights on

Eskom is set to double South Africa's electric capacity by 2026



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Generating change

Gas shakes up world energy dynamics

*“The tantalizing prospect
of a single global gas
market feels closer.
But will it always
remain just around
the corner? ”*

Ben van Gils, Ernst & Young

The energy sector has an opportunity to reshape the generation mix completely over the next 30 years. Indeed, that will have to happen if we are to meet policy pressures to reduce carbon emissions and integrate renewable energy.

The biggest uncertainty in the mix concerns natural gas: how much there is, where it is, who wants it and how much they have to pay. Since shale gas appeared, energy dynamics have changed across the world (see *Utilities Unbundled* issue 11, December 2011). Coupled with the growth of the liquefied natural gas (LNG) industry, the tantalizing prospect of a single global gas market feels closer. But will it always remain "just around the corner"?

As things stand, the friction and inequality between regions is palpable. The theory that gas is the long-term fuel of the future – as a relatively clean bridge to renewable power – is breaking down in Europe. There is currently little business case to build European gas generation plants, despite the proposed nuclear shut down in Germany. Low baseload power prices and clean spark spreads simply do not support decisions to build unsubsidized natural gas-fired capacity in the region.

New US exports, in the form of LNG that could be shipped round the world, may herald a new era – along with more LNG from Qatar, Australia and Africa. But there is no clear idea how much of this possible new gas will reach its markets.

Our lead feature on page 10 surveys the current operating environment for gas-fired capacity in Europe, assessing the potential implications of new US LNG exports for European power generators and utilities. The analysis from our contributors – including European utility Vattenfall and the Russian National Energy Agency – highlights the complexity and uncertainty that surrounds natural gas markets today.

Howard Rogers of the Oxford Institute for Energy Studies asks whether a flood of new LNG could be one major factor in breaking the link between the price of gas and the price of oil, which has disciplined gas prices for decades (page 50). If that happens, the momentum for international gas price parity could gather tremendous force.

The evolution will be slow, and for now uncertainty continues. But what's clear is that utilities need to start thinking in terms of an interconnected gas market – even if a single global market remains some way off.

We welcome your views on all the topics we've covered in this issue; contact details for our authors are listed throughout.



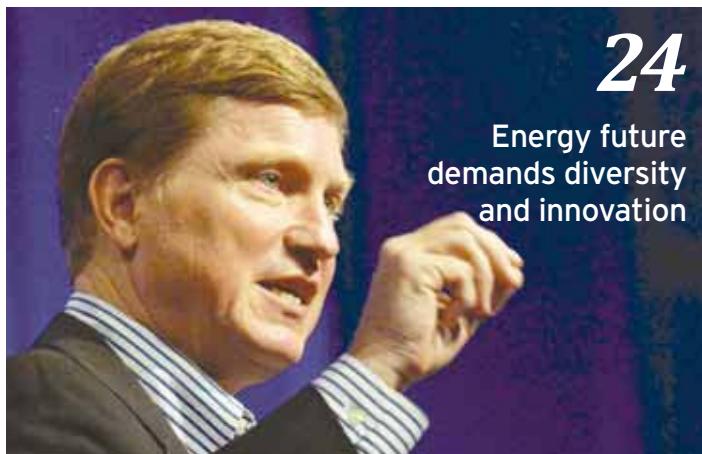
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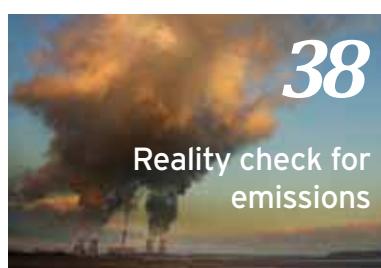
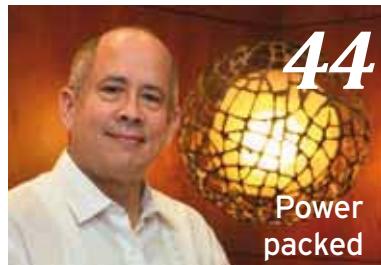


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Market monitor

Watching brief on utility projects worldwide

US

Tax credit uncertainty for wind industry

The Production Tax Credit (PTC), a US\$0.22 subsidy per kilowatt-hour (kWh) of generated energy, could be withdrawn on 31 December 2012. Projects are stalling and jobs are in jeopardy, pending the decision. Critics say the PTC distorts the wholesale energy markets and gives wind unfair advantage over fossil fuels. Since the PTC was introduced in 2005, installed wind capacity has risen seven-fold; the cost of producing wind power has fallen 90% since 1980. President Barack Obama, as part of his renewable energy commitment, backs an extension.

UK

Pushing ahead with nuclear new-build

Contracts for difference (CFDs) are designed to incentivize low-carbon electricity generation and secure reliable future supply for the UK. The CFDs put a guaranteed market price on generation, with opportunities to claw back any surfeit. Most notably, CFDs will be key to large-scale nuclear investment in the UK. However, RWE and E.ON have now agreed to sell their Horizon joint venture, scheduled to build new reactors in England and Wales, to Japan's Hitachi Ltd.



Spain

Higher tax burden on power producers

The Spanish Government has proposed a 6% tax on the cost of selling electricity generated from conventional and renewable sources. This is in response to the nation's €24b (US\$32b) tariff deficit due to years of selling electricity below cost price. Charges will also apply to nuclear waste, water consumed at hydropower plants and coal, gas and fuel oil used in the generation of electricity. This fiscal reform is intended to deliver greater certainty for the Spanish electricity industry.



Brazil

Electricity industry in line for a US\$133b investment

Brazil's revised 10-year energy plan calls for a US\$133b investment in power generation and transmission. Renewable energy capacity will get a boost, with hydroelectric generation expanding from 84GW to 117GW by 2021. Wind power is set to overtake nuclear and biofuels, growing from 1.45GW to 15.6GW over the next decade. The investment should see the country's transmission grid expand by 41,500km.

Bulgaria

Green electricity producers face tariff cuts

Bulgaria's energy regulator has cut preferential feed-in tariffs on renewable electricity installations. Wind projects can expect a 10% cut while solar PV projects completed before January 2012 face 20% reductions and those completed before July 2012 take a 39% hit. The influx of new renewable energy sources feeding into the grid has driven up expenditure for the electricity networks. In response, the regulator has reduced remuneration per renewable kWh fed into the grid.

Norway

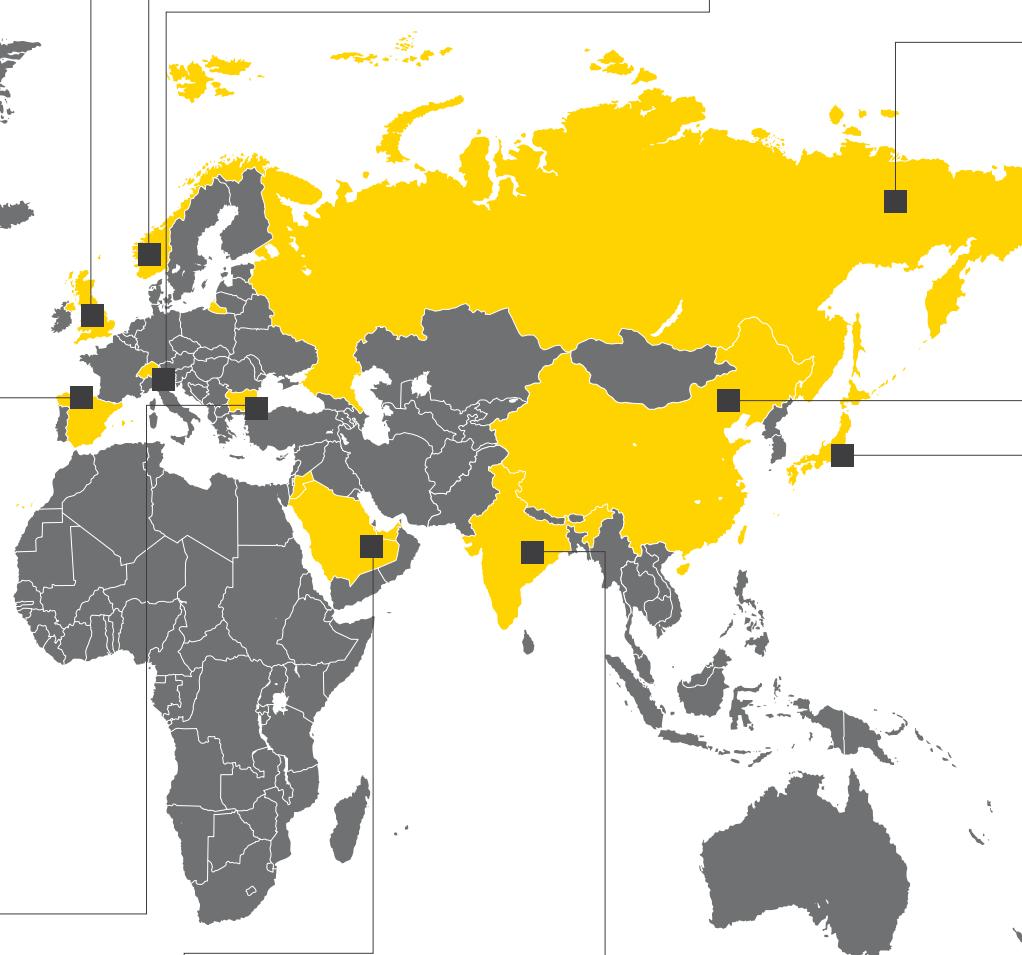
CO₂ compensation scheme to keep manufacturing in country

Energy-intensive manufacturing might find it beneficial to stay in Norway due to a proposed CO₂ compensation scheme. The industry complained that the 2005 EU Emissions Trading Scheme made Norwegian electricity prices unfavorable, compared with countries with less strict climate control regulations. Around 80 companies in 15 industries will benefit. The proposed scheme, effective from 1 July 2013, is expected to cost US\$86.5m per year. However, if the price of carbon allowances increases, the figure could rise to several hundred million dollars.

Switzerland

Operator to take charge of national grid

EICom, Switzerland's independent electricity regulator, has given the go-ahead to transfer the country's national grid to Swissgrid by the end of 2012. The 6,700km grid is valued at US\$2.1b. The grid owners and Swissgrid have agreed a capital structure with 30% equity at handover, and a further 35% in mandatory convertible loans. Payment to the owners will be staggered on the basis of long-term debt capital to ensure secure funding at the early stage.



Middle East

Gulf countries pursue nuclear opportunities

Middle Eastern countries, including the United Arab Emirates (UAE), Jordan and Saudi Arabia, are intent on bringing the first nuclear facilities to the Gulf. The UAE, which is the first "newcomer" country to approve construction of a nuclear plant in the past 31 years, is now expected to deliver a US\$20.4b facility by 2017. Jordan, meanwhile, has appointed Mitsubishi and AREVA to develop its first nuclear power station by 2019.

India

Legislation to address power blackouts

Plans to amend India's 2003 Electricity Act will give regulators greater autonomy and power to enforce discipline on state utilities. The Government also intends to restructure around US\$35b worth of loans held by state-owned electricity utilities. This will result in half of utilities' short-term borrowings being transferred to respective state governments. The moves, designed to increase electricity supply, will also avert repeats of the Indian power grid failure in July 2012, which led to the world's largest blackout.

CIS

Russia and Germany connect via gas pipeline

The second leg of the Nord Stream Gas Pipeline (NSGP), which connects Russia to Germany via the Baltic Sea, is complete according to majority stakeholder Gazprom. This milestone increases the pipeline's capacity to 55 billion cubic meters (bcm) of gas per year. Commercial supplies to Western Europe should start as early as the fourth quarter of 2012.

China

World's largest hydropower plant up and running

After 18 years and a total investment of almost US\$50b, the world's largest hydropower plant, at Three Gorges in China, is now fully operational. With the installation of the last of the plant's 32 turbines in July 2012, the project reached its full 22.7GW capacity. The project is designed to improve flood control in the Yangtze River, increase electricity supply to industrial regions and reduce greenhouse gas emissions by minimizing dependency on coal-fired energy production.

Japan

Shareholders vote against closure of nuclear plant

Shareholders at Tokyo Electric Power Company (TEPCO) have rejected a proposal to permanently close Japan's largest nuclear power plant, Kashiwazaki-Kariwa. The proposal comes amid demands from activists and public opinion polls for the abandonment of nuclear power on safety grounds. Separately, however, shareholders have given the go-ahead to US\$12.57b investment of public funds to stabilize the company financially. This will give the Government majority voting rights and freedom to select TEPCO directors.

Deals roundup

In the third quarter of 2012, subdued economic confidence left power and utility sellers holding onto assets while buyers with capital opted into renewables and avoided larger, more complex transactions. Report by **Joseph Fontana**

Deal highlights

- Deal values down 60% on Q2 2012 to US\$19b
- Average deal value sags 59% to US\$352m reflecting aversion to larger, more complex transactions amid economic uncertainty
- Valuation gap between buyers and sellers frustrates deal-making

“ Market confidence is low. Investors are turning away from risky, big-ticket transactions to smaller renewable energy deals or opportunities to invest in cost-cutting and efficiency. ”

Joseph Fontana, Ernst & Young

Big picture: deal inactivity characterizes third quarter

Deals were few and far between in Q3 2012 as the climate of global economic uncertainty prevailed. Cautious deal-making is expected to define the remainder of 2012.

Buyers and sellers struggled to agree on target prices. With the valuation gap – the difference between what buyers will pay and sellers accept – hovering around 10% to 20%, sellers are mostly hanging onto assets rather than risking a loss. That sentiment is likely to continue into Q4 and potentially beyond.

The massive drop in activity – deal values fell 60% and volumes fell 12% – is evidenced by fewer big-ticket transactions. In Q2, eight deals brought in more than US\$1b each (four topped US\$3b), while Q3 saw only four deals pass the billion dollar mark. Asia-Pacific suffered an 82% drop in value, a nod to the slowing Chinese economy and uncertainty in the region.

Delays to European privatization and divestment programs compounded inactivity, bringing down values by 71% and volumes by 34% over the previous quarter. The US is the standout region for deal activity, up 66% in value in Q3.

There is better news for renewables, posting an uptick in small deals in wind and solar despite cuts in government subsidies. Despite declining subsidies, renewables have some of the characteristics of regulated assets (i.e., some form of longer term underpinning to value) and are proving attractive lower-risk investments.

Table 1. Global power and utilities transaction snapshot

Global	Number of deals		Value (US\$b)	
	Q3 2012	Q2 2012	Q3 2012	Q2 2012
Total	68	77	19.0	47.9
Generation	14	19	8.0	5.5
T&D	7	13	4.5	14.2
Renewables	28	26	1.7	2.1
Others	19	19	4.8	26.1

Americas	Number of deals		Value (US\$b)	
	Q3 2012	Q2 2012	Q3 2012	Q2 2012
Total	26	10	8.9	5.4
Generation	7	1	5.4	0.5
T&D	3	4	0.3	4.2
Renewables	10	4	0.6	0.7
Others	6	1	2.6	0.0

Europe	Number of deals		Value (US\$b)	
	Q3 2012	Q2 2012	Q3 2012	Q2 2012
Total	27	41	6.4	22.2
Generation	1	7	0.2	0.6
T&D	4	7	4.2	9.7
Renewables	13	16	0.9	1.2
Others	9	11	1.1	10.7

Asia-Pacific	Number of deals		Value (US\$b)	
	Q3 2012	Q2 2012	Q3 2012	Q2 2012
Total	15	24	3.7	20.2
Generation	6	10	2.5	4.4
T&D	0	1	0.0	0.2
Renewables	5	6	0.2	0.2
Others	4	7	1.0	15.4

Source: Ernst & Young analysis based on Mergermarket data.

Close up: opportunities amid doom and gloom

US generation dominates activity

Depressed natural gas prices in the US have left many plants unprofitable, with unpredictable cash flow. Hybrid utilities, keen to exit underperforming merchant generation assets, are settling for lower valuations and redeploying capital within their regulated businesses.

This focus on optimizing asset portfolios and capital allocation tops boardroom agendas. So, while other market segments stood still, there was an uptick in activity in the generation space, accounting for some of the top 10 deals in Q3. The largest at US\$4.2b was the acquisition of GenOn Energy by NRG Energy, to create the largest independent power producer in the US.

Appetite for generation assets could be the catalyst for renewed M&A activity in 2013. However, individual asset or portfolio power plant deals, such as the announced sale of Dominion's three merchant plants, seem most likely.

Europe quits deal value top spot ... for now

Despite quality assets coming to market in Q3, valuation gaps and tough financial conditions obstructed deal discussions. Europe's dominance on deal values ended in Q3, down 71% quarter-on-quarter.

Momentum is expected to resume in Q4 if privatization deals announced by European state-owned utilities – notably Greek and Czech – come to fruition and if valuation gaps are narrowed. Asian investors are likely to be among the buyers as they seek to expand their geographic reach.

On the clean energy front, Europe remains the preferred destination for investment, despite subsidy cuts by governments. Considered less risky than unregulated assets, wind sales totaled

66% of Europe's renewable deal value in Q3. German asset managers MEAG GmbH acquired three UK-based wind farms for US\$247m and RWE Renewables Polska took on two wind farms producing 44MW from Gamesa Corporacion Tecnologica SA.

However, investors are also eyeing Latin America, notably Brazil with its 10-year plan to grow wind energy capacity.

Who's buying

Despite lackluster deal-making, finance is available.

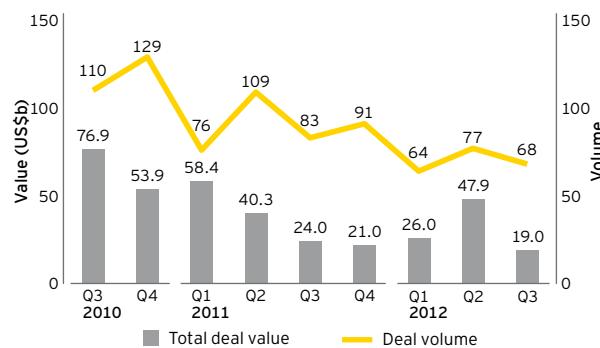
Financial buyers are the logical owners for many energy assets. They have sector knowledge, deep pockets and like the certainty afforded by long-term fixed power contracts. However, valuation challenges kept many deals from being completed and financial buyer deal activity slumped close to a two-year low in Q3.

Instead, financial buyers turned to renewable energy. Eight out of 14 financial deals in Q3 involved renewable assets, typically below US\$250m. This, along with the absence of big-ticket transactions, suppressed overall deal value.

Stand-offs on valuations stalled European privatization and divestment programs in Q3. But with proceeds already committed elsewhere in the businesses, deals cannot wait and investors are preparing on the sidelines for the right price. Conditions are gearing up for a hot transaction environment in Q4 as private equity, hedge fund, infrastructure and sovereign fund investors clamor over these high-quality assets, assuming a narrowing of the current valuation gap.

So Q3 trails some glimmers of optimism. However, until the valuation gap is conquered – and that is dependent on broader economic conditions – few big-ticket deals are anticipated in the next half year, barring those with significant strategic rationale.

Figure 1. Global power and utility sector M&A activity



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New exports of liquefied natural gas (LNG) from the US could cause a major shakeup in world gas markets. With the environment for gas generation so tough in Europe today, what are the implications for generators and utilities? Report by **Duncan Coneybeare**

A volatile mix

In the first half of 2012, demand for natural gas in Europe fell by 2%, on top of a 10.5% fall in 2011.¹ The drop is blamed on lower requirements from industry and from power generation. Meanwhile, the continent has also seen a consistent trend for reduced or zero margins for gas-fired generation.

In the longer term, many stakeholders still believe natural gas will have an increasingly important role in the world's energy future. LNG is expected to play a key role in delivering that vision of the future. But right now, the future for gas-fired generation continues to look bleak.

Natural gas priced out in Europe

Industrial demand for natural gas has dropped due to the economic downturn. In power generation, natural gas has also lost out to generation from coal-fired thermal plants and renewable sources. Meanwhile, the EU Emissions Trading Scheme carbon price, which is intended to tip the balance away from coal and toward natural gas, is currently failing to achieve that goal (see Reality check for emissions, page 38).

In the words of Stefan Dohler, Vattenfall's Head of Asset Optimisation and Trading, "It's a very challenging situation for our stations at the moment. Every day we have to decide: can we create value from operating these plants?"

Global coal prices have fallen due to relatively weaker demand in Asia and the world's developing economies. Add in reduced consumption of coal for power generation in North America (due to the US shale gas revolution, with cheap natural gas displacing coal), and the resulting lower coal prices have made coal-fired generation more cost competitive in Europe. Natural gas is simply being priced out of the merit order.

There is already significant fallout from this tough environment for gas across Europe. For example, Austrian utility Verbund has been forced to recognize impairments against the value of its brand new Mellach plant, citing the combination of a 15-year, 750 mcm/year oil-indexed gas supply contract and low power wholesale prices. A write-down of €110m (US\$142m) in October 2011 was followed by one of €52m (US\$67m) in July this year.²

European generators continue to face a real-life "prisoner's dilemma" – gas-fired capacity needs to close for spreads to improve, but the hope is that others will close their capacity first.³ Yet closing any thermal capacity, even if it is loss-making, remains a hard decision for European power generators to make. Doing so may immediately trigger significant cash outflows, for example redundancy payments. It might also mean missing out on future subsidy programs for thermal plant, should Europe move away from energy-only wholesale markets. Significant maintenance capex decisions may be the factor that ultimately forces closures.

In the meantime, low baseload power prices and clean spark spreads do not support decisions to build unsubsidized natural gas-fired capacity in Europe today, even though most would accept that this will be needed to complement the growth in renewables.

Vattenfall's Dohler says that in the German market, for example: "Any new build only works ... if you have combined heat and power production ... there you can get subsidies for the CHP production, as well as the likelihood of higher energy utilization ... that's the only way to make investment in gas-fired capacity with positive returns."

“It's a very challenging situation for our stations at the moment. Every day we have to decide: can we create value from operating these plants? ”

Stefan Dohler, Vattenfall

However, in the future he believes that making decisions to invest in new gas-fired plants may be less about load factors and more about the flexibility of having reliable capacity when needed, assuming that Europe moves away from energy-only wholesale markets.

In that case, says Dohler, investment decisions are less likely to be driven by expectations about future generation margins, as represented by simple spark spread calculations: "Then, the price of gas as fuel is not the decisive factor ... it's driven by the capital cost of the capacity you build and gas-fired capacity can be built at cheap cost per installed unit. That is more relevant than the price of operating the plants when you expect to have very limited operating hours in the future."

Stefan Dohler

Senior Vice President, Head of Asset Optimisation and Trading
Vattenfall



Stefan Dohler joined Vattenfall in 1998 and held senior management positions in the transmission and distribution activities of the business. He was appointed Vice President of Finance for the Production division in 2010 and accepted his current role this year. Stefan Dohler is member of Vattenfall's Executive Group Management (EGM).

1. 2011 – Natural gas consumption statistics, European Commission – Eurostat, http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Natural_gas_consumption_statistics; 2012 – Eurogas, <http://blog.eurogas.org/en/2012/10/eurogas-expects-stable-gas-demand-in-the-eu-for-2012/>
2. PIE's New Plant Tracker – Gas plant malaise deepens," Power in Europe – Issue 634, Platts, 17 September, 2012.
3. Possible exceptions are Scandinavia, where hydro generation plays a far more important role, and the UK, where closures driven by the Large Combustion Plant Directive may see capacity margins tighten significantly by 2015.

Case study

Gas-fired generation struggles in Germany

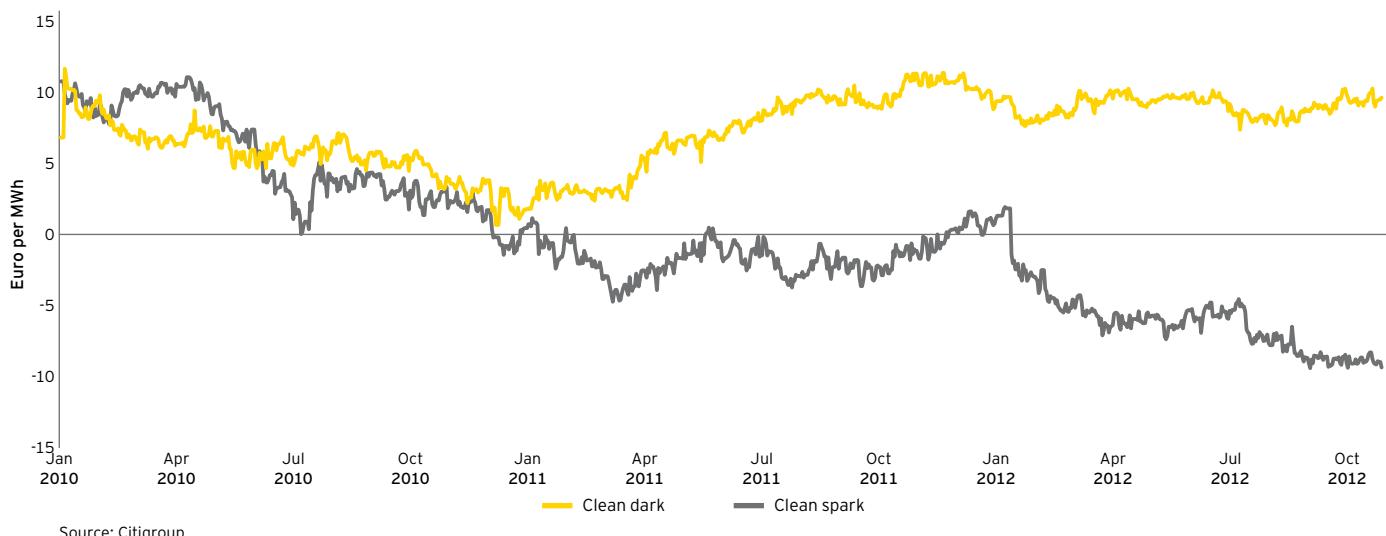
The German power market is characteristic of what utilities around Europe are facing. Clean spark spreads in Germany are now at their lowest level in over two years (see Figure 1), so even the most efficient new gas-fired capacity in Europe will struggle to cover its marginal costs, let alone its long-term capital costs. As Dohler says: "Purely in power production terms, it is very challenging at the moment on the continent – at least in

the Netherlands or Germany, our two main areas of operation."

Meanwhile renewables growth and subdued demand for power have meant that even the closure of German nuclear plants following the Fukushima accident has had little impact on baseload power prices. Natural gas and coal capacity have lost out to subsidized renewables; combined renewables output in Germany rose 20% in the first half of 2012,

compared to the same period in the prior year, and represented 25% of Germany's gross electricity consumption.⁴ Spot power prices appear to have become more volatile and sensitive to renewable power output as a result. There is still a significant surplus of centralized generation plant: Germany has a capacity margin of approximately 30%. This leaves little prospect of baseload prices rising any time soon.

Figure 1: German 1-year forward baseload spreads



4. Source: "PIE's New Plant Tracker – Gas plant malaise deepens," Power in Europe – Issue 634, Platts, 17 September 2012.

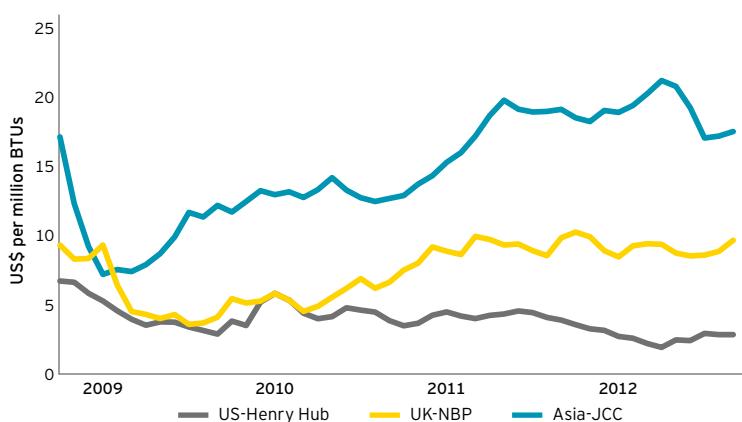
US turns to gas

Meanwhile, events in the US contrast markedly with Europe. Continued low US natural gas prices (see Figure 2), driven by unconventional gas production, are encouraging coal-to-gas switching on a scale not seen in decades.

Because of the shale gas revolution and the lack of material natural gas export capacity, natural gas pricing in North America has become totally disconnected from the other regions of the world. Henry Hub prices now stand around US\$3/mmBtu, far lower than in Europe or Asia.

Over the past year, the disparity between Henry Hub prices in the US and European or Asian prices has encouraged North American natural gas producers to consider exporting LNG to access overseas markets. The potential impact this could have on natural gas prices elsewhere in the world has attracted more and more interest.

Figure 2: Global natural gas prices (monthly averages)



New US projects proposed could double world liquefaction

A huge number of liquefaction projects for LNG export from North America have been proposed (see Figure 3). In total they now reach almost 250 million tonnes per annum (mtpa) across the US, Canada and Mexico.⁵ This is equivalent to the world's entire current global liquefaction capacity.

Nobody truly expects all 250mtpa of capacity will be built. Howard Rogers, Natural Gas Programme Director at the Oxford Institute for Energy Studies, summarizes: "The North American situation is turning into a potential stampede. It will be a very rash person who bets on all those projects going ahead. But even if only a fraction ... comes to fruition, it's a significant new wave of LNG."

5. "LNG Landscape – More US exports likely, but Asian LNG prices to remain robust," Citi Research, 18 September 2012

"The North American situation is turning into a potential stampede ... even if only a fraction ... comes to fruition, it's a significant new wave of LNG."

Howard Rogers, Oxford Institute for Energy Studies



US LNG exports may level out world prices

The consequences for world natural gas markets are still far from clear. Rogers argues that, even if all LNG exports from North America were to go to Asia, there would still be implications for natural gas markets around Europe.

"Asia is the primary market that these projects will target – but the world is finite," he explains. "The more volume you put into Asia, the more you will tend to displace other suppliers who have the option to supply Asia or the Atlantic Basin. So arbitrage evens things out to a differential based on the cost of transport of the swing supplier."

All things being equal, we should expect LNG exports from North America to allow the market to arbitrage any large price differences between North America, Europe and Asia. We have the genuine prospect of a single global natural gas market eventually emerging, with price differentials more or less reflecting transport costs.

Asian importers seeking gas at hub prices

Asian buyers, in particular, are clearly keen to access natural gas at prices that are linked to Henry Hub, rather than being oil-indexed. Oil indexation is the norm for pricing natural gas in Asia-Pacific,⁶ and price levels have been far higher than in the US since the start of 2009.

It is no surprise that major LNG importers such as Japan's TEPCO are reportedly interested in natural gas supply indexed to Henry Hub.⁷ In April 2012, Sempra's Cameron LNG project signed agreements with Mitsubishi and Mitsui of Japan to cover development expenses and negotiate 20-year tolling agreements.⁸ Cheniere's Sabine Pass liquefaction plant is intended to be operated as a tolling facility, with buyers already lined up from South Korea and India.

China and new Far Eastern importers boost demand

The overall market for natural gas today remains relatively tight. Increased demand from Japan after the Fukushima accident is not the only reason. Demand from China, India and a number

of new natural gas importers (notably Thailand, Indonesia and Malaysia) has also risen, or is likely in the medium term. Chinese demand for LNG is reported to have increased by 31% in 2011⁹ and it will be a huge factor in shaping the world's future LNG markets.

In the short-term, Asian buyers are evidently motivated by the differential that exists between Asian and North American natural gas prices today. However, if they do successfully lock into North American gas prices, they will be making a significant change to the risk profile of their LNG supplies. They will swap oil price risk (reflecting the possibility of conflict in the Middle East, OPEC production quotas and the like) for Henry Hub risk (which is much more about US gas supply/demand and longevity of shale gas revolution).

Immediate uncertainty from regulatory hold-ups

Before we get too excited, large scale exports from North America also face key uncertainties. The most immediate is regulatory approval in the US, which is overshadowed by US politics.

"As you can imagine, the US industrial and consumer lobby is against LNG exports because they believe that this will pull the US domestic price up. The upstream industry is generally in favor of it – for much the same reason," says Rogers.

Of all the proposed LNG liquefaction projects currently on the drawing board, only Cheniere's Sabine Pass facility has received U.S. Department of Energy (DoE) approval to export to non-Free Trade Agreement (FTA) countries.

Andy Brogan, Transaction Advisory Leader for Ernst & Young's Global Oil & Gas practice, highlights how important this is: "Non-FTA approval is a cornerstone of commercial viability in the eyes of financiers because the US does not have appropriate agreements for free trade with key LNG markets such as mainland China, India, Japan, Taiwan or Europe."

Many more liquefaction projects have applied for the relevant DoE approvals (see Figure 3). However, non-FTA approvals have been suspended pending a review of the cumulative economic impacts of liquefaction projects on the US natural gas market and on the wider US economy. No verdict is expected before the end of 2012.

6. Excluding areas where prices are still directly regulated or formed by netback.

7. "Tepco in talks to buy LNG from North America," IHS World Markets Energy, 18 September 2012.

8. "Sempra Energy unit signs commercial development agreement with GDF Suez for remaining capacity at Louisiana liquefaction facility," *Economics Week*, 18 May 2012, via Factiva, © Copyright 2012 Economics Week via VerticalNews.com.

9. "Strong market for now, but uncertainties lie ahead," *Petroleum Review*, July 2012



Sergey Pravosudov

General Director

Russian National Energy Institute



Sergey Pravosudov is a leading commentator on the world energy industry and Russian gas markets. He accepted his current position with the Russian National Energy Institute in 2006. Prior to this, he spent two years as Deputy Editor-in-Chief, and then Editor-in-Chief, of Gazprom's corporate journal.



“ US LNG cannot be cheap by definition — on top of the cost of production you need to add expenses for transit to coast, liquefaction, transit by sea tankers and distribution in Europe. ”

Sergey Pravosudov, Russian National Energy Institute

Who will buy?

At what price is US LNG competitive?

- ▶ Recent analysis by Citigroup¹⁰ suggests that natural gas from Cheniere's Sabine Pass facility could be delivered to North Asian customers, assuming that Henry Hub prices stay at US\$3/MMBtu, for approximately US\$10/MMBtu.
- ▶ This is US\$6 to US\$7 under the level that a customer in the region would today be expecting to pay under a contract indexed to Japan Customs Cleared (JCC) oil prices.
- ▶ US\$6/MMBtu for Henry Hub natural gas would still allow for LNG export to Asia, competitive at under US\$14/MMBtu against oil-indexed prices.

Rising US gas prices could impact export viability

The economic analysis being undertaken for DoE is complicated by the fact that US natural gas prices are widely expected to rise anyway. Howard Rogers says that with Henry Hub prices between US\$2.50 and US\$3, drillers targeting dry shale gas are likely to be losing money.

According to Rogers, "US gas prices will have to rise ... studies into the price needed for dry shale gas in North America to break even on a full-cycle basis usually come up with the answer of between US\$5 to US\$7 per mmbtu. My feeling is that by the time we get to LNG exports from the US in late 2015/early 2016, that price correction should already have happened."

If Henry Hub prices do rise, this will impact the viability of many proposed export projects from North America.

Sergey Pravosudov, General Director of the Russian National Energy Institute, argues that spot prices in Europe are insufficient to make supplying US LNG there profitable.

Pravosudov says that: "US LNG cannot be cheap by definition – on top of the cost of production you need to add expenses for transit to coast, liquefaction, transit by sea tankers and distribution in Europe."

Dohler agrees that most North American LNG exports will go to Asia: "If it were to come to Europe, it would only be at roughly the prices we already have there."

The higher prices prevailing in Asia make it a far more attractive and commercially viable destination market for North American LNG exports. As Rogers points out: "In July, the average LNG import price in Japan was about US\$18 and even the Asian LNG spot price is still around US\$14."

- ▶ However, a US\$6/MMBtu price would probably rule out supply to Europe in current market conditions.
- ▶ Crucially, the cost base will not be the same for all the proposed North American facilities. Sabine Pass is probably at the lower end of the spectrum, as it is a brownfield project, and transport costs to the end-user markets will also vary. Other projects may well be less cost competitive.

10. 'LNG Landscape – More US exports likely, but Asian LNG prices to remain robust,' Citi Research, 18 September 2012.

More LNG producers vie for Asian market

Another key uncertainty is the likely competition in the Asian market from other new sources of natural gas supply – most notably Australia. Much of the world's new LNG liquefaction capacity currently under construction or reasonably expected to be built is in Australia, whether fed by coal-bed methane or by conventional offshore gas. According to Pravosudov, these projects are all targeted at the Asian market.

The signs are promising for North American exporters. According to Citigroup's analysis of export project economics,¹¹ if the Henry Hub price rose to US\$6/mmBtu, LNG could still be exported to Asia from Sabine Pass and remain cost-competitive against LNG exported from Australia – so long as the JCC oil price, against which Australian exports would typically be indexed, remained above US\$90/bbl.

There is more good news for North American LNG export projects targeting Asia. The pipeline of competing Australian projects is reported to be suffering from significant cost inflation and delay. Woodside's Pluto LNG project started production 16 months late in April 2012, and was roughly 30% over budget. Santos has recently announced a US\$2.5b increase in the costs of its Gladstone LNG joint venture.¹²

"The new wave of Australian supply should start to come on stream from 2015 onwards. But their challenge is capital cost inflation," says Rogers. "They are trying to do so many projects in parallel that it is straining the availability of skilled labor and wage rates have shot up."

Rogers also suggests that the Australian projects will tend to be viable only if they can export under traditional LNG contracts at JCC-indexed prices. Against this backdrop it is possible that some projects previously expected in Australia will not go ahead as originally planned – opening the door for more North American exports to the Asia-Pacific region.

Future still frustratingly opaque

Given these uncertainties, the prospects for North American LNG exports remain frustratingly opaque. There's a difference in how industry analysts and industry participants view the situation. Ernst & Young's Brogan comments: "At the moment, industry insiders seem noticeably more pessimistic about the scale of US LNG exports."

It seems likely that within the next five years North America will become a net gas exporter. It may or may not become a major supplier to global markets. The emergence of export facilities could help to set a price ceiling for Europe (i.e., the costs of Henry Hub natural gas plus liquefaction plus transport and regasification).

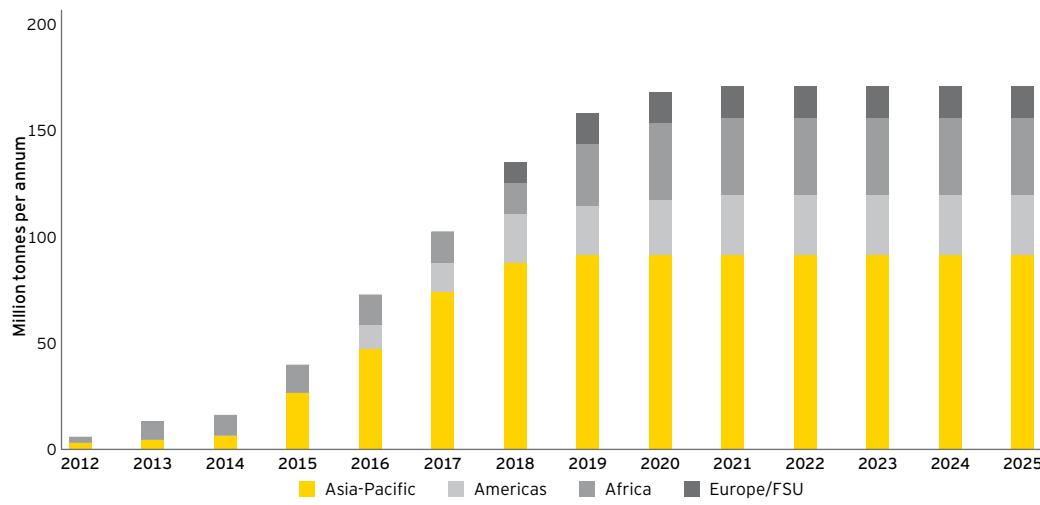
Brogan thinks that Canada could ultimately play a central role in bringing North American gas to a wider market. There are plans for five LNG export projects on Canada's West Coast, potentially on stream between late 2014 and 2019.¹³ Brogan wonders if Canada, as a country covered by FTA with the US, will become a conduit to the Asian market for US gas: "We might yet see some US gas being moved to Canada for onward shipment to the rest of the world."



“We might yet see some US gas moved to Canada for onward shipment to the rest of the world.”

Andy Brogan, Ernst & Young

Figure 4: Potential global LNG liquefaction capacity – under construction and probable



Source: Credit Suisse.

11. "'LNG Landscape – More US exports likely, but Asian LNG prices to remain robust,' Citi Research, 18 September 2012

12. 'LNG gas land,' *Financial Review Capital Magazine*, 19 September 2012, via Factiva, Copyright 2012 Fairfax Media Publications Pty Limited.

13. "Update: Canada expects to start LNG exports from late 2014: energy minister," *Platts Commodity News*, Platts, 18 September 2012, via Factiva, copyright 2012 Platts. All Rights Reserved.



Where does this leave Europe's utilities?

In the short term, operating conditions look very challenging for owners of gas-fired capacity in Europe.

They are heading toward a world of lower load factors and, for most of the time at least, lower margins – even potentially a two-tier power market in some countries. Power prices are likely to become more volatile under the influence of increased renewables output: when prices spike, operational flexibility and the ability to take advantage of those spikes will be critical.

In the medium term, European gas hub pricing will increasingly reflect the dynamics of global LNG trade. Utilities will need to be more aware of what is happening in that market and hub pricing will become more susceptible to pressures impacting other regional markets.

As Rogers puts it: "If you are a utility in Europe you will no longer be able to just think about your own gas supply market. You'll increasingly have to think about the regions of the world that are connected in terms of sharing LNG supply. This will extend to how LNG supply is going to interact with Russia's gas exports. It's going to be a big learning curve for some utilities to go up in a relatively short space of time."

European utilities are increasingly looking to diversify their portfolios of gas supply, to include contracted LNG and access to regasification capacity to allow purchase and use of spot cargoes. This should reduce input costs in the short- to medium term, versus traditional long-term oil-indexed contracts. But, with the demand/supply balance for natural gas on a global basis remaining tight, drastic price falls don't appear to be on the horizon.

What utilities will find is that the LNG business is fundamentally more complex than pipeline supply, as LNG cargoes have significantly more option value than traditional pipeline deliveries.

Maximizing the portfolio value from LNG means understanding a broader range of factors. This includes multiple sources of gas production, liquefaction and regasification capacity; shipping constraints; contract flexibility to enable sales at multiple locations; and marketing capability to a range of end-users – all within customized contract structures. Natural gas and power markets are set to become more interdependent than ever before.

If you are a utility in Europe you will no longer be able to just think about your own gas supply market. You'll increasingly have to think about the regions of the world that are connected.

Howard Rogers, Oxford Institute for Energy Studies



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Renewable views

Funding for renewables projects has historically come from a utility's balance sheet strength, supported by project finance. However, this is not an approach that can continue.

Utilities have found their balance sheets under real pressure in recent years, with little prospect for improvement in the near future. Credit ratings of many top utilities have tumbled in the last decade: in 2001, all of the 10 top utilities in Europe were rated A or above, whereas in 2012 only one rated A or above.

A professional portrait of Ben Warren, a man with short brown hair, wearing a dark blue suit jacket, a white shirt, and a purple patterned tie. He is standing in front of a large window with a view of wind turbines.

Utilities are expected to deliver renewables targets, but weak balance sheets and a lack of project finance raise a crucial question: How are they supposed to finance it?
Report by **Ben Warren**

“ Many utilities have found their balance sheets under real pressure, with little prospect for improvement in the near future. ”

Ben Warren, Ernst & Young

In addition, there is a lack of project finance for renewables projects. Banks are no longer willing or able to offer long-term, non-recourse debt for these projects. And as Basel III forces banks to shore up their balance sheets, a significant liquidity crisis is emerging.

To overcome this hurdle, new capital needs to be deployed in the marketplace, with new conduits to bridge the gap between investors and projects, supported by government policies that create the right climate for investment.

New financing sources needed

There is money out there, but utilities will need to look further afield and be more innovative about financing. Institutional investors, for example pension funds, insurance funds and life funds, represent one deep-pocketed source of capital that is already looking to invest in energy.

These funds want long-term, low-risk investments with predictable yields that are ideally index-linked – criteria that renewables assets in more mature technologies (such as onshore wind and solar PV) fit very well. They tend to be low risk in nature (with little or no exposure to commodity price or market risk), have predictable income streams, low covenant risk on those earnings and are typically index-linked.

What's missing is access. Institutional investors are currently limited to investing in equities and corporate bonds, rather than in projects directly.

Creating new conduits

Major utilities have historically seen themselves – rightly or wrongly – as asset owners and asset-heavy companies. But their balance sheets today are not strong enough to support incremental investment to the order of tens of billions, if not trillions, of investment. The model is broken, and a new approach is needed.

The first step is creating a conduit between sources of capital and renewables projects. To do this, two things are needed:

- ▶ Utilities could sell renewables assets to pension funds but maintain some operational asset management responsibility.
- ▶ Utilities could set up their own "captive" capital funds to attract third-party institutional investment for their specific asset portfolios and manage the risk.

New structures are likely to emerge on a project-by-project basis. Getting the scale and the risk/reward ratio right will be key challenges. Utilities will need to bundle assets to achieve the scale needed by institutional investors: a US\$20m asset is of no interest to a fund managing US\$80b. This is not something a piecemeal solution can address.

A key role for policy

Government has an important role to play. Rather than focusing purely on revenue-based support, governments need to create a stable, consistent policy framework that helps manage and mitigate risks, so that 50-year investment decisions can be made with greater certainty.

Initiative needed

These challenges can be met – what's needed is initiative. Utilities need to be willing to acquire new skills and talk to new players. Once a few landmark deals have taken place the doors will swing wide open. It's a question of leading the market. In the UK, we have seen Aviva Investors taking on solar assets and Hermes GPE doing the same. While these are investment arms of pension funds rather than the pension fund directly, it shows a step in the right direction.

Investment in renewables has to be made. It's a question of how, not if. Energy needs to be decarbonized. Even cheap gas will run out at some point. Technologies such as solar PV are now cost competitive in a number of applications compared to conventional energy. The sooner changes are made to secure funding for renewables, the better.

Renewable energy country attractiveness indices (CAI) – December 2012

Our quarterly publication ranks the relative attractiveness of 40 countries' renewable energy markets across a selection of technologies.

Grid issues, strong partisan views, mixed policy signals and austerity measures are among the tensions that are slowing the pace of expansion across the CAI's top ranking countries, as they battle to carve out a sustainable role for renewables. Meanwhile, increasing energy demand in emerging markets has strengthened government investment in the sector and injected some much-needed optimism into an industry still feeling the effects of the financial crisis. Manufacturers have been hit particularly hard in recent months as a result of oversupply and falling technology costs – though in the long term, greater cost-competitiveness should create a sustainable growth platform across the whole sector.

To access the full report, see www.ey.com/CAI



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Home at last

The supply chain



Silicon Labs is an industry leader in high-performance, analog-intensive, mixed-signal integrated circuits used in smart meters, intelligent home automation and security as well as many other applications.

After a number of false starts, are smart homes on their way to mass-market adoption?

Duncan Coneybeare asked three companies shaping this market for their views on smart home technology – and what it could mean for utilities

Greg Fyke

Director of Marketing for industrial products, Wireless Embedded Systems
Silicon Labs



Greg Fyke joined Silicon Labs in 2003 and has served in multiple marketing and business development roles with the company, most recently as a Senior Business Development Manager focused on long-term strategy and corporate M&A. Prior to Silicon Labs, he held marketing roles for networking products at PMC-Sierra.

Why hasn't the smart home concept taken off before?

Ever since the 1960s, home automation has promised homeowners increased comfort and convenience. But the high cost of installation, lack of standards and technical limitations have stifled that promise – until recently.

What's changed?

We believe smart homes are poised for the mass market. The concept has really come to life in the last three to four years, spurred by the development of standards, the broad adoption of wireless technologies and the emergence of mobile apps that allow people to monitor and control their homes through smartphones.

How are utilities responding?

They've embarked on Phase 1 – the installation of millions of smart meters. This phase is necessary but not sufficient to achieve the benefits of the smart grid. The value proposition of a smart home goes well beyond the smart grid, extending, for example, to home security monitoring, entertainment systems and broader comfort and convenience features.

The smart home has to be easy, productive and fun for the consumer to use. It's not yet clear if utilities will lead, follow or get out of the way. Some utilities have been very aggressive in deploying smart meters and back-end infrastructure and yet less successful in deploying home area networks. But it's the home area networks that will unfurl the true value of the smart grid and advanced metering infrastructure.

While advocates of smart homes ask, "Who wouldn't want greater control and convenience?", the skeptics ask, "At what price, and how much effort is required?" Here, Silicon Labs, ZigBee Alliance and – over the page – Portus provide an update on some of the key questions regarding smart home technologies: what it will take to move smart homes into the mass market, how utilities are responding and where innovation is taking place.



“The smart home has to be easy, productive and fun for the consumer to use. It's not yet clear if utilities will lead, follow or get out of the way.”

Greg Fyke, Silicon Labs



What is a smart home?

A smart home is a house that uses a communications network to connect, monitor, control and/or automate systems for lighting, heating and cooling, entertainment, security and other functions, as well as energy-intensive appliances.

“ Leading utilities know that smart homes are the key to residential demand response and load control and to long-term energy programs. ”

Bob Heile, ZigBee Alliance

The standards developer



The ZigBee Alliance is a non-profit association driving development of ZigBee standards, a market-leading standard for interoperable products in fields such as home automation and smart energy.

Bob Heile

Chairman and CEO
ZigBee Alliance



Bob Heile is the Chairman and founding member of the ZigBee Alliance. He is a 20-plus year veteran in the field of data communications and wireless data with several articles and workshops to his credit. Bob is also the Chair and founding member of the Institute of Electrical and Electronics Engineers (IEEE) 802.15 Working Group on WPANS, Co-Chair of IEEE P2030 Smart Grid Communications Task Force, and is a founding member of IEEE 802.11.

Is there a “killer app” that will move smart homes into the mass market?

There will be more than one, but the top driver will be rising energy costs. We know costs force consumers to change behavior, and consumers will want to create their own smart homes to help them control energy expenses. Electric vehicles (EVs) could be the disruptive technology. If EVs get a foothold, they'll force a smart environment independent of other factors. It will be the only way to keep the lights on if too many EVs wind up on the same transformer.

What role do you see for utilities?

Leading utilities know that smart homes are the key to residential demand response and load control and to long-term energy programs. In most rural US markets, however, there is no incentive for investment and little interest. In fact, in many states, regulation doesn't encourage conservation and investment in new infrastructure – it does just the opposite.

Where are you seeing innovation?

We are seeing innovative new business arrangements like Energy@home in Europe, comprising two appliance manufacturers, a utility and a wireless carrier, all partnering to deliver an integrated smart experience based on ZigBee standards to the customer.

We have also seen utilities based in Texas really differentiating themselves – Reliant, TXU and CenterPoint are just a few of the leaders out there who are ahead of the pack and giving their customers the access and control needed for a smart home.

The solution developer



Portus is a cleantech pioneer and developer of energy management and residential smart grid solutions.

Are attitudes toward smart homes changing?

A study in Australia this year found that 73% of consumers surveyed wanted more information about how to manage electricity costs. Retailers that do not respond to this will lose customers to those that do. Consumers are also more sensitive to their personal security, so smart home solutions are generating interest.

How are utilities responding?

Australian utilities tend to dabble with the smart home as an extension to their smart meter and home area network activities. They have viewed things in terms of their immediate objectives rather than from the customer's perspective. However, there is a major review underway to remove barriers to demand side participation in the national electricity market.

Recommendations include changing national electricity rules to allow new service providers to access meter data, develop direct relationships with customers and aggregate demand response capacity (which could then be traded into the real-time market). Disincentives for incumbent retailers and networks to implement demand response could also be removed. This will really open up the market.

“... the primary driver to mass market will be in response to escalating energy costs and bill shock.”

Tim Lindquist, Portus

Tim Lindquist

Chief Executive Officer
Portus



Tim Lindquist is founder and Chief Executive Officer of Portus. He is an entrepreneur, engineer and technology evangelist with over 25 years in the tech business and acknowledged expertise in the home energy management field. His experience ranges across the smart grid, cleantech, connected home, telecommunications, computer graphics and digital printing domains.

Where will the move into the mass market happen first?

There is already early uptake of home monitoring solutions through telecoms channels. This is responding to a growing need for peace of mind in relation to personal security, and keeping an eye on loved ones at home. But I believe the primary driver to mass market will be in response to escalating energy costs and bill shock.

We are pursuing a smart home that optimizes the operation of different appliances to reduce energy bills automatically, and deliver firm demand response without a negative impact on the customer's comfort. For wide-scale adoption, customers need to be able to install the whole solution simply, without any installation work required at the meter board, and without any issues related to responsiveness caused by connecting to applications via the cloud.



Another spotlight on fair value

New disclosure rules focus on companies' most subjective fair value measurements.
Report by
Tyler Dorn

With the recent passing of new rules from the Financial Accounting Standards Board (FASB), power and utility companies now have to cope with even more disclosures on how they develop and review their fair value measurements. A new study by Ernst & Young provides a snapshot of how they have adopted the new requirements.

Our recent survey of public energy companies in the US market – part of a larger survey of 60 public companies across various industries¹ – found divergence in how they initially addressed disclosures.

The new FASB rules were intended to provide users with additional transparency concerning the unobservable inputs used by companies to estimate the fair value of their most hard-to-measure assets or liabilities (i.e., Level 3 measurements) and the valuation processes surrounding these measurements. Mandated in 2011, as an amendment to FASB's codification of ASC 820, ASU-2011-04 went into effect for calendar year-end public companies beginning with the first quarter of 2012.

Our survey examined financial statement disclosures of public companies in the five sectors where Level 3 measurements tend to be more prevalent – banking, asset management, insurance, energy and real estate – to see how they were being implemented.

The most prevalent fair value measurements subject to the new rules for energy companies are long-dated derivative instruments. As a contract to sell electricity or natural gas extends further into the future, the forward price curves used to value those contracts become unobservable – and extremely difficult to estimate. The new disclosure rules require companies to quantitatively disclose estimates of those unobservable pricing points (e.g., the range and weighted average).

Delivery points for physical derivatives may also trigger fair value complexity, particularly when the delivery is not at an active or liquid hub. In such cases, a company must estimate, and quantitatively

disclose, the basis adjustment that is used in the fair value measurement. In some instances, companies disclosed the basis-only price, while others disclosed the "all-in" forward price.

"As a contract to sell electricity or natural gas extends further into the future, the forward price curves used to value those contracts become unobservable — and extremely difficult to estimate."

Tyler Dorn, Ernst & Young

Looking ahead, we believe the manner in which energy companies comply may evolve as they gain insight into the disclosures made by their peers and refine the information they provide based on leading practices. Further enhancements may also result from comments received by companies from the U.S. Securities and Exchange Commission (SEC) or other relevant regulators.

Through its comment letter process, the SEC staff has begun questioning registrants about how they complied with the new disclosure requirements. Comments provided by the SEC staff to date include, but were not limited to, the following:

- ▶ Consider disclosing weighted averages. When a wide range of data for significant inputs is disclosed, a registrant should consider disclosing a weighted average of the inputs and discuss how that average was determined.
- ▶ Consider multiple valuation techniques. When multiple valuation techniques are used for a class of instruments (such as an income approach and a market approach for certain debt instruments), registrants should consider disclosing the amounts determined under each valuation approach.
- ▶ Consider the level of aggregation. The guidance does not detail what level of aggregation the disclosures should follow. The SEC staff has indicated that it wants to see more granular information in qualitative sensitivity disclosures.



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1. The new fair value disclosures, Ernst & Young, July 2012.



Energy future demands *diversity* and *innovation*

Un certainty and unpredictability are an inherent part of energy. What is certain is that Americans have at our domestic disposal real tools and solutions to protect our nation's energy future. To achieve that future, we must come together and forge an energy policy rooted in innovation, independence, access and affordability. Southern Company advocates a comprehensive, common sense energy policy that will help America compete and succeed in an ever-evolving 21st century. It is based on two guiding principles to help move our nation forward: first,

using "all the arrows in the quiver" and second, investing in energy innovation.

We must develop the full portfolio of energy resources – or "all the arrows in the quiver." We cannot achieve America's energy future by clinging to energy policies of the past. We must leverage old and new technologies: new nuclear, 21st century coal, natural gas, renewables and energy efficiency. Think about it: you probably have a favorite stock, but you don't invest everything in that stock; you diversify across many. That's just good common sense, and it is how we should



Thomas A. Fanning

Chairman, Chief Executive Officer and President
Southern Company

Thomas Fanning became President of Southern Company in August 2010 and assumed the additional responsibilities of CEO and Chairman in December 2010. He has worked for Southern Company for more than 30 years and has held numerous officer positions with a variety of Southern Company subsidiaries in the areas of finance, strategy, operations, international business development and technology.

Since 1995, some 95% of all new US electricity generation has been powered by natural gas. Tom Fanning, CEO of Southern Company, states that as good as gas looks now, it's better to make it part of a diverse portfolio

approach our national energy policy. This reasonable, long-term approach will prevent us from being overly dependent on any single fuel source and protect us from the volatility of any one market.

Since 1995, more than 95% of new electricity generation in America has used natural gas as its primary fuel source. Even now, Southern Company generates almost half of its energy from natural gas because prices have fallen dramatically and we are committed to keeping costs low for our customers. The utility industry, however, is capital-intensive and investments are normally made with economic horizons of 30 years or longer. While natural gas appears plentiful and inexpensive today, history tells us there are many variables that could change in the months and years ahead. Natural gas is a dominant solution, but it is not a panacea. Our commitment is to make decisions that benefit our customers directly *today* while positioning us to continue to provide clean, safe, reliable and affordable energy in the future.

Southern Company is the only energy company in America today truly dedicated to developing the full portfolio. We have committed US\$20b to America's energy future, and the benefits will reverberate throughout the communities where we live and work. One estimate says our investment will create a quarter of a million jobs in the Southeast. With these investments, we are building on America's legacy of innovation by engaging in proprietary research and development. We are leading the nation's nuclear renaissance by being the first in a generation of Americans to build new units, using the latest nuclear technology with unprecedented safety protections. Our focus on energy innovation has provided a way forward for coal in this country. We are building a clean, cutting-edge coal gasification plant powered by Mississippi lignite, a previously unused, native fuel source. We're also advancing renewable energy. We recently built the nation's largest biomass plant in east Texas, invested in new solar facilities in Nevada and New Mexico and are bringing our customers wind power from Oklahoma and Kansas. Through a concept called "Smart Energy," we're bringing these and other innovations together to help ensure the power we provide our customers is clean, safe, reliable and affordable, from generation to consumption. We're interested in solutions, not rhetoric. Our unwavering commitment to innovation is rooted in the enormous benefits it provides our customers and the communities we serve.

There is no single solution to prepare for America's energy future. We need a comprehensive, consistent, common sense national energy policy based on two guiding principles: the full energy portfolio and a commitment to energy innovation through investment in research and development. We all have a stake in working together to ensure energy is affordable and accessible in America. That's our belief, and Southern Company is honored to play a part in making that future a reality.

Chile's *power challenge*

Chile's power sector will struggle to meet demand if it cannot find a constructive way to resolve environmental opposition to mega-power plants.

Marek Borowski reports

Mario Manríquez Kemp

Secretary Director

Chilean Association of Renewable Energy



Mario Manríquez Kemp served as Executive Vice President of the Chilean Association of Renewable Energy (ACERA) from December 2006 to October 2009, and currently serves as Secretary Director of ACERA. He also works as Operations Manager at Mantex Corporation, an industrial machinery and equipment company serving the mining, industrial and mini-hydropower sectors.

With a growth rate of 5.9% last year, Chile was a bright spark in a gloomy world economy, largely due to strong copper exports. But the country's ability to support sustained growth could be limited by its need for more reliable and competitive power supplies.

An increasingly resilient system

Power demand in northern Chile is dominated by the mining industry, and is served by the thermal-based Sistema Interconectado Norte Grande (SING) electricity grid, with natural gas playing a key role in power generation alongside coal and oil. The Sistema Interconectado Central (SIC) electricity grid covers the more densely populated central region (including Santiago) and is far more hydro-dependent.

The past decade has seen a number of challenges regarding energy supply, with a prolonged drought that affected hydro output, interruptions to pipeline supplies of natural gas from Argentina and a major earthquake in 2010 all causing problems.

According to Mario Manríquez Kemp, Secretary Director of the Chilean Association of Renewable Energy (ACERA), Chilean energy costs are consistently among the region's highest. "As Chile does not produce coal, oil or natural gas, it relies heavily on thermal energy and fossil fuel imports," he observes.

Natural gas pipelines connected to Argentina brought Chile access to a source of cheap fuel. However, the decision of former Argentine President Néstor Kirchner to cut supplies in 2004

reduced the role played by natural gas in Chile's energy mix. The start of liquefied natural gas (LNG) imports in 2009 successfully reversed this trend and Chile continues to import LNG via the Quintero and Mejillones terminals from a range of suppliers.

Litigation delays mega-power plants

The real issue now for Chile is reconciling environmental concerns with the increasing demand for power. Major delays affecting key energy projects have left local power generation companies struggling to cope with growing demand. Protracted permitting and Environmental Impact Assessment (EIA) procedures have led to numerous delays; only 11% of projects seeking EIAs since 2003 have begun construction.

Only 11% of projects seeking Environmental Impact Assessments since 2003 have begun construction.

Increasingly, the courts are becoming involved. According to Chilean think tank Libertad y Desarrollo, more than US\$22b and over 8,000MW in energy investment in Chile have been suspended due to regulatory disputes and litigation.¹ And in August 2012, the Supreme Court rejected plans for a US\$5b thermoelectric power plant in the copper-rich Atacama region, saying that Castilla could "harm the constitutional guarantee that one can live in an environment free of pollution."²

1. "Chile top court rejects US\$5b Castilla power project", Reuters, 29 August 2012. Accessed at <http://in.reuters.com/article/2012/08/28/chile-castilla-idINL2E8JS82620120828>, 22 October 2012.

2. Ibid.

3. "President Piñera signs Public Electricity Highway draft bill," Government of Chile website, 30 August 2012. Accessed at <http://www.gob.cl/english/featured/2012/08/30/president-piñera-signs-public-electricity-highway-draft-bill.htm> on 22 October 2012.

With electricity consumption in Chile projected to increase at an annual average rate of between 6% and 7% to 2021 (see Figure 1), and no major power plants scheduled for completion in the foreseeable future, how will the country meet demand?

Decisive role for government

The government is taking action. In August 2012, President Sebastián Piñera was reported to have said: "In light of the Supreme Court's recent ruling against a major energy investment project, I think that now more than ever we need the State to take a more dynamic and decisive role in the matter to ensure that we have the right regulations and legal framework."³

"I think that now more than ever we need the State to take a more dynamic and decisive role in the matter to ensure that we have the right regulations and legal framework."

Sebastián Piñera, President of Chile

Authorities have announced plans to construct a Public Electric Highway, "a new transmission line parallel to

the current almost fully utilized system," comments Manríquez Kemp. The project will include a north-south trunk transmission line and several transverse lines carrying non-conventional renewable energy (NCRE) between remote areas and principal networks.

The government has also announced a new national energy plan, targeting an increase from 17GW to 25GW in the country's installed base. This plan relies heavily on NCRE, a challenging assumption says Manríquez Kemp: "Currently, NCRE sources contribute no more than 4% of Chile's total power generation ... and corresponding development incentives have proved insufficient."

However, high electricity prices combined with decreasing NCRE costs are good news for clean energy pioneers: "Developers are now expected to produce NCRE at costs similar to those of thermal plants," Manríquez Kemp comments.

In addition, the Chilean Government's new energy policy includes the so-called "20/20" law, targeting 20% NCRE generation by 2020 while promoting further developments. Manríquez Kemp expects the "20/20" target to be met, although effective government support will be important: "I would be seriously concerned for our future if these

"We need greater diversification in our energy mix, and reducing Chile's dependence on energy imports will, in the long-term, help stabilize electricity prices."

Mario Manríquez Kemp, ACERA

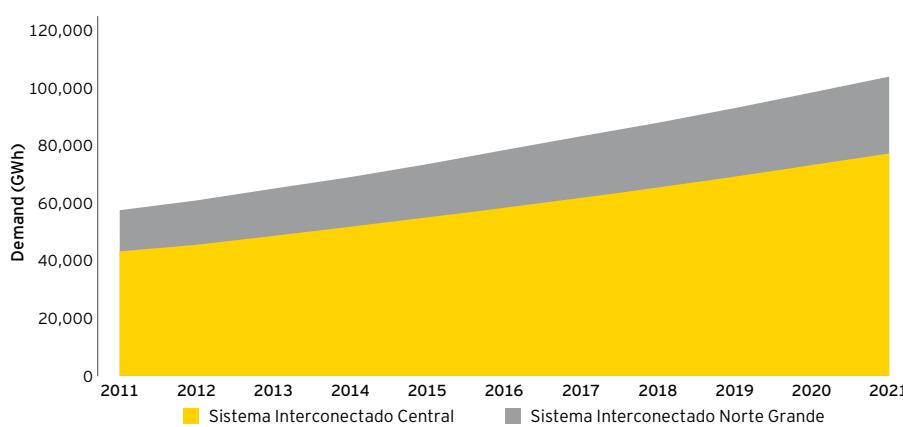
proposals are not legislated. We need greater diversification in our energy mix, and reducing Chile's dependence on energy imports will, in the long-term, help stabilize electricity prices."

Improving social awareness

To meet their objectives, authorities need to increase social awareness of the issues involved: "Citizens are largely unaware of what is at stake here: while expecting to switch on the TV in the evenings they oppose projects intended to increase energy generation," Manríquez Kemp comments.

Chile faces some very difficult challenges ahead in meeting its economy's thirst for power: "No doubt about it, this is definitely the way forward but we have yet to solve the problem," Manríquez Kemp concludes. For now, we must wait and see.

Figure 1. Forecast energy demand to 2021



Source: National Energy Commission and Energy Ministry



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Recent Federal Energy Regulatory Commission (FERC) reforms of system planning, cost allocation and rights to build have raised a storm of protest in the US transmission sector. But American Electric Power's (AEP) Lisa Barton says there's a silver lining. Report by **Craig Marshall**

Lisa M. Barton

Executive Vice President –
Transmission
AEP



Lisa Barton is responsible for transmission operations and new transmission business ventures. She also serves on the Board of Directors of Electric Transmission Texas (ETT), Electric Transmission America (ETA) and Transource Energy.

Silver lining

One of the biggest moves to hit the energy industry in years, FERC Order 1000, addresses basic reforms in transmission system planning and cost allocation. It also removes the federal Right of First Refusal that affords incumbent utilities the right to build certain types of transmission projects in their service territories. This is causing utility companies to re-examine their strategies for necessary grid expansion at a time when unprecedented levels of investment are required.

Order 1000 opens development and ownership of transmission lines to a variety of new players. Many power and utility companies are worried about what the creation of this new segment will mean for the industry, but one of the largest sees a brighter future ahead.

While some companies lobby state legislators for protection, Lisa Barton, Executive Vice President of Transmission at AEP, the nation's largest owner of transmission lines, argues that the change in FERC policy will lead to stronger electrical infrastructure. "The Order aims for more efficient planning of the transmission system, distribution of costs to customers in an equitable manner and creates a competitive process to award projects. This will improve our electric delivery infrastructure and benefit customers," she says.

Barton's support is perhaps surprising, given how well AEP has done under the old rules. She oversees nearly 39,000 miles of transmission lines, a system that serves about 10% of the electricity demand in the Eastern Interconnection (the interconnected transmission system that covers 38 eastern and central US states and eastern Canada), as well as 10% of ERCOT,¹ the Texas grid.

Mix of old and new

Barton foresees a mix of old and new players in this new segment. "Some market entrants may have participated in merchant transmission development, or may be completely new to transmission. You may also see financial players hiring engineering and construction firms to build projects they ultimately own," she says.

Some critics of Order 1000 fear a loss of collegiality between transmission line operators. The ability to pitch in after a storm creates outages in a neighboring territory,

for example, has always played a big role in helping the US system maintain service in emergencies.

It's an important concern, Barton agrees. "As an industry, one of our strengths has been the willingness of one company to help its neighbor. That will need to be maintained," she says. "We're an industry that has its foundations in a strong sense of stewardship."

She adds that executing the needed build-out will continue to require coordinated effort from industry, regulators, planning authorities, the environmental community and other stakeholders. "It's important that, at the Regional Transmission Organization level, we get this right."

New policies equate to progress

Barton argues the policy changes should help make US electrical infrastructure more robust because of the substantial need for transmission expansion to increase system reliability, improve market efficiencies, satisfy public policy requirements and facilitate the delivery of diverse energy resources to customers. "Of paramount importance to both FERC and AEP is ensuring that customer rates remain just and reasonable – and that needed expansion and investment take place," she says.

Ultimately, she says that protectionism is not a sustainable strategy and that utility companies must be forward-thinking and strategic in this new environment.

"AEP is supportive of the FERC's policy initiatives. We are taking the necessary steps to ensure that we are well positioned to maintain our leadership role in a competitive environment," she says.



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¹ The Electric Reliability Council of Texas.



▲ His Excellency Loay bin Ahmad Saad Al-Musallam, NWC

Water on the fast track

With its ambitious water and waste water infrastructure projects, Saudi Arabia is taking action today to avoid future water scarcity issues. Report by **Jo Rowbotham**



Along with the other countries in the Gulf, Saudi Arabia faces the challenge of deteriorating water resources at a time of population growth and increasing urbanization (more than 80% of Saudi Arabia's population lives in urban centers). The world's largest producer of desalinated water, Saudi Arabia is expected to improve its water and waste water coverage dramatically as the government and related agencies make the water sector a top priority.

State-owned National Water Company (NWC) was established four years ago to manage the country's water and waste water sector, and is initially focusing on the major cities of Riyadh, Jeddah, Mecca and Taif. The scale of expenditure required is conservatively estimated at US\$12.4b over five years for these major cities. Total investment is expected to reach US\$14b by 2020.

"It's an asset-intensive sector, and these are very complex, massive projects in terms of size, capacity and investment," explains His Excellency Loay bin Ahmad Saad Al-Musallam, CEO of NWC. "In cities like Jeddah, we have built the whole waste water system from scratch, including the main tunnels, the networks, the waste water collection system and the waste water treatment plants."

The organization is also moving at speed, to deliver benefits to the population as quickly as possible. In Riyadh, NWC is working on a large scale water project to augment the water supply for 2013-14, which will deliver 27 new facilities such as new wells, water treatment plants, water tanks and filling stations: "A project of this scale would typically be delivered in two years: we're doing it in six months," says His Excellency Al-Musallam.

“We are working in Riyadh on a large project that would typically be delivered within two years: we’re doing it in six months.”

His Excellency Loay bin Ahmad Saad Al-Musallam, NWC

His Excellency Loay bin Ahmad Saad Al-Musallam

CEO

National Water Company



His Excellency Loay bin Ahmad Saad Al-Musallam has been CEO of NWC since it was founded in 2008. Prior to this, he served as Deputy Minister of Planning & Development in the Ministry of Water & Electricity from 2004 to 2008, where he was Head of Privatization and Re-engineering of the Water Sector.

The right contractors to enable knowledge transfer

So what practical challenges has NWC met in delivering such complex infrastructure projects?

"The most critical challenge initially was finding the right contractors, particularly the Engineering Procurement and Construction contractors," says His Excellency Al-Musallam. "Since we were founded four years ago, we have worked hard to open the sector for international contractors with the expertise to deliver these projects on time and per expectations."

NWC uses a mix of approaches depending on the needs of the project, ranging from management contracts and Operations & Maintenance (O&M) for terms of three to five years, to Build Own Transfer (BOT) and Build Own Operate (BOO) which have terms of up to 30 years, to joint ventures.

"We need to balance what we do internally with what we outsource. Knowledge transfer is extremely important for any successful transformation and in order to build our internal capabilities. We make every effort to work with the best international experts in the market, and learn from them." To this end, NWC has also set up a National Water Polytechnic to serve as a regional training center and promote the highest level of international leading practices.



◀ Construction of NWC's wastewater system, Jeddah

A more sustainable approach to tariffs

"Our ultimate objective," says His Excellency Al-Musallam, "is to deliver water and waste water to all citizens."

Doing so will require a gradual shift to more cost-reflective tariffs. The price paid by water consumers in Saudi Arabia (about US\$0.25 average revenue yield per cubic meter of water) represents only 10% of the cost of water production (around US\$2.64 per cubic meter).¹ As a consequence, above average water consumption has limited cost implications for consumers.

"People are used to paying very low tariffs in the Gulf region. Changing this has many implications, both social and political, and will need to be approached very carefully. However, there is agreement that these tariffs need to be revised to encourage people to consume water wisely."

One idea may be to show the level of subsidy currently provided, a step other countries have taken to encourage conservation. "It is important to show the real cost of these services," says His Excellency Al-Musallam, "and part of educating the public to change perceptions about water use."

Future developments

Recycling waste water and the sale of treated sewage effluents (TSE) are expected to bring new revenue streams as well as environmental benefits. NWC has estimated that the total available/planned supply from the six largest cities is in excess of 4.8 million cubic meters per day.

"Prior to the establishment of NWC, waste water was treated up to the tertiary level, which was very expensive. But there was no clear plan on how to use the recycled water or how to manage it sustainably," says His Excellency Al-Musallam. NWC has now launched several initiatives to promote the sales of TSE and developed new ways of utilizing it, for example in cooling plants.

Plans are also underway to create a standalone water regulator. Responsibility for the sector currently resides with the Ministry of Water and Electricity. "This is important for the sustainability of the sector, and discussions are currently underway. We expect to see this development take shape very soon."

Global recognition

In April 2012, Saudi Arabia's NWC was recognized as one of the top public water agencies in the world, and shortlisted for Water Performance Initiative of the Year at the Global Water Awards in Rome. NWC's work in building a new wastewater system in Jeddah, and raising the city's water and waste water connections from 22% to 80%,² was instrumental in earning this international recognition.

This follows winning the Water Reuse Project of the Year award in 2011, for draining a 2.5 million square meter sewage lake in Alasla Valley, southeast of Jeddah. "We accomplished the draining of Misk Lake, which had been there for 17 years, ahead of schedule in just three months. We treated the whole area so it is free from contamination," says His Excellency Al-Musallam.

The company values the role of external benchmarking and strives to operate at the highest standards. "You must consider the best international practice," he says, "and how the latest technology is being used, in order to bring greater efficiencies and cost optimization to your business."



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1. "Frost & Sullivan: Depletion of Fresh Water Sources Prompts Investments in Water Infrastructure," *Islamic Finance News*, 18 September 2012.

2. "Contributing to Better Lives: Sustainability Report 2011", NWC.

Keeping



South Africa needs power and Eskom is on track to deliver, embarking on the biggest capital program seen by the power and utilities sector in decades. Report by

Norman Ndaba

Prish Govender

*General Manager
Project Development
Eskom*

In the past six years, Prish Govender has been involved in all project development activities associated with Eskom's new build and refurbishment program, encompassing coal, nuclear, gas, hydro and renewables, primary energy infrastructure and transmission. In his extended portfolio at Eskom, he is also accountable for capital efficiency, strategic capital monitoring, land development activities, and development and standardization of project planning and execution practices.

South Africa's electric power generation has not kept up with economic growth in the last 15 to 20 years. The widening gap between demand and supply culminated in shortages of power to such an extent that, in 2008, the country experienced massive blackouts. Since then both the South African Government and Eskom, the country's leading power utility, have embarked on a massive program to increase electric capacity, with the purpose of driving economic growth and creating a more equitable social framework.

Capacity to double

In 2005, the South African Government mandated Eskom – the country's state-owned utility and the largest electricity provider in Africa – to increase electricity capacity. The mandate started a huge capital program that includes new generation, transmission and distribution capabilities.

Eskom is currently building two new coal-fired power plants – Medupi and Kusile – and one pump water storage scheme – Ingula – which together will contribute around 11GW of the 17GW capacity being added to the grid (with 5,700MW already installed). This massive build program has already given South Africa an extra 4,300km of power lines, with another 2,000km in the works. Transmission capacity has been boosted to approximately 22,000 MVA with 8,000 MVA more under construction. Ultimately, Eskom will double its capacity to 80,000MW by 2026.

The budget for all of this stands at R385b (US\$44.4b) up to 2013, but is expected to top a trillion rand (US\$115b) by 2026. Funding is via government guarantees – Eskom does not have a standalone credit rating – with more than 80% of the money already secured.

the *lights on*

Complex challenges

Prish Govender, General Manager, Project Development for Eskom, is leading the program he describes as "exciting but challenging ... we need to continually assess risk and ensure robust mitigation strategies are in place."

Govender says the "huge footprint" of the program makes it inherently complex.

"One particular challenge is securing the required skills across the EPCM [engineering, procurement and construction management] value chain as well as the project management skills," he explains.

Govender says Eskom has also been challenged by delays in securing the environmental permits required when acquiring land. And while ensuring a regular and high-quality supply of coal has previously been an issue, he is confident this will not be a problem for Eskom's new plants.

"We are partnering with the mines to proactively manage the coal supply," he says.

"A project is a project is a project"

One of Eskom's biggest challenges is posed by the amount of time that has passed since it last tackled a project of this size: "Our last build program was in the late 80s, early 90s ... over the years, we have lost our skills, processes and systems," Govender explains.

Eskom is now rebuilding these processes, and standardizing and embedding them across the company. Govender says that, while projects may vary in scope, "a project is a project is a project."

Standardized processes are especially valuable when executing capital projects: "For us, and many utilities dealing with major projects, one of the biggest issues is the ability to prioritize and optimize capital. For Eskom, that's a particular challenge because we have so many different lines of business."

He says that Eskom, as a regulated utility, focuses on minimizing risk rather than maximizing return on investment.

"Delivery-focused" leadership

Is leading such a massive program daunting? Govender takes a no-nonsense approach, saying he believes in "delivery-focused" leadership that concentrates on output.

"I always say a true mark of a leader is their ability to deliver something People are recognized for what they deliver – good or bad," says Govender.

“When I talk about leadership, I talk about leading with the heart of a servant.”

Prish Govender, Eskom

He has a unique take on what he considers the true essence of good leadership: "I talk about leading with the heart of a servant. It's one of the behaviors we strongly encourage ... we make every effort to empower our people to produce what they need to produce. It is about training, development, mentoring and coaching and making sure that we create a sustainable organization."

On track to meet targets

Despite the challenges of such a complex program, Eskom is making good progress. "In June, we hit a major milestone for Medupi with our first boiler pressure test. We expect the first unit to be online by the end of 2013. The first unit of Kusile should be operational before the end of 2014.

"With Ingula, we are almost finished with all of the excavation works. We have experienced no major hiccups with our transmission projects and are on track to meet our targets," says Govender.

He says that the program is more than just business as usual for Eskom

and its team whom, he says, realize how important it is to "keep the lights on in South Africa."

"Our people understand the role Eskom plays in developing the economy and driving growth. And one of the factors that drives South Africa's growth is our ability to put these assets on the ground as quickly as possible."

“One of the factors that drives South Africa's growth is our ability to put these assets on the ground as quickly as possible.”

Prish Govender, Eskom

Govender says the program has had a transformative effect on Eskom, which is now a "large-scale EPCM organization with robust project management systems and methodologies."

The utility hopes to leverage on the opportunity, in South Africa and in greater southern Africa, to play a continuing role in the region's overall development. Govender says Eskom is eyeing nuclear and renewables technology.

Ultimately he says the current capital program means serious growth for the country through "a bigger localization percentage and a bigger job creation percentage The impact of Eskom on the economy of South Africa will grow."



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Quick reminder

Germany's energy transition

The Energiewende – the word literally means “energy transition” – is Germany’s plan to phase out nuclear power over the next decade, while expanding renewable energies and decarbonizing electricity.

Stephan Kohler, Chief Executive of the German Energy Agency (dena), explains why better energy efficiency is vital to Germany’s energy future.
Report by **Thomas Kästner**

EFFICIENCY DRIVE

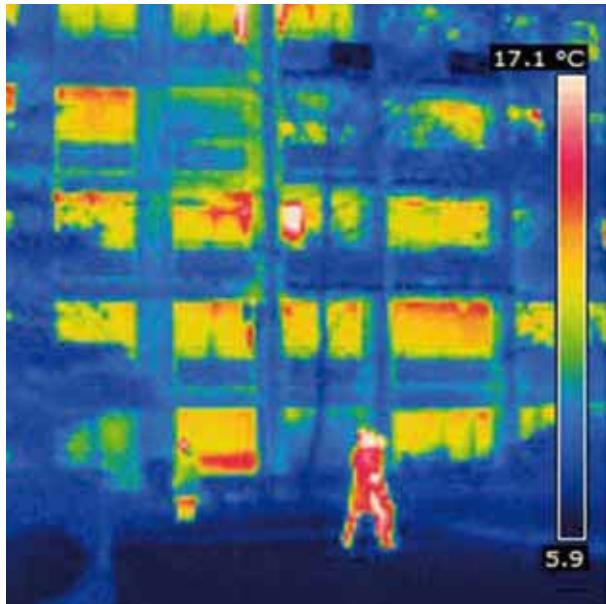
Germany has set tough new energy efficiency targets to support its overall plan to transition to a nuclear-free, low-carbon economy.

Stephan Kohler is tasked with developing new energy efficiency markets. We talked to him about the challenges Germany faces in encouraging consumers, and the energy economy as a whole, to embrace the idea of “comfort, not kilowatts.”

Q What do you think are the most important — or surprising — developments in Germany’s attitude to transition this year?

A We’ve been tracking attitudes through our Deutscher Energiewende-Index (DEX) since April 2012 (see *Tracking the mood*, page 37). Although there are continued concerns about security of supply and economic viability in the face of transition, the index reveals confidence has increased slightly in the last quarter, probably due to the “Altmaier effect”: under the new Federal Minister for the Environment, Peter Altmaier, the economy is a little more confident that the challenges can be mastered.

Right from the start, the index has clearly shown that more needs to happen to create the basic conditions for the new energy concept. The expansion of renewable energies needs to be better synchronized with the expansion of the electricity system. And we have to redesign the electricity market to make it worthwhile investing in new power plants, transmission lines and storage facilities.



Stephan Kohler

Chief Executive, dena
German Energy Agency



Stephan Kohler is driving the initiative to develop energy efficiency markets in cooperation with politicians, businesses and consumer groups. Kohler's 33-year career in energy spans the nuclear sector, a range of energy advisory bodies, environmental information and research. He was appointed Managing Director of dena in September 2000 and has been Chief Executive since May 2006.

Q How can efficiency contribute to energy transition and stabilize price development — and when can we expect to see results?

A Energy efficiency is available right now. The technology and expertise already exist. That makes it all the more frustrating that we're lagging behind. Investment is being hampered by the protracted dispute about tax relief on building modernization for greater energy efficiency. And a lot more needs to be done to reduce electricity consumption. The success of transition will be decided not just by the construction of new electricity lines, gas-fired power plants, storage facilities and offshore wind farms, but also by the use of energy efficiency in domestic heating systems, electrical appliances, cars, data centers and production facilities.

Q What's the scale of potential energy savings for consumers?

A In many cases, efficiency pays off after just a few years. Private households, commercial operations and industrial companies can cut electricity costs by up to 20% or 30%. This means consumers can offset the electricity price increases we are expecting by 2020. When it comes to heating buildings, energy savings of as much as 80% are economically feasible. Every euro invested in energy efficiency contributes to sustainable value added – benefiting regional engineering and trade services, and quality products from German companies.

Q Germany already has the largest — and one of the most developed — markets for energy services in Europe.¹ What additional regulatory and policy efforts do we need to increase energy efficiency?

A To strengthen the energy efficiency market, we need a coordinated mix of funding programs, regulatory frameworks and market instruments. Modernizing buildings for energy efficiency should be promoted by significantly increasing funding through the existing KfW program² and tax relief to up to €5b (US\$6.37b) annually. We also need to create new programs to subsidize highly efficient household appliances and the use of energy-efficient cross-industry technologies, and to tap into the considerable potential for increasing the energy efficiency of street lighting and public procurement.

1. According to Germany's 2nd National Energy Efficiency Action Plan (NEEAP): <http://www.bmwi.de/English/Navigation/Service/publications,did=476674.html>.

2. The KfW program provides funding to improve energy efficiency in buildings.

€33b

Will Germany hit its efficiency targets?

If Germany's official energy efficiency targets are achieved, the country could reduce its energy costs by up to €33b (US\$42b) in 2020, according to calculations by dena.³

Achieving a substantial increase in efficiency is vital, to balance supply and cushion the pricing impacts of changing the generation mix. But how far will the country go?

dena recently released energy saving predictions based on two scenarios: a conservative scenario based on the current regulatory framework and trends and an ambitious "energy turnaround" scenario. The agency calculated the change in energy consumption and costs up to 2020, compared to 2008:

- ▶ In the conservative scenario, Germany could save around €18b (US\$23b) in 2020 – reflecting a 7% reduction in energy consumption.
- ▶ The "energy turnaround" scenario predicts €33b (US\$42b) savings – 13% of total energy consumption – provided the regulatory framework significantly improves and private investment in energy efficiency measures rises.

The new EU Energy Efficiency Directive, introduced in September 2012, will increase pressure on all Member States including Germany. The new EU indicative targets aim for a 15% total energy saving by 2020 – still far short of the 20% goal envisaged in 2007.⁴

Q What other barriers stand in the way of making greater progress?

A The new energy concept is a project for society as a whole. Politicians have to define the goals and create the basic conditions, but we're all responsible for putting the associated measures into practice: industry and businesses, because they have the necessary expertise, but also each and every energy consumer. The market now has a large number of innovative solutions and service providers covering many tasks. dena makes successful projects visible – for example, through the Good Practice in Energy Efficiency label, the annual Energy Efficiency Award and the Efficient House quality seal. Publicizing projects of this kind promotes the transfer of knowledge and experience, and provides role models.

Q What are the key incentives for consumers to implement energy efficiency measures, and what factors stand in the way of investment?

A Ultimately, it's all about a radical change of mindset. The focus has to be on customer requirements rather than supplying electricity or fuels. What is needed are made-to-measure services, provided in ideal technological, economic and ecological terms. If the aim of energy supply is not to deliver heating oil, but to provide pleasant indoor temperatures, providers will organize this as efficiently as possible, because it's in their best interest to do so. We have to create functioning markets that support this. If energy efficiency is to gain widespread acceptance, it has to be a convincing product. This calls for transparency with regard to the energy costs of houses, cars, computers or production systems. And it requires everyone – manufacturers, dealers, tradespeople and energy suppliers – to understand the competitive advantage of offering what customers really want: comfort, not kilowatts.

Q How can power and utility companies increase the uptake of energy efficiency? What support do you think they will need, and from where?

A On the supplier side, in addition to expanding renewable energies, the main thing will be to build efficient 10,000MW to 12,000MW fossil-fueled power plants between now and 2020. But it is currently difficult to get public support for new power plant construction projects. What's more, the economic conditions are not right. Because the increase in energy from wind and solar power plants is being fed into the grid, fossil fuel power stations will operate for ever-shorter periods in the future. If new gas- and coal-fired power plants are to be economically viable, we have to think about a European capacity market. On the consumer side, energy suppliers can develop new markets with efficiency services. In this way, they will contribute to maintaining customer purchasing power, increasing customer satisfaction and achieving political goals as regards climate protection.

3. "Energy efficiency – Germany can do better." dena website, www.dena.de/index.php?id=5689&L=1&no_cache=1, 18 September 2012.

4. "Parliament gives final green light to energy efficiency directive," EurActiv.com, <http://www.euractiv.com/energy-efficiency/european-parliament-gives-final-news-514732>, 12 September 2012.

Q Do you see these areas for action as an opportunity for energy suppliers or for third-party energy services companies?

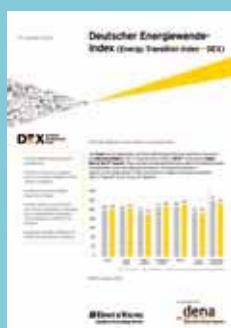
A Energy efficiency and further development of the energy system as part of the transition are future areas for action for energy suppliers and energy service companies. The latest DEX figures continue to show that energy suppliers have clearly recognized energy efficiency as an opportunity for developing new business segments and growth. Suppliers that prove themselves here will also create good international market opportunities for themselves. Other countries are following developments in Germany with great interest and high hopes: dena sees this very clearly in its collaborations with Russia and China. Germany will set standards, the implications of which we can hardly imagine today. We need to be aware of the opportunity and responsibility in our hands.

Tracking the mood

Germany's energy sector remains concerned about profitability and security of supply, and views energy efficiency as a decisive factor in successfully transitioning to renewable energy.

According to the September 2012 issue of the Deutscher Energiewende-Index (DEX), a quarterly survey by dena and Ernst & Young, there is widespread belief across the energy sector that energy efficiency represents a significant competitive advantage for Germany. Investors, manufacturers, suppliers and energy consumers believe it will pay off economically. Power companies and grid operators are focusing more heavily on using energy efficiency to open up new areas of business. Meanwhile, in the past three months:

- ▶ Views on renewable energy have improved slightly.
- ▶ The majority of companies surveyed now view the effects of energy transition on Germany's economy, their production costs and the competitiveness of products less critically than three months ago – but still very negatively.
- ▶ However, the sector views its future competitive position much more positively than three months ago.
- ▶ Security of supply is still extremely important. Although currently still rated positively, many companies fear the situation could deteriorate over the next 12 months.



The DEX tracks the overall mood of companies, consumers, investors and political bodies affected by energy transition in Germany. For more information contact:

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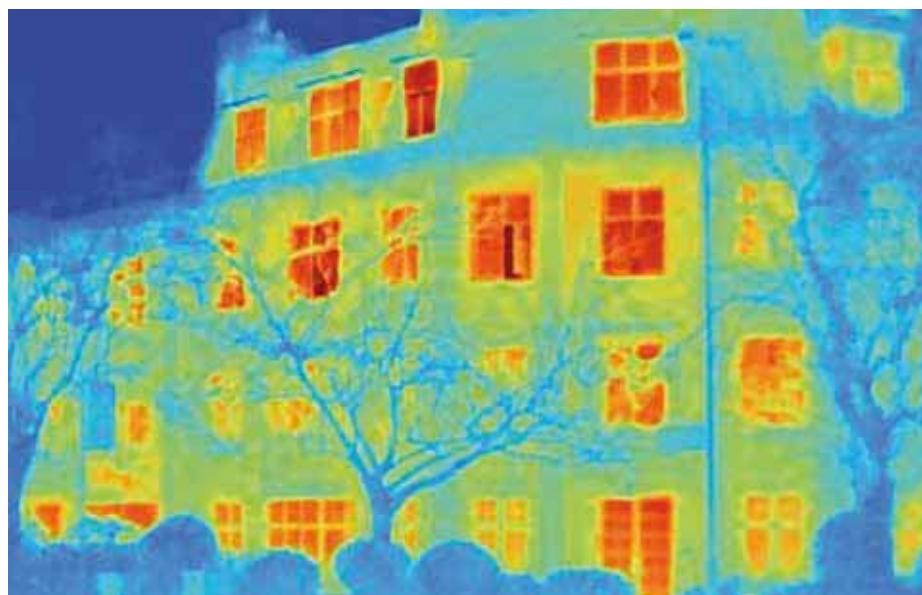


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Reality check for *emissions*

Stefan Dohler

*Senior Vice President
Head of Asset Optimisation
and Trading*
Vattenfall



Stefan Dohler joined Vattenfall in 1998 and held senior management positions in the transmission and distribution activities of the business. He was appointed Vice President of Finance for the Production division in 2010 and accepted his current role this year. Dohler is a member of Vattenfall's Executive Group Management (EGM).

Has the economic crisis permanently dampened the EU Emissions Trading Scheme or is failure not an option? Report by **Frank Bühring**

Introduced in 2005, the EU Emissions Trading Scheme (EU ETS) was heralded as an economically efficient means of reducing greenhouse gas emissions using a "polluter pays" principle. A market was created in trading carbon allowances between low and heavy polluters, with an ever-decreasing ceiling on the level of emissions that installations emit. It was intended to drive innovation in clean technologies as polluters sought to reduce the cost of emissions, lessening the impact of climate change.

It worked well for the first couple of years, with the price of allowances fluctuating with

demand and supply. Then the economic crisis took hold. With economic output significantly reduced, industrial emissions fell naturally. Since the beginning of Phase 2 of the EU ETS (2008 to 2012), the spot price per allowance has slumped from around €20 to €30 (US\$25.47 to US\$38.21) per ton of carbon dioxide emitted to around €6 to €8 (US\$7.64 to US\$10.19) per ton.¹

The carbon market has stalled. Now questions are being asked: Is the carbon price too low to incentivize low-carbon investment? Is intervention needed by way of price-fixing?

1. Oliver Sartor, "The EU ETS carbon price: To intervene, or not to intervene?," Climate Brief, No. 12, 02-12.

Emission targets made easy

The third phase of the EU ETS scheme, from 2013 to 2020, is about to begin. However, when 2020 emission targets were set by the EU, economic expectations were much higher, which would have driven industrial activity and created demand for allowances.

At Swedish state-owned energy group Vattenfall, Stefan Dohler, Head of Asset Optimisation and Trading, comments that target setting does not reflect today's macroeconomic reality.

"Essentially, the mechanics of ETS work well," says Dohler. "It is both intended by ETS, and desirable from a macroeconomic point of view, that carbon prices are low in times of economic crisis, while in boom times there is a growing scarcity of CO₂ allowances. Low-priced allowances are not a failing of the scheme; rather, 2020 emission targets are now too easy to reach due to the fall-off in economic output."

With polluters able to buy surplus allowances at today's prices and bank them for future use, the stimulus to invest in non-polluting technologies is significantly reduced. "Reduction targets for 2020 are based on old economics," he explains. "The target path towards 2050 needs to be recalibrated as it is not linked to today's reality."

Not even a rapid return to reasonable economic growth would, in Dohler's opinion, kick-start a shift in the price of carbon allowances. "Competing mechanisms, like renewables, are pushing low-carbon emitting generation into the market. This has the effect of cutting emissions while reducing both demand for allowances and pricing."

Carbon price dictates decision-making

Carbon allowances act like any other commodity that is fundamental to running a business. "At Vattenfall, an increase or

fall in the price of carbon influences the sequence in which we operate our asset portfolio to secure the most profitable return. This day-to-day monitoring is designed to optimize short-term economic performance," says Dohler.

Dohler is convinced that EU ETS is the right mechanism for the market and, over time, will fulfill its original brief of accelerating innovation in carbon-reducing technologies. The price of carbon sways long-term investment decisions for utilities. "Put it this way, few people are

“The mechanics of ETS work well. ... low-priced allowances are not a failing of the scheme; rather, 2020 emission targets are now too easy to reach due to the fall-off in economic output.”

Stefan Dohler, Vattenfall

going to base capital expenditure decisions on the low price of carbon today. They are not likely to look ahead 20 or 30 years and opt for coal-based generation technologies because they think the price of carbon will remain at current levels," he says.

Tax or stimulus?

With the market flooded with allowances right now, the EU is considering delaying the auction of permits in the market from 2013. While this intervention would help to artificially stimulate demand and push up prices, Dohler claims it is not enough. He says there needs to be a complete and permanent withdrawal of allowances from Phase 3 of the scheme to restore robustness, rather than simply shifting them further down the timeline: "By shortening availability, you restore a better balance between supply and demand and set a carbon price signal going forward. Only then can you recalibrate the path towards 2050 emissions targets relative to the current scenario."

The alternative is for the EU to scrap the scheme completely and to move toward a system of taxation, though this

A global market in carbon

The EU ETS is currently the largest carbon trading scheme in the world. Its vision is to develop an international carbon market by linking compatible domestic systems. This will cap emissions at a global rather than a national level. In effect, this will create a trading system that really is too big to fail.

Linking national emissions trading systems will:

- ▶ Enable participants to offset allowances with other territories
- ▶ Cut the cost of carbon pollution
- ▶ Stabilize the carbon price signal
- ▶ Enable better global coordination of climate change activities

The Australian Government was the first to sign up. It has agreed to integrate its carbon emission market with EU ETS beginning in 2015. With the Australian system short on allowances right now, and EU ETS over supplied, the merger should help to rebalance prices.

It will begin with a one-way flow, allowing Australian polluters to use EU credits to meet up to 50% of their annual liabilities. Starting in 2018, European entities will be able to buy Australian allowances.

**Table 1. Emissions trading schemes around the world**

Scheme/proposed scheme	Countries/regions of operation	Start date	Proposed start date	Trading instrument
Kyoto Protocol: Clean development mechanism	Across 37 countries	2005		Certified Emission Reductions (CERs)
EU Emissions Trading Scheme	EU ²	2005		European Union Allowances (EUAs)
Switzerland Emissions Trading Scheme	Switzerland	2008		Swiss Units (CHU)
The New Zealand Emission Trading Scheme	New Zealand	2008		New Zealand Units (NZUs)
Regional Greenhouse Gas Initiative – RGGI	US (North-East)	2009		Regional greenhouse gas emissions (RGGI)
Tokyo Metropolitan Trading Scheme	Japan	2010		
Australia Carbon Pricing Mechanism	Australia	2012		
Californian emissions trading scheme	US – California		2013	
Pilot carbon trading schemes	China: in seven provinces and cities – Beijing, Chongqing, Guangdong, Hunan, Shanghai, Shenzhen and Tianjin		2013	
RIO ETS (2013-15)	Brazil		2013	
Western Climate Initiative	US, Canada (California, Quebec)		2013	
South Korea emissions trading scheme	South Korea		2015	
Mandatory energy efficiency trading scheme	India		2014	
Voluntary emissions market	Thailand		2014	
National scheme	Vietnam		2018	
ETS with World Bank Partnership for Market Readiness (PMR) support	Chile		None indicated	
ETS with World Bank Partnership for Market Readiness (PMR) support	Costa Rica		None indicated	
Mexican voluntary CO ₂ emissions trading scheme	Mexico		None indicated	
Taiwan Carbon Offset scheme	Taiwan		None indicated	

Source: Ernst & Young analysis.

2. In 2007, non-EU members Iceland, Norway and Liechtenstein joined the EU ETS.

was never the intended purpose of ETS. Dohler has reservations. Rather than being based on energy policy, he fears that emissions targets will end up with underlying political, electioneering or national fiscal motivations.

He believes a tax would introduce greater uncertainty, while schemes such as Germany's renewable energy regime – which he describes as a good kick-start for the expansion of renewables but backfiring in terms of costs for consumers and market distortion – could destabilize the entire energy market. That said, he does not rule out the co-existence of ETS with a market-based renewable energy scheme, but explains that the mechanisms need to be perfectly aligned otherwise they will collide.

The EU needs to act quickly, says Dohler: "A one-off intervention in pricing is preferable to changing the entire set-up of a system that is fundamentally sound. The EU needs to stand by ETS as the tool of the future. It may push up costs to the end-consumer as carbon prices rise, but to me, backing ETS is a cheaper and better option than discrediting the entire ETS mechanism."

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TEPCO's *roadmap to recovery*



▲ Zengo Aizawa, TEPCO

More than a year and a half after the Fukushima Daiichi nuclear accident, we talked with Tokyo Electric Power Company (TEPCO) about progress to decommission the stricken plant – and the company's views on the future of nuclear energy in Japan. Report by **Ryuzo Shiraha**

Figure 1: The decommissioning roadmap



**Cost to complete the recovery roadmap:
¥500b**

**Total cost of decommissioning Fukushima Daiichi:
¥900b**

Zengo Aizawa

*Executive Vice-President and Chief Nuclear Officer
TEPCO*



Zengo Aizawa joined the Tokyo Electric Power Company (TEPCO) in 1975 and held a variety of executive and management roles before his appointment as Executive Vice-President and Chief Nuclear Officer in June 2011.

The events of March 2011, when a tsunami caused catastrophic damage to Japan's Fukushima Daiichi nuclear power station, are well known. But while the immediate repercussions of the disaster are etched in the world's collective memory, Fukushima Daiichi's operator TEPCO focused on moving quickly to address both the short-term and long-term effects of the accident.

First priority is to stabilize
In December 2011, TEPCO and the Japanese Government – which, in July 2012, took control of the utility as part of a ¥1 trillion (US\$12.5b) bailout – released a jointly constructed three-phase roadmap (see Figure 1) detailing their plans to ensure its long-term safety.

Speaking to us from his Tokyo office, TEPCO's Executive Vice-President and Chief Nuclear Officer, Zengo Aizawa, took us through the roadmap's progress to date.

"Understandably, the roadmap's most pressing aim was to bring the situation under control as quickly as possible," Aizawa explains.

"Radiation dose is in steady decline" was achieved in July 2011 and in the following December 'Release of radioactive materials is under control and radiation doses are being significantly held down' was announced," says Aizawa.

The achievement of the stabilization marked a shift in the program, with efforts turning to ensuring the long-

term safety of the plant. As part of this process, TEPCO took steps to remove nuclear fuel stored in the plant's spent fuel pools, and to remove fuel debris from the reactor pressure vessels (RPVs) and the primary containment vessels (PCVs).

The roadmap defined its Phase 1 as a period "to start fuel removal from the spent fuel pool within two years after December 2011." Commencing the fuel removal would require extensive preparation including major research and development (R&D) activities and an on-site investigation that leveraged results. Phase 2 was defined as a period to carry out "fuel debris removal within 10 years of December 2011," and the subsequent period up to the completion of decommissioning work was defined as Phase 3.

Lessons from Three Mile Island

Aizawa, who is leading the roadmap process, told us that its most significant aspect is Phase 2 and the start of fuel debris removal. This phase will be complex, challenging and drawn out; works are expected to be completed in 2021. Major R&D efforts will be required to support the process and restore the PCVs.

"We plan to adopt robotics and remote technology for decontamination work."

Zengo Aizawa, TEPCO

Aizawa says these works' numerous technical challenges mean "we must progress step by step, taking careful consideration of local issues, R&D results and safety requirements."

He says "consideration and judgment" will be part of every sign-off point, ensuring adequate consultation and constant review throughout the process: "The critical judgment point for removal of fuel debris will be stopping interbuilding water leakage from the reactor turbine building and repairing the lower part of the PCVs."

He explains that TEPCO may apply a technique based on one used after the 1979 Three Mile Island disaster in New York.

"We believe that removing under water, where radiation is shielded effectively, may be the most reliable solution at the present moment. Although at Three Mile Island they were able to successfully fill up RPVs with water, the situation for Fukushima Daiichi Nuclear Power Units 1-3 seems to be different," he explains.

"For these units, the cooling water, which was previously infused into reactor cores, is leaking out from the RPVs, suggesting that the establishment of barriers necessary to fill up with water would be critical to realize the removal of fuel debris."

Working with government and industry

Aizawa says that while TEPCO is leading the decommissioning process, it is collaborating with other government bodies and a range of technical experts throughout.

"The Agency of Natural Resources and Energy (ANRE) will play a role in budgetary provision regarding the R&D we are doing, as well as playing a part in project management.

"As well, the ANRE will provide us with appropriate guidelines and supervise our commitments," explains Aizawa.

TEPCO is also working closely with Japan's Nuclear Regulatory Agency,

which will be responsible for making any necessary adjustments to the regulation framework behind the mid- and long-term roadmap, and for ensuring that the restoration is carried out in a safe manner.

Together with the Japanese Government, TEPCO has established a research institute – Research and Development Headquarters – which will contribute to the roadmap's R&D activities. Institute members include Japan Atomic Energy Agency (JAEA), Hitachi Ltd./Hitachi-GE Nuclear Energy Ltd. and Toshiba.

Robotics and remote technology

To ensure a successful decommissioning process, TEPCO is proactively working with a team of experts and drawing on the most advanced applicable technologies from around the world.

Technology may be particularly useful in dealing with some of the more challenging aspects of the removal process, including the high x-ray emission and extremely limited space inside Fukushima Daiichi's units.

"It may be necessary to use remote technology to carry out this work," says Aizawa.

"Specifically, we plan to adopt robotics and remote technology for decontamination work, investigation of leaking parts and fuel debris inside reactor turbine buildings, PCVs, RPVs, repair of leakage parts and the fuel debris removal processes."

"Strong but rapid" nuclear reform

Aizawa says that while TEPCO feels "deep remorse" for the Fukushima Daiichi disaster, the utility has learned lessons from the accident.

"Under our newly established administration, we are committed to using the world's highest standards of safety and technology to drive forward our nuclear reform strongly but rapidly," he says.

“Generally speaking, nuclear energy will continue to be an important source of electricity.”

Zengo Aizawa, TEPCO

Aizawa points out that, considering the 4% self-sufficiency ratio of Japan's energy, TEPCO "assumes that nuclear energy will continue to be an important source of electricity, as we take into account the need for a stable energy supply, rising national debt caused by increased fossil fuel costs and the issue of global warming."

"In addition, when you consider the high technology level required in the reactor decommissioning process, we would propose that a certain threshold of nuclear energy needs to be maintained, partly to maintain these high levels of human resources."

Whatever the future holds for the Japanese nuclear sector, TEPCO is confident that the lessons learned from Fukushima Daiichi mean it is ready to play its part.



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Power packed

Erramon Aboitiz

Chief Executive Officer
AboitizPower

Based in Cebu City, the Philippines, Erramon Aboitiz is CEO of AboitizPower (since 1998) and Aboitiz Equity Ventures (since 2009). He is only the sixth CEO of AboitizGroup, succeeding his cousin, Jon Aboitiz, to head a family business run by what Aboitiz describes as "a consortium of cousins." He joined the company in 1978, initially taking on roles in treasury and finance.

The electricity business in the Philippines is not for the fainthearted. Elimination of government subsidies and the geographical challenges of an archipelago nation have made power expensive and difficult to deliver.

This makes the success of AboitizPower particularly impressive. Cebu City-based AboitizPower is the holding company for AboitizGroup's investments across the power value chain. It is run by CEO Erramon Aboitiz, who strongly believes in balancing tradition with progress.



AboitizPower, the power producing arm of a long established business, is breaking new ground in a rapidly changing market. CEO Erramon Aboitiz – winner of Ernst & Young Entrepreneur Of The Year® (Philippines) – believes utilities should make a real difference to their sector and the future of their country. Report by **Ben van Gils**

Government sell-off drove growth

AboitizGroup has an impressive past – it was established by Paulino Aboitiz around the middle of the 19th century – but AboitizPower has experienced transformational growth in just the last five years or so. Key to its remarkable expansion – in August 2012, AboitizPower shares traded at US\$0.84, up from US\$0.10 when listed in 2007 – was an ambitious, meticulously planned buyout of previously government-owned assets.

AboitizPower made its first acquisition – a small 4MW plant – in 2004, but Erramon Aboitiz, who has been at the helm since 1998, says the business really started to take off between 2007 and 2010: “The privatization of assets by the National Power Corporation was a once-in-a-lifetime opportunity; it was something we did not want to miss out on,” he says.

“Entrepreneurship is not about blind optimism; it is about being innovative and trying something new while ... managing and balancing the associated risks.”

Erramon Aboitiz, AboitizPower

It was also a time of uncertainty, as many were unsure whether the government would follow through on its program and dispose of all of its power sector assets. “If they didn’t, it would mean we would be competing with government,” Aboitiz points out. Aboitiz acknowledges that there was “no question” of the risks involved in the process, particularly considering the Philippines had no spot market at the time.

“Financing our acquisitions was seen as a huge challenge, and uncertain,” he admits. “It was not easy convincing our Board initially; but they saw the potential and gave their approval as long as certain conditions were met.

“We knew we had to build our war chest to bankroll our ambitious plans. This was a big reason behind our public listing in July 2007. We wanted to raise the funds ahead of our acquisitions. Throughout our IPO road show, investors thought this was unusual. They’d say, ‘You have a strong balance sheet, why do you need to raise the capital now? You should be leveraging your balance sheet.’

“We explained that we preferred to take a conservative approach: raise the capital first and leverage after, when things looked clearer. In emerging markets like ours, the windows to raise capital are often narrow and fragile. We wanted to eliminate that risk and do it ahead of time.”

Commitment to sustainability

AboitizPower's acquisitions boosted its balance sheet and have in turn brought more affordable and reliable electricity to the Philippines. These two achievements were, says Aboitiz, the aims behind the government's privatization plans and are integral to what he says are the company's guiding principles:

- ▶ Provide a reliable and ample power supply when needed.
- ▶ Ensure that the supply of electricity is provided at a reasonable and competitive price.
- ▶ Accomplish these with the least adverse effect on the environment and communities.

"This vision guides everything we do," Aboitiz explains. "All three are important. Achieving just one or two is not sustainable in the long term. We are in a business that always faces environmental challenges and therefore sustaining our environment has to be part of our business model. It also means a lot to me."

Aboitiz's commitment to sustainable power is reflected in a power-generation portfolio that includes a 40% stake in renewables, with several hydroelectric and geothermal assets as well as some fossil-fired power plants located across the Philippines. The company has also pioneered Cleanergy, its own brand of clean and renewable energy (see *Cleanergy* box opposite).

What do customers really want?

While his dream is for Filipino households to be powered by Cleanergy, Aboitiz hopes to make the country's industry more sustainable as well. He is excited to offer companies the chance to purchase a percentage of their power as Cleanergy, and achieve their own corporate responsibility goals.

According to Aboitiz, "It is all part of our mindset of finding better solutions for our customers, whether through increased reliability or meeting goals around renewable energy."

Aboitiz says his team is always thinking: "What do customers really want?" and adjusting the business to suit that thinking. It's this spirit of innovation that saw Aboitiz awarded Ernst & Young Entrepreneur Of The Year® (Philippines) 2011. When asked about the need to balance risk and entrepreneurship, he remarks the two "go hand in hand."

"To me, entrepreneurship means taking risks and doing things that have perhaps not been tested or are in the early stages. You have to be very good at managing that risk, ensuring it's something you can take on. You must consider what could go wrong and what you would do if it did. Entrepreneurship is not about blind optimism; it is about being innovative and trying something new while at the same time managing and balancing the associated risks."

Domestic focus for now

AboitizPower has close to 2,000MW of new projects that it is involved in on the drawing board, including the 250MW expansion of run-of-the-river hydro and a pumped storage facility. The company is also exploring the use of liquid biomethane from rubbish dumps to power selected transportation vehicles.

For now, says Aboitiz, the company is content to stay within Filipino borders: "We have our hands full with projects for the medium term. We have seen power consumption in the Philippines grow by 7% in kilowatt hour terms. The growth has come from all sectors – residential, commercial and industrial. The domestic economy is doing quite well and we are confident that electricity demand will continue to grow with the economy."

The launch of Open Access on 26 December 2012 (see *Cleanergy* box opposite) is now expected to be one of the biggest developments in the country's electricity market for years and Aboitiz is especially looking forward to it.

"We have long considered this the 'holy grail' for the deregulation of the electricity market in the Philippines," says Aboitiz "It will bring down the barriers needed to increase competition and drive down prices."

Aboitiz admits the change will bring challenges, but he and his team are looking forward to tackling them: "We know we need to focus on our customers' needs, both from a distribution and a generation perspective.

"The prevailing mindset of our team is to keep finding better solutions for customers. It's something we take very seriously. For example, our Aboitiz Energy Solutions team helps customers become more efficient electricity users and bring down their bills. It sounds counterintuitive for someone selling power, but we think this will not only build customer intimacy but also make their businesses more competitive and help them grow. We realize we cannot grow alone and are interdependent with our customers," says Aboitiz.

What is Cleanergy?

“The future of our children is our choice, not our fate.”

Erramon Aboitiz, AboitizPower

Erramon Aboitiz believes passionately that power companies can – and should – make a difference to the environment of the countries they operate in. Cleanergy is helping AboitizPower fulfil this commitment. This brand of clean and renewable electricity, powered by the company’s hydro and geothermal generation assets, gives customers the option to reduce their carbon footprint.

While he admits that Cleanergy’s higher cost has slowed its take-up in difficult economic times, Aboitiz is confident it will become more popular, especially after the launch of Open Access on 26 December 2012, when long-awaited government changes mean Filipino users will be able to choose their own energy providers.

“Cleanergy is slowly gaining traction. Our efforts are currently focused on education and building awareness so that when the power of choice is handed to the consumer, those that truly care about sustainability will make the switch to Cleanergy.

“Our vision is to make Cleanergy available to every Filipino.”

Workforce will move with the company

The continuing growth of Aboitiz is behind their headquarters’ planned relocation from Cebu City to Manila in 2013. It’s a mark of the company’s success in maintaining a family feel that much of its workforce is making the move too.

“We have a high level of loyalty and commitment among our team members,” says Aboitiz. “People in the Philippines are less mobile than those in more developed countries, so to have more than 80% willing to move with the company is very gratifying to me.”

Aboitiz says the future is challenging but very exciting: “We are very pleased with our growth in the past. We are, however, looking forward to continuing this trajectory by bringing in power to support the economy’s energy demands and making our country more competitive by reducing the cost of power. This is our ultimate goal.”

“**Making our country more competitive by reducing the cost of power ... is our ultimate goal.**”

Erramon Aboitiz, AboitizPower



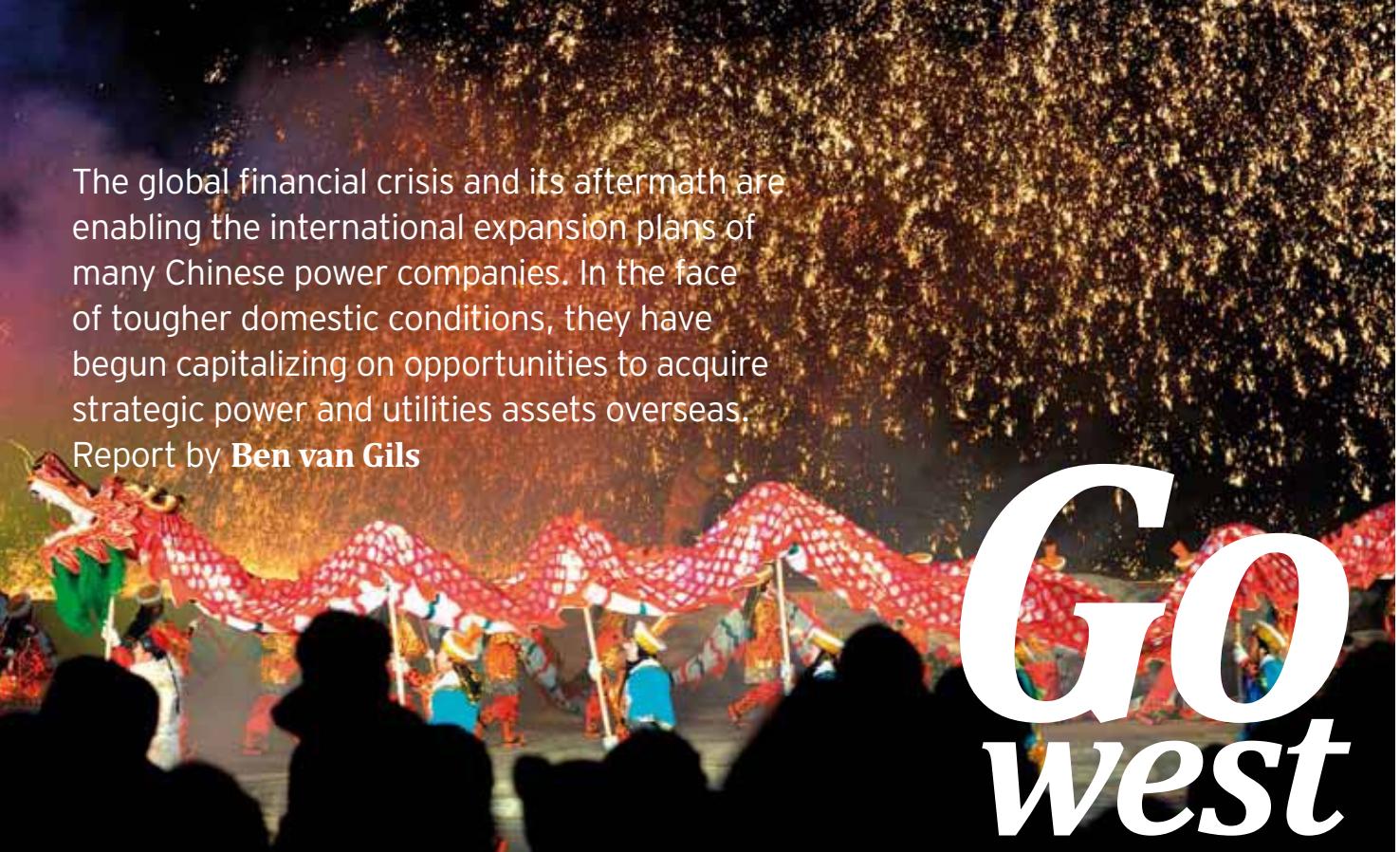
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The global financial crisis and its aftermath are enabling the international expansion plans of many Chinese power companies. In the face of tougher domestic conditions, they have begun capitalizing on opportunities to acquire strategic power and utilities assets overseas.

Report by **Ben van Gils**

Go west

Liang (Jeffery) Sun

Executive Director

GoldWind International Holdings Ltd



As Executive Director of the international business arm of Xinjiang GoldWind Science & Technology Co., Sun mainly engages in GoldWind's overseas investment, including developing overseas business strategies, organizing overseas financing and investment activities, and executing and managing overseas projects. Prior to this role, he served as Vice President and CFO of Xinjiang GoldWind and successfully led the company's 2010 IPO on the Hong Kong Stock Exchange on 8 October 2010.

Tough domestic market

China's power market is highly competitive and conditions today remain challenging. In January 2012, the country's five largest power companies¹ reported a combined deficit in respect of thermal generation of RMB2.8b (US\$445m).² This continues the sector's heavy losses since 2008 and can be largely attributed to rising input prices and strict government-imposed electricity price controls.

The country's renewable energy sector is also becoming less attractive, according to Liang (Jeffrey) Sun. Sun is Executive Director at GoldWind International Holdings Ltd., one of China's leading wind turbine manufacturers. "With the economy slowing, China is focusing more on integrating existing capacity and therefore does not encourage the development of new wind power plants. It is becoming more difficult for us to obtain connection permits," Sun explains.

In search of returns overseas

With fewer domestic opportunities available, Chinese power and utilities companies have been investigating assets elsewhere around the world.

Acquisitions by China Huaneng Group, one of China's top five state-owned electricity generators, highlight this trend. In 2008, the Group acquired leading Singaporean power

producer, Tuas Power, for US\$3.1b. This was followed in 2011 by the US\$1.2b purchase of a 50% stake in US-based InterGen NV, which operates 11 power plants in the UK, Netherlands, Mexico, Australia and the Philippines.

China Huaneng General Manager, Mr Peixi Cao, has been quoted as saying that going global is a necessity for Chinese power companies, "especially to access certain developed countries where electricity prices are determined by the market and companies are usually profitable. ...[In this way] our domestic burdens can be alleviated."

This trend encompasses the renewables sector too. Since 2011, GoldWind has acquired two US wind farms, Shady Oaks and Musselshell, for US\$200m and US\$100m, respectively.

Tax breaks have been one of the influencing factors here. Sun explains: "Despite its modest electricity price, we have been mainly focused on the US due to its preferential policies including cash grants and investment tax credits (ITC). We enjoy good cash flows and profit margins due to the substantial tax benefits available."

Profiting from renewables

With thermal power companies posting heavy losses, the profitability of China's biggest power and utilities companies is increasingly underpinned by their non-power and clean energy operations.³

1. China Huaneng Group, China Huadian Corporation, China Guodian Corporation, China Datang Corporation and China Power Investment Corporation.
2. "Operational Performance of State-Owned Big Five Power Companies in 2011 and January 2012," Ministry of Finance of the People's Republic of China, April 2012, http://qys.mof.gov.cn/zhengwuxinxi/qiyeyunxingdongtai/201203/t20120319_635947.html accessed 12 September 2012.
3. Xuechen Zhu and Jianfeng Xu, "Becoming a Global Leader," China Huaneng Magazine, December 2011.

This has included looking to overseas markets where there are stable renewable energy policies.

In July 2011, in what was the first direct investment in overseas renewable energy by one of China's top five largest power producers, Longyuan Power, a subsidiary of China Guodian Corporation, signed an agreement to buy a Canadian wind project from Farm Owned Power (Melancthon) Ltd. for US\$247m. Sun says that Longyuan now plans to buy Shady Oaks from GoldWind this year.

"Developed countries are targeted because renewable energy policies are changing in China. Both European and US authorities have tended to promote consistent, stable, sector supportive measures, which encourage renewable energy development – at least to date," Sun explains.

Operating in a mature regulatory environment may also offer turbine manufacturers the chance to access more profitable downstream business. Indeed wind farm development and operation currently account for most of GoldWind's international business, according to Sun.

"In my experience, Chinese domestic turbine market prices are falling, exerting excessive pressure on manufacturers," says Sun. "That's why we began moving downstream in 2010. Selling turbines generates little profit while the return on our overseas wind power plants can exceed 20%."

No shortage of cash

Meanwhile, some cash-rich Chinese companies have been seeking to expand their geographic presence and diversify risks. Recent examples include: two major acquisitions by the State Grid Corporation of China (SGCC), totalling US\$1.5b⁴; and China Investment Corp's (CIC) purchases of major utilities assets worth approximately US\$2.5b.⁵ CIC's CEO has been reported as saying that the latter purchases are intended to increase its exposure to direct infrastructure investments.⁶

Chinese banks have also been supportive of overseas expansion. GoldWind, for example, has managed to secure more than US\$6b of credit from various Chinese financial institutions. And, while the local financial environment is becoming tougher due to weaker domestic economic conditions, as Sun observes, "Good companies are hardly affected, as banks seek to maintain high-quality portfolios. Even in harsh times, GoldWind continues to enjoy strong bank support."

Increased profitability and liquidity

While it is still too early to gauge the financial success of the various overseas investments made by Chinese companies, Sun says GoldWind is already seeing the benefits.

"Our overseas business is performing well and our initial objectives have been

met. I believe the investment return on our overseas wind farms may exceed 20%, well ahead of our peers," says Sun.

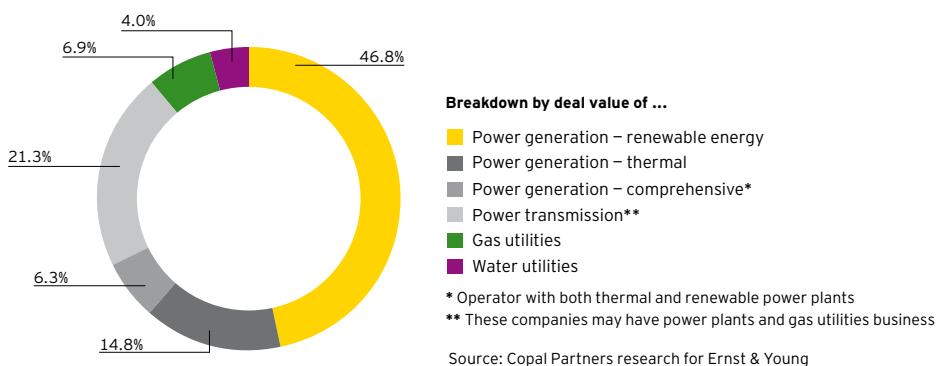
Profitability is not the only criteria for success, he explains. "We have increased liquidity due to the shorter cash conversion cycle. Financing costs can be reduced when foreign banks are involved. For example, Citi supports our investments in the US market."

Overseas expansion to continue

Current overseas expansion by Chinese companies is likely to continue and potentially accelerate. GoldWind is currently negotiating to acquire five more wind farms before the end of the year, while State Grid Corporation of China is expected to purchase Enagas SA, a natural gas utilities company based in Madrid. Meanwhile, China Guodian Group is widely tipped to buy Baglan Bay power plant in the UK from GE.

Supported by their banks and investors, Chinese companies are reforming the landscape of the global utilities market. While conditions in their domestic market remain challenging, we should expect these corporations to continue to expand internationally. According to Sun, "Momentum will be maintained until China's economy resumes normal growth."

Figure 1: China's outbound investments



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4. The acquisition of Redes Energéticas Nacionais (25%), and seven Power Transmission Lines from Actividades de Construcción Servicios SA (ACS).
5. Since January 2011, CIC has acquired the following stakes: Thames Water Utility (8.7%), GDF-Suez (10%), Cheniere Energy (50%), and AES-VCM Mong Duong Power (19%).
6. "Global Economic Recovery Needs New Growth Opportunities," Lou Jiwei, CIC Chairman and Chief Executive, 29 November 2011, <http://www.china-inv.cn/include/resources/loujiwei11129ch.pdf>, accessed 12 September 2012.

The long goodbye



With grumblings about gas prices on multiple fronts, is it time to reevaluate the role of oil indexation in long-term gas supply contracts? **Howard Rogers** of the Oxford Institute for Energy Studies shares his views with *Utilities Unbundled*

Current dissatisfaction with the price of gas could change the way contracts are priced, but the real game changer that breaks the oil/gas price link is likely to be liquefied natural gas (LNG).

Friction between regional gas markets

At present, there are significant imbalances in the price utilities have to pay for gas around the world. These can range from US\$3 per million British thermal units (MMBtu) or less in the US, to over US\$15/MMBtu in Asia, suggesting significant friction between regional gas markets.

In large part this reflects a disparity between the price of gas under oil-indexed long-term contracts, more common in Asia and Europe, and wholesale hub prices. When demand for gas dropped as a result of the financial crisis, a number of European utilities were left stranded on the wrong side of long-term contracts.

Locked into high gas prices, several significant midstream businesses came under severe financial pressure as a result.

As a matter of urgency, they embarked on negotiations with gas suppliers to narrow what appeared to be a widening gap between oil-indexed contract prices and hub prices.

Buyers and sellers of gas in Europe were able to make some progress here. For example, following lengthy discussions with Gazprom, E.ON announced in March 2012 it had reached a settlement that improved the Group's half-year results by about €1b (US\$1.28b).¹ Although the formulas – oil-indexed or otherwise – used in these concessions were not disclosed, the settlement did at least demonstrate the willingness of (and need for) suppliers to adjust the approach to pricing gas so that their customers didn't go bust.

“Because of the recession, gas suppliers have had to adjust their approach to pricing gas; the alternative was seeing their customers go bust.”

Howard Rogers,
Oxford Institute for Energy Studies

1. “E.ON reaches settlement with Gazprom on long-term gas supply contracts and raises Group outlook for 2012,” eon.com, <http://www.eon.com/en/media/news/press-releases/2012/7/3/eon-reaches-settlement-and-raises-group-outlook-for-2010.html>, 7 March 2012.

This raises the question: does oil indexation have a future? Over the years, oil-indexed contracts have served a valuable role, creating certainty and visibility on prices. But are they still fit for purpose? To answer that, it's worth recalling why gas pricing was linked to oil prices in the first place.

The rationale behind oil indexation

The linkage between gas and oil prices dates back to the commercialization of the Groningen field in Holland in the 1960s. This was an onshore field with low production costs, so following a cost-plus model at that time would have led to gas sales at very cheap prices. As gas was competing with oil products for heating and power generation, a pragmatic decision was taken to set the price of gas on a competitive basis to gas oil and fuel oil.

In the intervening years, the market has evolved. Fewer and fewer people now use oil for heating; far less oil product is used for power generation. Major gas pipelines are now in place, bringing down transport costs. And demand for gas has grown massively, with gas trading at a sufficient level in some countries to create a liquid market that generates reliable prices.

“The amount of LNG that will hit the markets from 2015 to 2020 could precipitate a real shake-up in the industry.”

Howard Rogers, Oxford Institute for Energy Studies

These factors have stripped away much of the rationale for linking gas prices to oil. Today, the attachment to oil indexation looks increasingly like an argument made by an industry that is reluctant to step away from a comfortable, low-risk position. In other industries, most businesses cannot accurately predict the price of their products; instead, they keep costs and prices as competitive as possible.

What does the future hold?

Were the concessions granted during the financial crisis a temporary relief measure, or something more fundamental? With details of the settlements that have been reached remaining confidential, we cannot tell for sure. But the suspicion must be that existing formulas were simply tweaked rather than replaced with a different pricing basis.

The underlying rationale for a move away from oil indexation is clear. But given the industry's historical attachment to oil indexation, it seems highly unlikely that this relationship will be abandoned within the next five to ten years.

One factor that might break the oil/gas price link sooner rather than later is LNG. More specifically, the amount of incremental LNG production that looks likely to hit the markets from 2015 to 2020 could precipitate a real shake-up in the industry. LNG exports and arbitrage will certainly have a destabilizing impact on existing pricing structures.

“The attachment to oil indexation looks increasingly like an argument made by an industry that is reluctant to step away from a comfortable, low-risk position.”

Howard Rogers,
Oxford Institute for Energy Studies

Different pricing formulas are going to be needed, with contract terms that are flexible enough to ensure that the market operates in a transparent and reasonable way. As these become the norm, utilities will then need to let go of the status quo and embrace the new commercial realities of less certainty and more risk.

And as gas moves to more consistent global pricing mechanisms, utilities will need to become more global in their thinking. With the flexibility that LNG brings, at some point utilities will need to pay as much attention to what is happening in gas markets elsewhere in the world as they do to their own supply, demand and pricing mechanisms. For Europe, the future tracks of Asian demand and US production will become equally as important as the availability of pipeline supply from Russia and related transit issues.

Howard Rogers

Director, Natural Gas Research Programme
Oxford Institute for Energy Studies



Howard Rogers joined the Institute in January 2009 and became Director of its Natural Gas Programme in October 2011. His areas of expertise include global natural gas, LNG and European markets and gas supply. Prior to joining the Institute, Howard was with BP for 29 years, including BP's Gas and Power division for 10 years.

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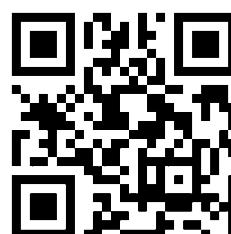
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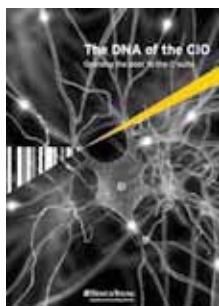


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