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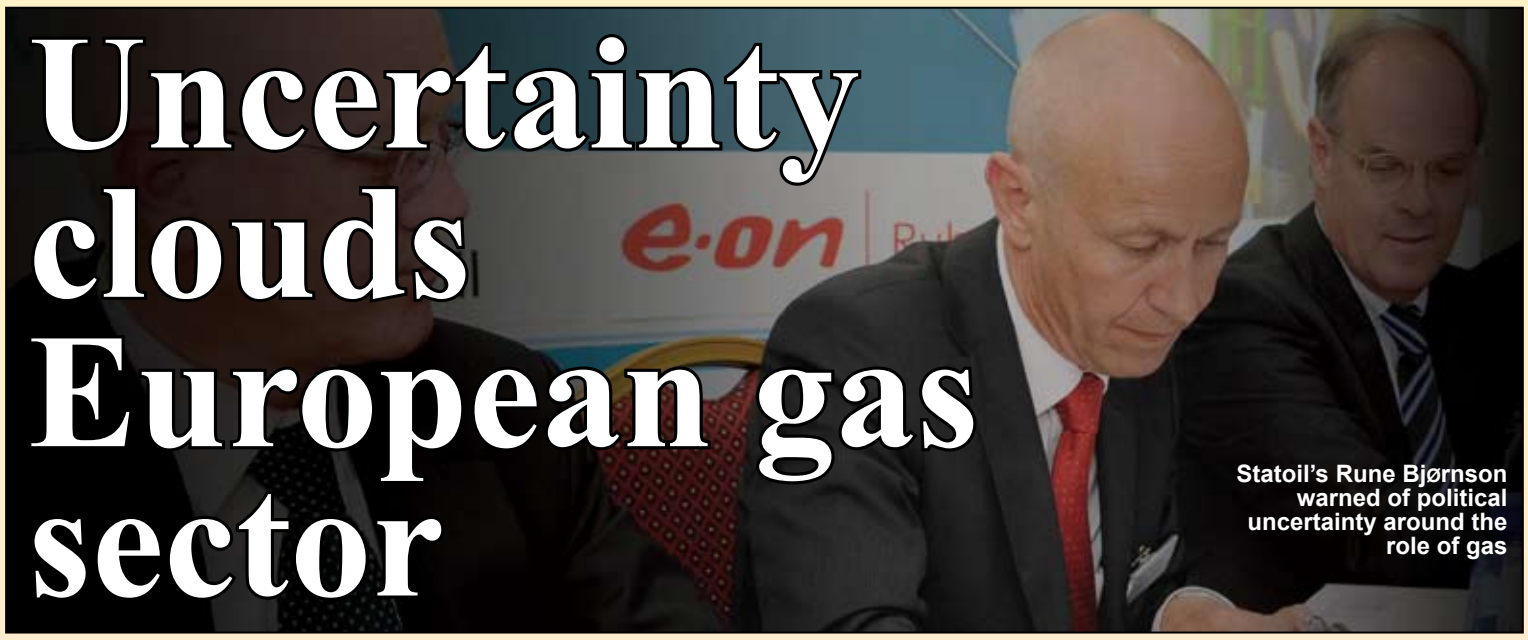
Uncertainty clouds European gas sector



Statoil's Rune Bjørnson warned of political uncertainty around the role of gas

A number of factors are putting pressure on gas fired plants across Europe. But while some are questioning the future role of gas, Gazprom is once again considering moving into the European gas fired power generation sector. **Junior Isles**

Political uncertainty and challenging market conditions for gas fired power generation are threatening the role of gas in Europe's energy mix.

Nowergian company Statoil, the second largest supplier of natural gas in Europe, recently warned that political uncertainty over the role of gas for power generation in Europe may affect future investment in gas production facilities.

Rune Bjornson, senior vice president for natural gas at Statoil told the *Financial Times*: "Continued political uncertainty around gas demand in Europe will ultimately have an effect on the willingness of producers, including ourselves, to invest in new supplies."

Many European utilities are refusing to invest in gas fired generation as sluggish power demand, government policies, the high price of gas versus coal, collapsing carbon markets and an increase in renewables are all combining to put pressure on gas fired generation.

E.On is considering mothballing gas fired power stations. Its gas turbine flagship plant, Irsching-5 in Bavaria, last year operated less than 25 per cent of the time as falling power prices made burning natural gas unprofitable by record margins. Meanwhile the UK's SSE plans to close several of its gas fired power stations, while Centrica has said it will not build any new gas fired plants in the UK for at least four years as a result of a lack of clarity on electricity market reforms.

At the end of February, Gerard Mestrallet, chief executive officer of France's GDF Suez said: "Gas fired plants are stopped three days out of four. The thermal [power] industry is in crisis. There is overcapacity."

The difference between the cost of fuel and the price paid for the power generated reached a record low on March 12th in Germany. The spark spread for the month ahead fell to minus €18.35/MWh ($23.87/MWh). Gas plants are also unprofitable in France, the Netherlands, Spain and the Czech Republic, according to data compiled by Bloomberg. In the UK, they are barely breaking even.

Despite the situation, Russia's Gazprom, Europe's largest gas supplier is considering taking a position in Europe's gas fired power generation market.

The Russian gas giant, which supplies around 25 per cent of Europe's gas market, has long been trying to move into Europe's electricity generation sector. Last year its attempt to

Continued on Page 2

UK keeps CCS hopes alive

The UK government progressed its plans to commercialise carbon capture and storage (CCS) with the announcement that two projects have been shortlisted for its £1 billion in funding to support the construction of a full scale CCS demonstration project.

As part of its Budget last month, the government said a consortium led by Shell and another by Drax were still in the race to receive the funds. Ministers, however, noted that a final investment decision on a winning project would not be made until 2015.

Shell plans to capture emissions from an existing gas fired power plant at Peterhead, Scotland, while Drax aims to do the same at a new coal fired station in North Yorkshire, known as the White Rose Project.

The Shell-SSE consortium will capture up to 85 per cent, or 10 million tonnes of carbon dioxide emissions, from the Peterhead Power Station and transport it by pipeline offshore for long-term storage deep under the North Sea.

Drax has set up a consortium known as Capture Power Ltd, together with Alstom and BOC, to develop the White Rose Project.

Located on land adjacent to the existing Drax Power Station, near Selby in North Yorkshire, the 426 MW power plant will burn coal with the added ability to co-fire biomass and meet the equivalent power needs of over 630 000 homes. Fully equipped with CCS technology from the outset, 90 per cent of all the CO_2 produced by the plant will be captured and transported by pipeline for permanent storage deep beneath the North Sea seabed.

The government aims to agree terms with the two bidders by the summer for front-end engineering design studies, which will last approximately 18 months.

The industry welcomed the decision to move the proposals forward. Dr Jeff Chapman, chief executive of the Carbon Capture and Storage Association said it represents "a watershed for CCS in the UK and in Europe".

The projects are two of four shortlisted in October last year. Chapman added: "Clearly there is disappointment for the two projects that have not been selected to go forward at this stage as those companies have put significant efforts into developing their bids. However, the government has an opportunity to ensure that these projects are kept alive by designing the Contract for Differences under the UK's Electricity Market Reform in a way that supports these CCS projects going forward."

It was a good Budget for Drax, which also saw the government pledge support for a £225 million ($337.5 million) project to convert half of the Drax power plant in Yorkshire to a biomass plant. The Drax power station is the UK's biggest coal fired plant. Newspaper reports said the government would guarantee £75 million of debt on the project, with the rest of the funding coming from private investors and the state-owned Green Investment Bank.

Last July Drax said it plans to transform itself into a "predominantly biomass fuelled generator".

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join forces with Germany's RWE failed as the partners were unable to agree on joint projects.

Gazprom is attracted by European moves to reward gas fired power plants, which are predominantly operating as back-up for renewables, with capacity payments to compensate for downtime.

"It's about supporting European moves to increase the attractiveness of investing in gas power generation primarily through capacity payments," Gazprom said in a statement.

Although it gave no specifics, Gazprom said it was looking at buying combined cycle gas turbine power plants in several European markets where the outlook is "attractive".

Gazprom has also been in talks with GDF Suez and Denmark's DONG Energy about possible projects.

The need for gas fired plants is particularly acute in the UK. The regulator Ofgem recently said the country may soon face a power capacity shortfall as the lack of gas fired capacity combines with the withdrawal of coal units because of environmental regulations.

At the end of March, the UK announced a new oil and gas strategy that highlights the UK government's growing concern about the future of gas fired generation and what is sees as a need to support the sector.

Announcing the strategy, Business Secretary Vince Cable, Energy Secretary Ed Davey and Scottish Secretary Michael Moore told business leaders that an oil and gas strategy would secure billions of pounds of future investment and thousands of jobs.

Davey said: "Even as we move to a low carbon economy, oil and gas will remain an integral part of the UK energy mix for decades to come.

Davey: oil and gas industry is a "vital" resource

The UK's oil and gas industry is a vital strategic resource that helps fulfil our energy needs and insulates us from volatile global markets.

"With our support for carbon, capture and storage, for decommissioning, and by encouraging increased collaboration across different energy sectors, especially offshore, there will also be new sustainable growth opportunities for the industry and the wider UK supply chain," he added.

The UK government also came out strongly in supporting shale gas in last month's budget with attractive tax incentives.

Shale gas has initiated an energy revolution in the US, turning the US from an importer of natural gas into a potential exporter. There is significant potential in the UK as well, but the exact scale of the economically recoverable reserves is currently subject to considerable uncertainty.

■ Michael Fallon has replaced the outspoken John Hayes as UK Energy Minister as part of a UK cabinet reshuffle.

UK budget sends out mixed signals

The UK government says its budget sets out a low carbon pathway; but support for shale gas and no mention of renewables has upset environmental groups, says **Junior Isles**

The UK's recent Budget Statement sent out mixed signals on the government's commitment to a low carbon path and meeting its ambitious CO_2 reduction goals.

In a move to raise the cost of burning fossil fuels and make cleaner alternatives more competitive, the government set the carbon tax for the 2015 financial year at £18.08 per tonne of CO_2.

Commenting on the rise in the carbon tax, IHS energy analyst Catherine Airlie said: "The carbon tax has risen because an oversupply of permits in the European carbon market caused prices to sink to all-time lows in the last 12 months. The UK tax will do what the carbon market can't."

Yet while claiming the UK would combat climate change by reducing the burning of fossil fuels, Chancellor George Osborne also moved to promote the exploration of shale gas.

Responding to the Chancellor's announcement of tax breaks for the shale gas industry, Greenpeace energy campaigner Lawrence Carter said: "The Chancellor is slashing public services with one hand while gifting tax breaks to the fossil fuel industry with the other… everyone from the energy regulator Ofgem to BP to the Energy Secretary say UK fracking won't bring down bills.

"Bungs to the gas industry make it harder for Britain to meet its climate targets and stifle the low carbon sector, which provided one third of all UK growth between 2011-2012," he added.

The renewables industry was disappointed there was no mention of renewables in the Chancellor's Budget.

Renewable Energy Association Chief Executive Gaynor Hartnell said: "There is no meaningful dialogue between the Chancellor, who speaks solely of the growth opportunities of gas and nuclear, and those calling for investment in renewables."

Leonie Greene Head of External Affairs at the UK's Solar Trade Association added: "Renewable technologies like solar need bold leadership and a positive vision if we're to compete successfully in the global race the Prime Minister keeps highlighting. We're on a path to nowhere if this Chancellor continues to ignore climate change, the economic potential of the green economy, and the dangerous upward trajectory of fossil fuel prices."

Not all, however, were so damning of the Budget. Dr Tim Fox, Head of Energy and Environment at the Institution of Mechanical Engineers said the Budget included some "positive announcements for the energy sector" including the new tax regime to support UK shale gas activities, the two projects identified as preferred bidders to move into the next stage of the government's carbon capture and storage (CCS) competition and more broadly the £3 billion investment in infrastructure projects for 2015/2016.

"The government must continue to encourage the development of a balanced power generation mix including renewables, nuclear and fossil fuels, ultimately abated with CCS," Fox said.

Suntech bankruptcy highlights solar woes

■ First Chinese company to declare bankruptcy ■ Other manufacturers report heavy losses

The bankruptcy of solar panel giant Suntech Power, the Wuxi, China, subsidiary of Suntech, highlights the deepening struggle facing solar panel manufacturers.

When Suntech announced that its primary subsidiary in China was facing insolvency, it became the most prominent foreign-listed Chinese company to face the bankruptcy court.

Suntech Solar Power was the largest solar panel maker by sales in 2011 but following two years of losses and increasing debt, the company declared bankruptcy, making it the first big Chinese solar company to do so.

China is the biggest producer of solar panels but the sector is suffering from overcapacity. Attracted by tax breaks and subsidies, hundreds of small Chinese solar producers sprang up. New competitors were still entering the market as late as 2011, when weak demand and a supply glut forced producers to slash prices.

Jenny Chase, head of solar analysis at Bloomberg New Energy Finance commented: "We are entering a period of great difficulty for Chinese solar manufacturers."

Chinese manufacturers have been severely impacted by a dramatic fall in polysilicon prices. In 2008 polysilicon spot prices were $475/kg but those prices crashed in 2009 and are now just $18/kg.

Chinese producers have also been affected by US anti-dumping tariffs imposed to offset what Washington says are improper subsidies from Beijing. European solar producers also have filed anti-dumping complaints, with the European Union asking for higher tariffs on Chinese imports.

Suntech is one of a growing band of solar energy companies to run into trouble. Chaori Solar, another leading player, ran into debt last December. Last month the company reminded its investors that its losses in 2012 could be as much as Yuan1.3 billion ($209 million).

Other major Chinese producers including Yingli Green Energy Ltd., LDK Solar Co. and Trina Solar Ltd. have reported heavy losses. This has prompted expectations that the government will intervene and force companies to merge or shut down.

Nevertheless, the industry shake-out is still presenting opportunities. While numerous companies like Bosch and Siemens are backing out of the solar industry, the competitive environment of Scandinavian-German solar module manufacturer, Innotech Solar has improved.

The company is increasing its production in Halle/Saale in Germany and Glava in Sweden, allowing Innotech Solar to take the next step in achieving its full production capacity of 100 MW.

In mid-March, Japanese trading house Mitsubishi Corp. and government-private investment fund Innovation Network Corporation (INCJ) of Japan said they have agreed to acquire an Italian solar power generation company.

Mitsubishi will buy a 50 per cent stake in Solar Holding S.R.L. for some Yen3 billion ($32 million) from its Italian parent Solar Ventures S.R.L. and INCJ will acquire a 35 per cent stake for some Yen2 billion. Solar Ventures will retain the remaining 15 per cent stake.

International giants see African promise

International companies are showing a growing interest in Africa. In his annual letter to shareholders, General Electric's chief executive Jeff Immelt said the company would double its sales in sub-Saharan Africa over the next few years.

Immelt said sub-Saharan Africa had been "off the radar" when he took over in 2001. Now he says the region is "essential to the company.

Sales to the region were about $3 billion last year, about 2 per cent of the company's revenue, but this could double in the next few years.

GE will be targeting Angola, Nigeria, Mozambique and South Africa, where it plans to build businesses with sales of $1 billion or more.

All of these countries are rich in natural resources. South Africa is one of the world's largest coal producers, while Nigeria and Angola are large oil and gas suppliers.

Meanwhile, large gas reserves have recently been discovered in waters off Mozambique.

These, and gas discoveries in Tanzanian waters, have seen the region become one of the hottest prospects for gas in recent years.

In March, Statoil said it was joining forces with BG Group to plan a $14 billion liquefied natural gas facility in Tanzania that could see the country become a leading exporter of natural gas.

Energy consultancy Wood Mackenzie says the two countries potentially have the same size gas resource as Australia and could ultimately produce more LNG than Qatar, the world's biggest LNG exporter.

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Nuclear slowdown forces cuts

■ Alstom to cut jobs in Chattanooga ■ Vogtle construction budget increased

Citing a lack of orders for nuclear power components, Alstom said it would cut its workforce to just 60 employees by year's end at a turbomachinery plant it opened in Chattanooga, USA, in 2010. The engineering giant announced it is restructuring the $300 million plant's operations and cutting 80 jobs.

Tim Brown, Alstom's communications director said the expected nuclear resurgence, which the 32 500 m^2 (350 000 ft^2) was built to serve, has been slow to come about. He blamed the accident at the Fukushima Daiichi nuclear power plant in Japan two years ago for helping to dampen growth in the sector.

"The ultimate driver is that people are not ordering new nuclear," said Brown. "There's not the demand for nuclear [that there was] when we built the factory."

Brown said the Chattanooga plant would be refocused to meet the existing needs in the power industry. This includes work for coal and gas fired power plants as well as nuclear.

Looking ahead, Brown said Alstom will adapt to market conditions and plans to keep the plant's entire capability for "when the market rebounds" and there are added opportunities.

The difficulty in building nuclear plants on time and to budget has been exacerbated by Fukushima, which has resulted in projects being reviewed to incorporate additional safety measures.

In Georgia, Southern Co. told regulators at the end of February it needed to raise its construction budget for the Vogtle project in eastern Georgia by $737 million to $6.85 billion. At about the same time, a Georgia lawmaker sought to penalise the company for going over budget, announcing a proposal to cut into Southern Co.'s profits by trimming some of the money its subsidiary Georgia Power makes.

Georgia Power recently said it has completed the placement of basemat structural concrete for the nuclear island at its Vogtle Unit 3 nuclear expansion site, a significant achievement in the building of the first new nuclear units in the US in 30 years.

Georgia Power is building two new nuclear energy facilities based on Westinghouse AP100 reactors at Plant Vogtle units 3 and 4, near Waynesboro. Unit 3 is scheduled to go on line in 2017, and Unit 4 will follow in 2018.

With large nuclear plants struggling to complete on time and plagued by soaring costs, the future of nuclear could be in much smaller scale plants.

As part of the Obama Administration's "all-of-the-above" energy strategy to speed the transition to more sustainable sources of energy, the Energy Department last month issued a new funding opportunity announcement to help US industry design and certify innovative small modular nuclear reactors (SMRs).

The Energy Department will solicit proposals for cost-shared SMR projects that have the potential to be licensed by the Nuclear Regulatory Commission and achieve commercial operation around 2025.

In February US utility Tennessee Valley Authority (TVA) awarded Babcock & Wilcox mPower a contract to complete extensive design work and apply for permission to build a SMR in Oak Ridge, Tennessee. TVA expects to submit the license application for what would be the US's first SMR in 2015.

Wind and bioenergy potential compared to oil and gas

Analysis from Bloomberg New Energy Finance shows that the energy reserves contained in wind and bioenergy projects in the US and Brazil are significant compared to oil and gas.

A new report by Bloomberg New Energy Finance (BNEF) has, for the first time, placed US and Brazilian wind and bioenergy projects on a basis comparable with fossil fuel reserves, and found them to be considerable.

The report, entitled: *Renewable Reserves: Testing the Concept for the US and Brazil*, found that in Brazil, the energy resource equivalent of existing renewable projects amount to over two fifths of the country's proven oil and gas reserves, in terms of expected lifetime energy output.

The US possesses greater oil and gas riches. Yet, even there, the analysis found that the Energy Resource Equivalent of existing wind and bioenergy projects are equivalent to approximately one seventh of the size of that country's fossil fuel project reserves.

Guy Turner, head of economics for BNEF, said: "Traditional energy companies, and the financial markets, have tended to disregard the reserves inherent in wind, biomass-to-power and biofuel projects, while heavily weighting those offered by the hydrocarbon extraction industry. There has been little focus on this issue to date.

"However, this pioneering report shows that if you calculate the reserves embedded in renewable energy projects on the same energy basis – millions of barrels of oil equivalent – they can add up to big numbers. This work should give investors a new way of assessing the value of the sector."

Until now, industry, investors and policymakers have lacked a widely agreed methodology for comparing renewable energy projects with each other, and with fossil fuel projects. In the coal, oil and gas industries, resources and reserves are measured in terms of volume, with the quantities categorised according to specific levels of certainty.

In contrast, renewable projects are typically expressed in terms of annual production capacity. This says nothing about the energy contribution these projects are expected to make over their lifetime.

Furthermore, there has not been a consistent approach for describing the technical and economic maturity of renewable energy projects and the level of certainty about their energy output, for instance discounting undeveloped renewable energy resources in a standard way comparable to unproven fossil reserves.

The study adopted a simple approach for quantifying and categorising renewable energy as "commercial projects" and "potentially commercial projects" based on their stage of development. The concept was then applied to the wind and bioenergy sectors in the US and Brazil by analysing project level data and the results were converted from megawatt-hours to millions of barrels of oil equivalent in order to compare them to estimates for fossil fuel reserves.

The study is being used as a tool to communicate the concept of renewable reserves, with the aim of bringing more experts and organisations into the discussion. Development of a full reserve accounting methodology will involve more work, for example writing detailed criteria for assessing the economic viability, technical feasibility, and completion uncertainty of projects in a development pipeline. A leader in this work is the multi-stakeholder Renewable Reserves Initiative, which is currently developing such a methodology.

E.On expands in Brazil

German utility E.On will increase its stake in Brazilian utility MPX Energia SA in a deal worth about €800 million ($1 billion) by acquiring shares from Brazilian industrial magnate Eike Batista.

In a written statement, E.On said it will raise its stake in MPX to 36.1 per cent by acquiring shares equivalent to around 25.4 per cent of the company from Mr. Batista.

E.On entered the South American market last year by taking a 10 per cent stake in MPX for around €350 million. Both companies also formed a joint venture with the aim of building and operating power plants in Brazil and Chile and becoming the largest privately owned energy company in Brazil.

Over the past few years, Mr. Batista raised billions of dollars to invest in a series of startup companies that operate across a range of industries, including oil and gas, mining, infrastructure and electricity generation.

Investors expressed concern that Batista's plan to reduce his MPX stake has tempted E.On to invest more capital into Brazil than originally intended, even as the Brazilian economic outlook has wavered.

However, E.On's CEO Johannes Teyssen has said he remains committed to Brazil, saying that it is an important diversification away from economic and political risks in Europe.

E.On, like a number of European utilities, has been facing serious challenges in Europe as a result of reduced power demand and low power generation margins. Germany's decision to phase out nuclear has added to E. On's woes and has seen the company embark on an asset-selling programme to cut its large debt.

Abengoa and BrightSource Energy team up on CSP

Spanish company Abengoa and US-based BrightSource Energy have agreed to jointly develop, build and operate the world's two largest solar power towers in California, USA. The two companies will work together to permit and finance the 500 MW Palen Solar Electric Generating System.

Abengoa will build the plants as the engineering, procurement and construction (EPC) contractor, and also operate and maintain the plants. BrightSource will design the plant and supply the solar field technology.

The Palen project consists of two 250 MW units located in a Department of Interior Solar Energy Zone in Riverside County, California. With permitting and development under way, construction is expected to begin at the end of 2013. The solar plants are expected to come online in 2016.

The Palen site has already received authorisation from the California Energy Commission (CEC) for construction and operation of a 500 MW solar thermal project. In December 2012, BrightSource filed an amendment to the existing permit seeking authorisation to deploy solar power tower technology, also known as concentrated solar power CSP).

CSP generates power the same way as conventional steam power plants – by creating high temperature steam to turn a turbine. However, instead of using fossil fuels or nuclear power to create the steam, they use heliostats to concentrate the sun's energy onto a heating fluid to generate steam.

China faces climate finance gap

- Report calls for climate finance reform
- PV industry sees temporary rebound

Syed Ali

China will need to raise up to $243 billion of additional funds by 2020 in order to adequately finance action to curb the impacts of climate change and invest in low carbon development according to a new report commissioned by the Chinese government's National Development and Reform Commission (NDRC).

The report, authored by international NGO The Climate Group and the Research Centre for Climate and Energy Finance at the Central University of Finance and Economics, China, estimates that achieving China's 2015 and 2020 emission intensity targets (a 17 per cent cut vs 2010 levels and a 40-45 per cent cut vs 2005 levels, respectively), will require a total investment of up to $333 billion by 2015, escalating to $413 billion by 2020.

Current public and private funds are not sufficient to cover the required investment, resulting in a financing "gap" of around 2 per cent of China's projected GDP in 2015 – or up to $214 billion – increasing to $208-243 billion by 2020.

The report calls for a two-stage plan to reform China's climate finance mechanisms by 2020. Reforms include implementation of national climate change laws, establishing development finance institutes and setting up a Carbon Trading Regulatory Commission.

China has already made huge investments in renewable energy and clean technology: in 2012 it accounted for one quarter of global investment in renewables, spending $67.7 billion – a 20 per cent increase vs 2011. China's goal is to have 15 per cent of its total energy demand sourced from non-fossil energy by 2020.

A recent report from the China Electricity Council (CEC) said installed power capacity would top 1230 GW by the end of 2013. Thermal power will still account for the bulk of the capacity, topping 860 GW, followed by 280 GW from hydropower, 75 GW from on-grid wind power, 14.78 GW from nuclear power, and 6 GW from on-grid solar power.

Last month hard-pressed Chinese solar companies saw orders increase amid a rebound in photovoltaic (PV) panel prices after the Spring Festival. China's PV industry has been suffering since late last year as a result of a slump in demand and declining polysilicon prices.

Orders for Chinese PV equipment plummeted 80 per cent year-on-year in 2012, according to the China PV Industry Alliance. Last year, up to 90 per cent of Chinese polysilicon makers halted production and 80 per cent of solar panel producers shut down or sharply reduced output, it said.

The rebound in China's PV industry may, however, be temporary. The CEC reported that although electricity use last year grew 5.5 per cent from 2011, it was markedly lower than the 11.7 per cent increase registered in 2011, echoing a slowdown in the country's economy.

Scope for Asia gas trading hub

The International Energy Agency says Asia-Pacific's gas market can evolve into a dynamic network of trading hubs that would benefit Asian competitiveness.

The Asia-Pacific region's natural gas market can evolve from one in which prices are linked to oil to one featuring a more competitive and dynamic network of trading hubs in which prices better reflect local gas demand and supply, according to a recent International Energy Agency (IEA) report.

Asia is expected to become the world's second largest gas market by 2015 but it is dominated by long-term contracts in which the price of gas is linked, or indexed, to that of oil. In recent years, this has helped keep Asian gas prices much higher than those in other parts of the world, leading to serious questions about the sustainability of the system and its effects on Asian competitiveness.

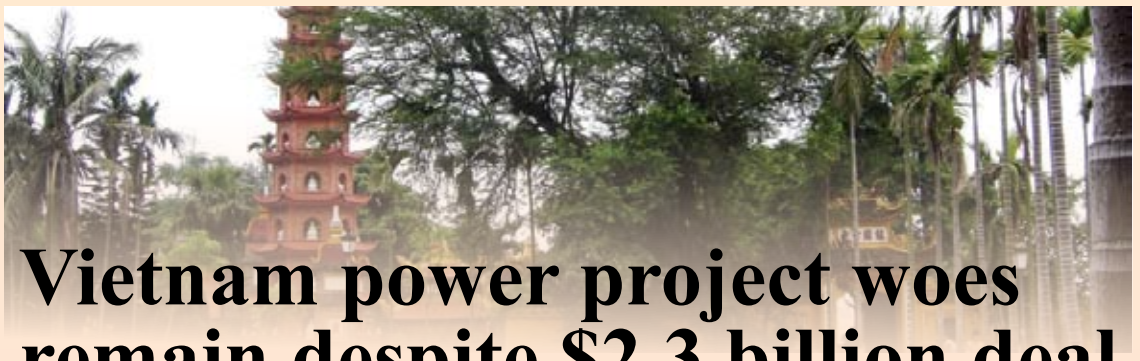
The report called *Developing a Natural Gas Trading Hub in Asia* shows what would be necessary to create a more integrated natural gas market in the Asia-Pacific region in which price signals are more effective and yield benefits for Asian competitiveness.

Some of the report's key findings are:

- Current market structures discourage gas consumption and impact Asian competitiveness *vis-à-vis* more flexible markets in the US and even Europe
- OECD experience suggests that the biggest obstacle for an effective gas market is a lack of infrastructure access
- The role of governments must change; instead of focusing on price regulation along the value chain, governments must maintain and supervise competitive market conditions
- Credible state commitment to regional gas market competition can instil confidence, encourage new market participants, and promote the use of transparent hubs to balance producer portfolios.

The report also noted that Singapore holds the best initial prospects for gas hub development, with Japan, Korea, and China as likely competitors in the future.

IEA Executive Director Maria van der Hoeven said: "The prospects are there, but even the prime candidates will need to do more. China's fast-growing domestic gas network is still underdeveloped, and the entire production chain remains heavily regulated. Singapore's small domestic market means that to grow as a hub it must rely on re-exports, which are hindered by regulation. Last but not least, Japan has great potential to act as a hub, but it will have to take some important steps. Domestically, that means improving infrastructure access and further developing its domestic power market. But externally, it also means engaging with exporters to affect the terms of gas contracting so as to improve efficiency while maintaining energy security. The LNG producer-consumer dialogue initiated recently by Japan can be effective to facilitating that engagement."



Vietnam power project woes remain despite $2.3 billion deal

Despite inking a $2.3 billion deal to build a 1200 MW coal fired power plant, a number of projects in Vietnam are still under threat.

Last month an international consortium led by Korea Electric Power Corporation (Kepco) agreed to build the Nghi Son 2 plant on a build, operate and transfer (BOT) arrangement. The consortium, owned by Kepco and Japan's Marubeni on a 50:50 basis, will run the plant for 25 years.

"It is a significant achievement given the competition against leading global companies, such as France's EDF group and Japan's Mitsui," Kepco said.

Other projects, however, have faced difficulties. The Kien Luong Thermo-electric Centre, one of Vietnam's largest proposed power complexes, remains a paper project as its investor faces financing troubles.

In August 2008 the Tan Tao Group received the go-ahead to invest in the Kien Luong centre, a thermal power plant with a capacity of 4400 – 5200 MW requiring an investment of $6.7 billion. Under the initial financial plan, Tan Tao would cover 20 per cent of the cost, while bank loans would cover the remainder.

International lenders require that Tan Tao has a guarantee from the government to access large loans but the group has been unable to secure any such guarantee or a Power Purchase Agreement with state power utility EVN.

"By the end of June, should Tan Tao Group still fail to have enough capital to continue construction, the province will call on the government to pull the plug on the Kien Luong Electricity Centre," Pham Vu Hong, deputy chairman of the provincial government, confirmed.

The project was scheduled to reach completion by the end of this year.

Meanwhile, Kon Tum province in the central highlands of Vietnam has followed the lead of Dak Lak, Gia Lai and Phu Yen Provinces with a decision to discontinue hydropower projects.

The provincial People's Committee said 21 hydropower projects have been removed from the development plan but there are still 48 plants either in process or operating.

Hundreds of hydropower projects in the central region and central highlands have either been put on hold or stopped due to social and environmental impacts.

India moves to boost investment

India is hoping the launch of an annual rating system of state power distribution companies will boost lending to them and also help improve their performance.

The utilities have been graded on a scale of one to six – from A+ to C – by ICRA Ltd and Credit Analysis and Research Ltd (CARE). A highly rated distributor will be eligible for funds from state-owned banks and other financial institutions at a lower interest rate.

Such a mechanism may provide incentives to distributors to improve their operational and financial performance and help lending institutions assess risk exposure. The rating may also serve as a basis for the federal government's assistance to the state power sector.

The system has been instituted at a time when the government plans to bail out debt-laden power distributors by recasting their short-term borrowing. These utilities owned by state governments are finding it difficult to raise working capital and owe Rs.2.46 trillion ($45.25 billion) to lenders.

The health of the power sector is linked to the financial condition of distribution utilities because they are responsible for buying power from utilities such as NTPC Ltd. There is a growing concern about investing in power generation units due to the poor financial health.

Meanwhile, India is to receive a €150 million loan from the European Investment Bank (EIB) and Exim Bank for financing investments that will help mitigate climate change.

The framework loan comprises a series of investments dedicated to renewable energy, projects for the production of electricity and heat, energy efficiency projects, and other climate change mitigation projects.

India's effort to tackle climate change through a massive addition of new solar capacity slowed slightly with last month's announcement that the invitation of bids for grid-connected projects under the second phase of the Jawaharlal Nehru National Solar Mission (JNNSM) may be pushed back by a month or two.

"The tenders inviting bids for 750 MW of solar photovoltaic projects will happen by April end or May first week," noted Tarun Kapoor, Joint Secretary of the Ministry for New and Renewable Energy.

China deepens energy ties with Russia

A package of deals between China and Russia will help China fuel its energy needs. **Junior isles**

China deepened its energy ties with Russia with the signing of a package of deals that will help China satisfy its massive appetite for energy.

Chinese President Xi Jinping and Russian President Vladimir Putin attended signing ceremonies of at least ten agreements, including a number of oil and gas deals, during the Chinese leader's three-day visit to Moscow last month.

China and Russia are natural partners. China is the world's biggest and fastest growing energy consumer, while Russia is one of the world's largest producers of oil and gas producers.

Putin has also been urging domestic companies to forge closer ties with Asia as demand for energy in Europe, Russia's largest oil and gas market, has been sluggish due to the financial crisis there.

One of the agreements between the two countries will see China become Russia's biggest oil customer. By 2018, China could be importing as much as 50 million tonnes of oil a year from Russia.

Under the agreement, China will provide Rosneft, the world's largest listed oil producer, a $2 billion loan in exchange for 25 years of deliveries, according to Rosneft's chief executive Igor Sechin.

The deal will help Rosneft pay for the $55 billion takeover of TNK-BP, which was finalised in late March.

Rosneft will also be partnering with China National Petroleum Corporation (CNPC) in the development of onshore blocks and offshore licenses. The Chinese energy firm is Rosneft's latest foreign partner in its long-term development plan to tap resources in the Arctic shelf.

Sechin said CNPC would be granted wider access to Rosneft's upstream projects. The two state-owned companies would jointly explore three offshore blocks in the Barents Sea and eight blocks onshore Russia.

CNPC also signed a memorandum of understanding with Gazprom to deliver gas to China from Russia's Far East fields. The MOU commits the two companies to cooperate in a project that will see Gazprom deliver some 38 billon m^3 a year to China via a new pipeline from Siberia starting in 2018.

Although the broad terms of the contract have been agreed, the two sides have not yet settled a disagreement on gas prices that has hindered negotiations for several years.

Egco to reduce fossil fuel dependence

Thai independent power producer Electricity Generating Public Co. Ltd. Egco) is to spend $505.8 million this year to boost generating capacity. The move will help the company diversify from fossil fuels to greater renewable energy use.

Egco President Sahust Pratuknukul said the company will consider investing in new projects and acquiring power plants operated by independent power producers.

Speaking to the *Bangkok Post* he said: "We are working on proposals for new IPP and small power producer projects. As well, we're looking at new investments partly through joint ventures in renewable energy projects such as wind and solar power."

Sahust: looking at new investments

Sahust said Egco would continue to explore new investment opportunities in neighbouring Southeast Asian countries.

Present capital expenditures are allocated to seven ongoing projects. These include the Theppana small wind farm in Chaiyaphum, Solarco Co – which has six solar projects in Nakhon Pathom and Suphan Buri – and a municipal waste power plant in Hat Yai. The total capacity of just these three projects is 37 MW.

Other ongoing small power projects (SPPs) are TJ Cogen Co in Pathum Thani and SK Cogen Co in Ratchaburi, with a combined generating capacity of 375 MW.

Last year, the company invested in five solar projects – SPP2 in Saraburi, SPP3 in Si Sa Ket, SPP4 on the border between Si Sa Ket and Ubon Ratchathani, SPP5 in Roi Et and G-Power Source Co with its power plants in Nakhon Sawan, Chai Nat and Phetchabun – with a combined capacity of 46 MW.

Pakistan eyes more coal use

- Thar Block-2 can fuel 4000 MW of power plants for 50 years
- Burj Power to invest in developing four coal fired plants

Syed Ali

Pakistan's plans to use more coal for power generation look more promising with the beginning of a coal extraction project at Thar Coal Block-2. Sindh Engro Coal Mining Company (SECMC), a joint venture between Engro Corporation and Government of Sindh broke ground on the project last month.

Shamsuddin A Shaikh, CEO of SECMC, said: "Thar has enormous energy potential. SECMC's Thar Block-2 can produce sufficient coal to feed 4000 MW [of] power plants for the next 50 years. Total foreign exchange savings for 4000 MW of Thar coal based power plants are estimated at more than $50 billion for the life of the project."

The project, which will cost a total of $1.3 billion and take four years to complete, has received a $700 million dollar sovereign guarantee from the Economic Coordination Committee, and is expected to start later this year.

In a separate development, Karachi Electric Supply Co. (KESC) said it would invest about $500 million for setting up coal-based power plants and improving transmission and distribution systems in Karachi during the next five years.

In late February UAE-based Burj Power also said it will invest up to $700 million in developing four coal-based power plants of 125 MW each at Port Qasim in Karachi.

Burj Power's CEO Shahzad Qasim said the first plant would be operational by 2016. "We will try to add one plant annually from 2016 onwards, until we achieve 500 MW of capacity," he said. The first phase of the project will cost up to $170 million.

"We have yet to finalise a power purchase agreement with KSEC. After that, Burj and KESC will go to Nepra together for the finalisation of the tariff," Qasim noted. He said that electricity produced by the coal-based plants would cost approximately half of what electricity costs if generated using oil. The project will be constructed near the upcoming coal and clinker terminal being developed at Port Qasim.

Meralco strengthening regional credentials

Manila Electric Company (Meralco), the Philippines' largest power distributor improved its regional credentials with the takeover of GMR Energy (Singapore) Pte. Ltd.

The company partnered with Hong Kong's First Pacific Company Ltd to form FPM Power Holdings Ltd to take a 70 per cent stake worth $488 million in the Singaporean power company.

Meralco chairman Manuel Pangilinan said the buy-in is part of Meralco's long-term vision to be a regional player in the power industry.

"It is anticipated that the investment shall be income-accretive to the Philippine economy and to Meralco," Pangilinan said.

Meralco PowerGen (MGen), a subsidiary of Manila Electric Company, is responsible for Meralco's overseas foray. Pangilinan said Meralco wants a minimum stake in feasible power generation projects in the region.

GMR Energy is in the advanced stage of building a 2x400 MW liquefied natural gas power plant on Jurong Island, Singapore. Its Jurong facility is expected to begin commercial operations this December.

■ Tuas Power officially opened its S$2 billion ($1.6 billion) Tembusu Multi-Utilities Complex (TMUC) at the end of February.

The TMUC utilises a multi-fuel strategy of low sulphur and low ash coal, renewable biomass, natural gas and diesel to produce and supply steam to petrochemical companies in the Jurong Island Tembusu cluster.

Some of the steam will be used to generate electricity to meet the TMUC internal plant load requirements and the excess electricity will be sold through the Singapore electricity market. The project, which will enhance energy security in Singapore, is the largest investment by any Chinese company in Singapore.

UK pledges nuclear support


Cable: promise to help UK compete

- Nuclear Industrial Strategy to support R&D
- Planning permission for Hinkley Point C

Junior Isles

Following the granting of planning permission for the Hinkley Point C nuclear power plant, the UK government has said it will help its businesses compete more effectively in the international nuclear energy market. The move is part of an industrial strategy to help Britain compete globally.

Late last month, Business Secretary Vince Cable and Energy Secretary Ed Davey jointly launched the Nuclear Industrial Strategy, promising to help the UK "compete in the nearly £1 trillion global nuclear industry" by tackling skills shortages.

Ministers have promised £18 million ($27 million) to 35 research projects and £15 million for a "world-class" central resource for firms developing technology. Some £12.5 million has also been committed to the UK's decision to join the Jules Horowitz Test Reactor Programme, announced earlier in March.

With the exception of Sizewell B, all of the UK's 16 reactors – supplying almost a fifth of the country's power – are set to close by 2023, with eight replacements planned. According to the government, the new build programme could create 30 000 jobs.

The news of support for UK business came shortly after planning permission was granted for EDF Energy's Hinkley Point C nuclear power plant, which the government hopes will be the first of the new nuclear fleet to begin operation.

At the time of writing, however, the final decision to build the plant was hanging on the outcome of negotiations between the government and EDF Energy over the "strike price" – the minimum guaranteed price that EDF would be paid for power from the plant.

EDF Energy head Vincent de Rivaz said that the strike price "must offer a fair and balanced deal for consumers and investors". According to reports, EDF is pushing for a price of £100/MWh, while the government is rumoured to have proposed £80/MWh. The two sides were expecting to reach a decision at the end of March.

The UK government is determined not to see its nuclear programme derailed. It views nuclear as having an important role in achieving its low carbon targets while at the same time presenting opportunities to create jobs domestically and build expertise that can aid its competitiveness on the world stage.

Ministers say £930 billion will be invested globally in building reactors over the next 20 years, with £250 billion being spent on decommissioning disused stations.

Just last month Poland said it will continue with its nuclear power programme.

State-controlled PGE Polska Grupa Energetyczna SA (PGE.WA) has been made the leader of the programme to build Poland's first nuclear power plant.

At the end of February Westinghouse Electric Company, Toshiba Corporation and Metrostav signed three significant Memorandums of Understanding (MOUs) with leading Czech-owned and operated engineering companies in preparation for the construction of Westinghouse AP1000 nuclear power plants at Temelín in the Czech Republic.

Experts split over shale gas incentives

The UK government's decision to support shale gas development has met a mixed response from industry.

Junior Isles

The UK is keen to replicate the US shale gas success story, promising generous tax breaks for the sector. However, industry experts remain split over how realistic the UK's plans are.

In his Budget, Chancellor George Osborne said that shale gas was "part of the future, and we will make it happen". He said the government would introduce tax breaks for the sector, ensure local communities benefit from shale gas projects and provide planning guidance for local authorities in areas where exploratory drilling is being planned.

The UK is thought to have significant reserves of shale gas and hopes to emulate the US, where the use of the controversial technique known as hydraulic fracturing or 'fracking', has unlocked huge reserves of shale gas and tight oil and dramatically reduced gas prices. According to the International Energy Agency, the exploitation of unconventional fossil fuels represents the biggest redrawing of the energy map for decades and could see the US be energy independent by 2035.

Some have welcomed the government's decision to support shale gas. Elizabeth Shepherd, partner and head of environment at global law firm Eversheds, commented: "The Chancellor's budget will be welcomed by the industry as a clear statement that the government is supportive of shale gas and committed to encouraging its development in the UK. It also sends the clear message that the government is keen to diversify the UK's energy mix by developing shale gas resources."

Colin Morrison from Turley Associates said that given the success of shale gas development in the US, "it was not surprising" to see strong support in the Budget to this resource.

"The government will produce planning guidance as early as July 2013 and aims to ensure the planning system by the end of the year is properly aligned with the licensing and regulatory regimes. From a planning perspective, however, this is going to continue to be controversial…"

In mid-March Cuadrilla Resources, the only company drilling for shale gas in the UK, put off plans for fracking this year. It said it had withdrawn its planning application in order to carry out a full environmental impact assessment.

At a recent lecture, Paul Stevens, Senior Research Fellow, Chatham House, discussed the issue of shale gas resources, the technology and environmental implications, and whether Europe could follow the US.

He said it was "highly unlikely" that the US success could be replicated "any time soon". He also said that the challenges facing shale gas in Europe suggest that George Osborne's "dash for gas" strategy is seriously flawed as it assumes a shale gas revolution in Europe.

Another paper produced by experts from three climate bodies concluded it would be risky to believe proponents of gas who say that new finds of shale gas would translate into cheap gas prices.

At the beginning of March, UK gas prices hit a record high after a technical problem forced a pipeline between the UK and Belgium to close and unplanned outages at North Sea facilities left the market severely under-supplied.

European wind connections

European offshore wind received a boost with the recent award of a contract to connect North Sea wind farms to the mainland supergrid.

At the end of February, transmission system operator TenneT awarded a more than €1 billion turnkey contract to Alstom for the DolWin3 HVDC offshore project, which will connect about five wind farms with around 200 turbines to the German onshore grid.

As the general contractor for TenneT, Alstom will supply and construct the onshore and offshore converter stations, as well as the connecting cable systems for the project. DolWin3 will use high voltage direct current (HVDC) technology to deliver the energy generated at sea via an 83 km sea cable to the mainland.

From the coast, the wind power will be transported a further 79 km via an underground cable to the converter station in Dörpen/West in Lower Saxony.

DolWin3 is the eighth grid connection project to be implemented by TenneT using HVDC technology. Together with three projects based on AC current technology, the TSO responsible for the North Sea will deliver a total of around 6.2 GW of offshore wind energy to the mainland.

The DolWin3 project will be the third grid connection in the DolWin wind farm cluster in the southwestern region of the North Sea and will have a capacity of 900 MW. The project will be completed in 2017.

"One of the main challenges for the future of energy grids is to transport electricity from offshore wind turbines to the onshore grid with as few losses as possible. With DolWin3, we strengthen our position as a key partner in the German energy turnaround," said Alstom Germany's CEO, Alf Henryk Wulf.

Patrick Plas Senior Vice President of Electronics and Automation at Alstom Grid added: "The HVDC market is growing rapidly and is being driven by European offshore wind connections, especially in Germany and the UK."

Last month Friends of the Supergrid, a group of companies with a mutual interest in promoting the policy agenda for a European Supergrid, restated the importance of creating a European grid network to capture the large amounts of renewable energy that will help the EU meet its 2020 targets and help provide energy security and independence.

Finland, Hungary gasification innovation

Finland and Hungary are pushing new innovation in gasification technology.

Last month Finnish power company Vaskiluodon Voima Oy inaugurated what it says is the world's largest biomass gasification plant.

The plant was delivered by Finnish engineering company Metso, whose scope of supply included fuel handling, a large-scale dryer and a circulating fluidised bed gasifier, modification work on the existing coal boiler and a Metso DNA automation system.

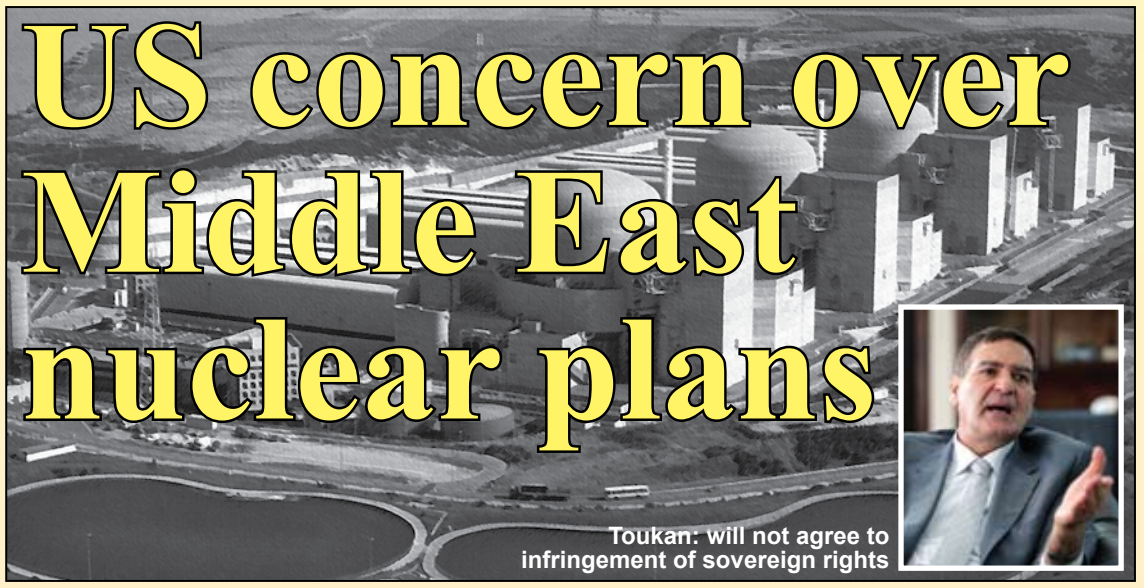
The bio-gasification plant was constructed as part of the existing coal fired power plant, and the produced gas will be combusted along with coal in the existing coal boiler. According to Metso, nearly half of the coal used by the plant can be replaced with gasified biomass.

"The operational experiences so far indicate that the 140 MW bio-gasification plant functions as planned, and the produced gas burns cleanly in the coal boiler and reduces emissions," said Mauri Blomberg, Managing Director, Vaskiluodon Voima.

Meanwhile, Wildhorse Energy Ltd, an underground coal gasification (UCG) development company focused on Central and Eastern Europe, said it has signed a non-binding memorandum of understanding with the Hungarian subsidiary of E.On to examine and evaluate the feasibility of constructing a UCG demonstration plant in Hungary.

Current plans could see development of a UCG commercial demonstration plant with a size of 100 MWth or 50 MWe.

US concern over Middle East nuclear plans



Toukan: will not agree to infringement of sovereign rights

Several Arab countries are accelerating their nuclear ambitions, in some cases to the consternation of the US. **Junior Isles**

Jordan says it will select the technology for its first planned nuclear reactor in mid-May. The kingdom's nuclear plans, however, are causing concern in the US where Washington is worried about the risk of nuclear proliferation in the region.

Jordan plans to build two 1 GW nuclear reactors near the capital, Amman, at an estimated cost of €12 billion. Khaled Toukan, chairman of the Jordan Atomic Energy Commission said the short-list was a "neck-and-neck" contest between a bid led by Russia's Rosatom and another headed by Areva of France and Japan's Mitsubishi.

Fuel for the plants, however, has raised US concerns. The US is keen for Jordan to sign an accord similar to the one between the UAE and the US, which would commit Jordan to not enriching uranium as part of its nuclear programme. Amman has signed international agreements on nuclear non-proliferation but refuses to sign any such bilateral deal with Washington on enrichment.

Toukan said: "We can't accept this. We will not agree to sign any agreement that infringes our sovereign rights."

US concerns over uranium enrichment in the region are likely to be heightened following the announcement in late February by Iran, which has nearly tripled its estimated uranium reserves and says that it will build 16 new reactors.

The country says it needs 20 large-scale plants to meet its growing electricity needs over the next 15 years. It currently operates a 1000 MW nuclear power plant at Bushehr, which was recently disconnected from the grid because of a mechanical problem.

Iran together with Pakistan recently defied warnings from the US State Department with the formal launch of a $1.5 billion gas pipeline project aimed at delivering Iranian gas to Pakistan.

Pakistan said Iran had offered $500 million in financing to help pay for the remaining 750 km to be built on the Pakistan side of the border. The US said the pipeline would "raise serious concerns" for violating sanctions against Tehran over Iran's nuclear programme.

Like Iran, Saudi Arabia has also floated plans to build 16 reactors by 2030. At the beginning of March the Saudi Arabian Cabinet approved the agreement with China that calls for cooperation in the field of nuclear energy for peaceful purposes.

Saudi Arabia has also signed cooperation agreements with France, Russia, Japan and South Korea to develop nuclear energy facilities to meet its increasing energy requirements.

A recent report by research and consulting firm GlobalData said global nuclear energy generation will climb by almost 30 per cent by the end of the decade, thanks in part to an influx of new nations developing nuclear programmes.

The report notes that there are around 45 nuclear-free countries looking at adding nuclear to their energy portfolio. Of this group, it says the UAE will be the primary nuclear energy driver over the forecast period, with four nuclear power plants expected to come online by 2020.

Shams 1 demonstrates solar potential

The inauguration of Shams 1, the world's largest operational concentrating solar power (CSP) facility to date and the first of its kind in the Middle East, demonstrates the rich solar potential of the Middle East region, where annual global radiation reaches 2000 kWh/m^2.

The $600 million, 2.5 km^2 plant designed and developed by Shams Power Company, a joint venture of UAE renewable energy company Masdar (60 per cent), France's Total (20 per cent) and Spain's Abengoa Solar (20 per cent), will produce enough energy to power 20 000 homes.

The International Renewable Energy Agency (IRENA) welcomed the start-up of the project. IRENA's Director-General, Adnan Z. Amin said: "The UAE's investment in renewable energy offers the region a pragmatic path to reducing per capita carbon emissions, which are currently among the highest in the world."

Shams 1, located in the Emirate's Western Region, follows a groundbreaking 10 MW solar PV site at the Masdar City clean energy complex.

"The inauguration of Shams 1 is a major breakthrough for renewable energy in the Middle East," said Dr. Sultan Ahmed Al Jaber, CEO of Masdar. "Just like the rest of the world, the region is faced with meeting its rising demand for energy, while also working to reduce its carbon footprint. Shams 1 is a significant milestone, as large-scale renewable energy is proving it can deliver electricity that is sustainable, affordable and secure."

Major oil and gas exporters in the Gulf Cooperation Council (GCC) have recognised renewable energy as their best long-term economic choice, as excessive domestic oil consumption undermines high-margin export opportunities. Abu Dhabi, for example, aims to cover 7 per cent of its installed capacity from renewables by 2020.

■ The UAE's Shaikh Saud bin Saqr Al Qasimi, Supreme Council Member and Ruler of Ras al-Khaimah, has issued Emiri (royal) decree No. (4) of 2013 establishing the Ras Al Khaimah Electricity and Water Authority (RAKEWA). According to the decree, the new government entity will regulate ownership, management, operation and maintenance of electricity generation and water desalination plants, as well as electricity and water networks. The authority shall also monitor prices of water and power services sold to consumers.

Coal will remain "cornerstone fuel" in global energy economy

Despite being under pressure in the US, coal fired generation will continue to play a key role in power generation globally.

While stricter emissions regulations and low gas prices are forcing the widespread closure of coal fired power plants in the US, coal fired generation continues to show strong growth Asia, Africa and even Europe.

A recent report: *21st Century Coal – Advanced Technology and Global Energy Solution*, by the International Energy Agency's (IEA) Coal Industry Advisory Board (CAIB) stated: "Coal will remain the cornerstone fuel in the global energy economy for decades to come."

The key message of the report focuses on improving efficiencies for advanced coal fired power generation as a first step to reducing CO_2 emissions. It states: "An estimated 59 Gt of reduced CO_2 emissions from coal power could have been achieved, had new coal units over the past 50 years used the highest efficiency technology available when built."

The international coal industry welcomed the publication of the new report calling it an important step on the pathway to near-zero emissions coal.

The report also highlights the transformational potential of CCUS (Carbon Capture Use and Storage) for achieving near-zero emissions from coal fired power generation, including using EOR (Enhanced Oil Recovery) to strengthen the business case for CCS.

In its conclusion the report said in 2013, the IEA should leverage its stature and undertake a special initiative to "re-educate OECD leaders" that coal will remain the cornerstone fuel, and on "other aspects of world energy".

Commenting on the release of the report, Milton Catelin, chief executive of the World Coal Association (WCA) said: "This report is an important piece of advice to the International Energy Agency and global policy-makers on the role of coal in a carbon-constrained world."

According to Assocarboni, the Italian Coal Industry Association, over the past decade, global coal demand increased by approximately 55 per cent, a higher growth in terms of both volume and percentage than any other energy source.

Gas and solar to ease Ghana power deficit

- AfGen signs MOU to develop gas projects
- Nzema expects to reach financial close this year

Ghana is hoping a greater focus on gas and solar will help combat power shortfalls.

Gasol plc, the west African energy development company, recently announced that its affiliate, African Power Generation (AfGen) Limited, has signed a Memorandum of Understanding with Ghana National Gas Company Ltd to develop a number of projects aimed at providing additional gas to Ghana, as well as supporting the longer term security of gas supply needed to address the nation's power generation deficit.

Alan Buxton, Chief Operating Officer at Gasol, said: "We are very pleased that Ghana Gas has agreed to explore collaboration with AfGen in a broadly defined partnership, including the importation and supply of non-indigenous gas to customers in Ghana, thereby assisting in bridging the Ghanaian gas deficit for power generation."

Ghana currently has a generating capacity of 2120 MW from various power stations but this is insufficient to meet its energy requirements.

At the end of 2012 Mere Power Nzema Ltd, a subsidiary of UK-based renewable energy investor and developer Blue Energy, announced plans to build a 155 MW solar plant that could start generating power in the fourth quarter of this year. The $400 million plant, at Aiwiaso, in the East Nzema district, will be one of the largest in the world and will increase Ghana's current generating capacity by 6 per cent when it reaches full commercial operation in 2015. It expects to reach financial close in the first half of 2013.

The Nzema project will be the first to go ahead under Ghana's 2011 Renewable Energy Act, which set up a system of feed-in tariffs, and it is a success for the government's policy of attracting international finance.

In November last year Energy Minister Joe Oteng-Adjei said he was seeking $1 billion of private investment to help Ghana achieve its renewables target.

European utilities struggle with tough market conditions

- E.On to invest more "selectively"
- Vattenfall to slash nearly 2500 jobs

Europe's major utilities are continuing to reorganise in the face of difficult market conditions.

E.On's chief executive Johannes Teyssen said last month that the company will be forced to invest much more "selectively" in coming years, as power generators across Europe are faced with declining earnings due to very low power prices and depressed energy demand.

E.On expects to raise more than €2 billion over the next two years by selling assets, including two regional German utilities and a stake in the uranium enrichment company Urenco.

Monies raised will complement another €3.5 billion from asset sales that have previously been agreed but are expected to close in the first quarter of 2013, the company said.

The sales are part of a broader drive by the company to reduce debt and generate cash to invest in emerging markets such as Brazil and Turkey.

Including the already agreed on sales, E.On has generated around €17 billion from asset sales and in late January said it is targeting a total of around €20 billion.

It said it could find a buyer for its stake in Urenco as early as this year, although any deal is unlikely to close before 2014. The company has been in contact with potential buyers of its Urenco stake for the best part of the past year.

Chief financial officer Marcus Schenck told journalists at E.On's annual earnings press conference: "We have been telling our partners that there is little sense for us to own a stake in Urenco following the German nuclear exit and our partners have signalled that we have a point."

He said the company intends to continue investing heavily in renewable energy as it considers the business a key growth area. "We're not planning any substantial reduction in capital investment in renewable energies," he said.

E.On plans to invest €1.1-1.5 billion in renewable energy in the next two years.

This is in contrast to its biggest domestic rival RWE, which says it will halve investment in renewable energy in the coming years. In February the company's renewable energies unit said it will reduce its activities in biomass fuels like wood and straw and would instead narrow its focus to concentrate on wind and hydropower.

In early March, RWE projected falling earnings for the next two years at least. Chief executive Peter Terium stressed the need to refocus the company as he expected operating results to "decline significantly" after 2013 as a result of changes in Germany. Germany's sudden switch from nuclear to renewables has hit German utilities hard.

In a move to cut debt and capital expenditure, RWE announced that it is to pull out of oil and gas exploration. The company has also looked at selling its stake in the Nabucco gas pipeline project.

Major German utilities are not the only ones that are making adjustments in the face of depressed profit margins from power generation, particularly from coal and gas fired power plants.

French utility GDF Suez also recently warned that its earnings will remain under pressure in the coming years.

At the beginning of March Swedish power company Vattenfall said it will slash nearly 2500 jobs, most of them in Germany, in an effort to cut costs by Kronor4.5 billion ($700 million) by the end of 2014.

Vattenfall's CEO Oeystein Loeseth blamed low electricity prices, production overcapacity and an oversupply of CO_2 emissions allowances in Europe's carbon trading market.

He said: "This new reality requires efforts in further improving our efficiency and strengthening our financial position."

Czech power company CEZ also reported that its fourth-quarter net profit declined more than 50 per cent on the year due to lower electricity prices, reduced power consumption and higher operating costs.

- E.On's supervisory board continued to show its faith in CEO Johannes Teyssen as it extended his contract by five years. The decision is part of a wider reshuffle of the company's board that will see some executives replaced as well as a reorganisation of responsibilities.

Wind turbine manufacturers adjust to US market

The last minute renewal of the US Production Tax Credit for wind projects at the start of the year has done little to help wind turbine manufacturers. **Junior Isles**

Wind turbine manufacturers are reorganising their operations in response to difficult conditions in the US.

Vestas Wind Systems says it is putting some of its factories up for sale in the country. The company announced in February that it was cutting about 10 per cent of its 1100 manufacturing workforce in Colorado. It blamed the battle in Congress over a tax credit for wind generators.

Although Congress granted a last-minute one-year extension of the $12 billion Production Tax Credit (PTC), Vestas said it came too late for many of its customers, who stopped ordering the turbines Vestas builds at plants in Windsor and Brighton.

Their converted tower factory in Pueblo, Colorado, however, is still part of their recovery plan and the company said 100 more people would be hired there by the end of March.

Vestas said in a statement: "As a result of the low activity level expected in 2013, Vestas adjusted its manufacturing footprint accordingly. We have done this in two ways: sharing production capacity, such as the recent contract to manufacture towers for a third party at our factory in Pueblo, and selling factories, such as selling our tower factory in Denmark last year to long-standing business partner Titan Wind Energy."

Vestas says it hopes the wind market will stabilise during the rest of the year with the PTC in place.

Meanwhile, Nordex has also been forced to restructure its US operation. In response to sustained pressure on earnings caused by insufficient capacity utilisation in America and China, together with the decline in new business in these two regions, the Management Board decided to reorganise the company's activities in the US and China.

This involved the discontinued production of the rotor blade facility in Dongying, China, which resulted in a charge of €6.5 million. The exceptional expenses arising in connection with the structural adjustments in the US and China amounted to €75.0 million. Of this, the US accounted for €44.8 million and China for €30 million.

Despite challenging markets in the US and China, according to its provisional consolidated financial statements for 2012, sales of the Nordex Group rose by 17.3 per cent to €1075.3 million, matching the Management Board's forecast.

Europe and South Africa accounted for 94 per cent of new orders. As a result, the Nordex Group "was able to outperform the industry-wide trend" and increase its backlog of firmly financed orders by over 50 per cent to €1049 million, said the company.

Babcock & Wilcox eyes acquisitions

Following an improvement in revenue and profit, US-based Babcock & Wilcox Co. says it is looking to acquire companies in the natural gas and alternative energy sectors to diversify beyond its core coal and nuclear technologies.

James Ferland, president and chief executive officer, said in a call with industry analysts: "2012 was a strong year for B&W. We faced challenges certainly, but we grew revenue and the bottom line."

B & W reported fourth quarter 2012 revenues of $865.3 million, an increase of $64.5 million, or 8.1 per cent from the fourth quarter of 2011. Revenues for the full year of 2012 were $3291.4 million, an increase of 11.5 per cent from the $2952.0 million recorded in 2011. The company is targeting 2013 consolidated revenues of $3.40 billion to $3.55 billion, driven largely by its Power Generation and Nuclear Operations segments.

Meanwhile, B&W continues to have high hopes for its mPower small modular nuclear reactor that remains under development. Executives said the company is looking for "strategic investors" in mPower.

Regarding potential acquisitions, Ferland said, B&W's core competencies include precision manufacturing, very large projects and a focus on the power sector.

Voith strengthens position in Russia

The potential offered by Russia has seen Voith Hydro and RusHydro, one of the largest suppliers of hydropower in the world, sign a contract to establish a new joint venture company, VolgaHydro LLC in Moscow. Each company holds a 50 per cent share in the joint venture.

With a technical potential of 424 GW compared with an installed capacity of 46 GW, Russia's hydropower market has tremendous potential.

In addition to the possibility of building new hydropower plants, VolgaHydro will focus on extensive modernisation and refurbishment of aging hydropower stations. Voith and RusHydro have already started refurbishing the Miatlinskaya and Saratovskaya plants.

"Having founded this joint venture, Voith strengthens its position in the significant Russian hydropower market sustainably," said Voith Hydro's CEO Dr. Roland Münch.

Tenders, Bids & Contracts

Americas

Samsung orders Siemens wind turbines

Siemens Canada has been awarded an order by Samsung Renewable Energy Inc. and Pattern Energy Group LP for the supply and commissioning of 124 wind turbines for the South Kent wind project in Ontario, Canada.

The 270 MW project will use Siemens' SWT-2.3-101 turbines, which have an output of 2.3 MW and a rotor diameter of 101 m. Installation will start this year, with commissioning scheduled for spring 2014.

R-R wins Mexico contract

Rolls-Royce has announced a contract to supply CYDSA, the Mexican textile and chemicals conglomerate, with a Trent 60 industrial gas turbine to power its processing plants at Coatzacoalcos, Veracruz in Mexico.

Under the terms of the contract, awarded by engineering contracting companies OHL and Sener, the Trent 60 unit will provide process steam and electricity for CYDSA's processing plants, with excess electrical power sold to Mexico's national grid.

Incorporating an AC generator and associated control systems, the Trent 60 will feature WLE (wet low emissions) technology, utilising water injection during combustion to reduce emissions and boost performance, and inlet spray intercooling to reduce energy requirements during compression, resulting in higher power and efficiency levels.

B&W signs FutureGen contract

Babcock & Wilcox Power Generation Group, Inc. (B&W) has reached an agreement with the FutureGen Industrial Alliance to begin initial engineering and preparation for full front-end engineering and design work on the US Department of Energy's FutureGen 2.0 carbon capture and storage (CCS) project.

B&W's complete scope of work for FutureGen 2.0 includes the design of the near-zero emissions plant's oxy-coal combustion system, air quality control systems, boiler, steel and other control systems.

The contract authorises B&W and the FutureGen Industrial Alliance to begin project Phase II-A for the 167 MW (gross) power plant in Meredosia, Illinois.

Alstom enters Canadian wind market

Alstom and NaturEner Energy Canada Inc. have signed an agreement for the supply of up to 414 MW of wind turbines to be installed at NaturEner's Wild Rose Projects in Alberta, Canada.

The agreement, worth €420 million, includes 138 ECO 110 3.0 MW wind turbines, and 10 years of maintenance services. It marks Alstom's entry to the Canadian wind energy market.

Scheduled to enter commercial operations at the end of 2014 and the end of 2015, Wild Rose 1 and 2 will be the largest wind farm in Canada on a combined basis.

Asia-Pacific

Marubeni and Kepco to build Nghi Son 2

Japan's Marubeni and Korea Electric Power Company (Kepco) have been chosen to build the Nghi Son 2 ultra-supercritical coal fired power plant in central Thanh Hoa province, Vietnam. Deputy Minister of Industry and Trade Le Duong Quang said the project will be built on a build-operate-transfer (BOT) basis.

The 1200 MW plant is expected to start operating in 2017.

Alstom to supply Nabinagar boilers

Alstom has been awarded a contract worth approximately €85 million ($115 million) by Bharat Heavy Electricals Limited (BHEL), to supply components for three supercritical boilers for Nabinagar Power Generating Company Ltd. (NPGCL), a joint venture company of NTPC Ltd. and Bihar State Electricity Board, located in Nabinagar, Bihar, India.

Under the scope of the contract, Alstom will cooperate with BHEL in designing the boilers and supply identified pressure parts for the 660 MW supercritical boilers, along with pulverisers and air preheater components. It will also assist BHEL with technical advice during the erection and commissioning of the units.

The units are expected to be commissioned by 2017-18.

Siemens wins Japan wind order

Eurus Energy Holdings Corporation, Japan's largest wind power developer, has awarded Siemens a contract for the delivery and installation of wind turbines for the Akita Port wind power project.

Siemens' scope of supply includes the delivery and installation of six direct-drive wind turbines of the type SWT-3.0-101, which have an output of 3 MW and a rotor diameter of 101 m. The deal also includes a service agreement.

Installation and commissioning of the wind turbines is scheduled for summer 2014.

GT13E2 turbines for Suzhou

Alstom has signed a contract with Harbin Turbine Company Limited (HTC) to supply two sets of GT13E2 gas turbine generators for Huaneng Power International's (HPI) Suzhou combined heat and power plant in China.

The 400 MW plant in Suzhou city, Jiangsu province, will help to increase power supplies in the region. The order is Alstom's third for a gas turbine from HTC in the last nine months.

The two units will be delivered in early 2014.

Europe

Enel orders ABB controls

Italy's Enel has placed an order with ABB for the supply of a Symphony Plus automation and control system for an existing power plant on the island of Sardinia.

The 590 MW Grazia Deledda Sulcis coal fired power plant consists of two generating units. The plant's existing control systems will be replaced with a total plant automation solution to enhance efficiency and improve environmental performance.

The Symphony Plus solution includes the recently introduced high-performance controller, burner management and flue gas desulphurisation systems, instrumentation, a new control room and operator stations equipped with an intuitive human machine interface.

New substations for SHE

Scottish Hydro Electric Transmission (SHE Transmission) has awarded four contracts with a total value of approximately £600 million ($900 million) to facilitate the delivery of new substations in the north of Scotland. The Caithness and Sutherland contract has been awarded to a consortium of ABB UK Ltd and Balfour Beatty Engineering Services Ltd; East Coast including Aberdeenshire has been awarded to a consortium of Alstom Grid UK Ltd and Enterprise Utility Services Ltd; Moray and West has been awarded to a consortium of Bam Nutall Ltd and Siemens Transmission and Development Ltd; and a fourth award has been made to a consortium known as Miller Quatro, a new entrant to the market place.

Gamesa lands O&M contract

Gamesa has secured a contract to provide operation and maintenance (O&M) services at 80 wind farms with a combined installed capacity of 2286 MW owned by Iberdrola in Spain and Portugal.

Under the deal the company will handle maintenance for three years – with an option to extend the deal for another two years – on 1143 Gamesa 2.0 MW turbines. It will strengthen Gamesa's presence in the operation and maintenance services business, a key area in its business development plan.

Westinghouse awarded fuel contract

Westinghouse Electric Company has been selected by Vattenfall Nuclear Fuels AB in Sweden to provide replacement fuel deliveries for the Forsmark 1 and Ringhals 3 nuclear power plants in 2015 and with an option for additional deliveries in 2016.

Under terms of the contract executed with Westinghouse Electric Sweden AB, Westinghouse will produce the fuel at its fabrication facility in Västerås, Sweden. It has been one of the main suppliers of fuel to Forsmark and Ringhals since 1973.

International

BWSC to build Lebanon plant

Danish power plant specialist Burmeister & Wain Scandinavian Contractor A/S (BWSC), has been awarded contracts worth approximately €270 to build two large diesel power plants totalling 272 MW in Lebanon.

The two diesel power plants of 194 MW and 78 MW, respectively, will be built on a full turnkey basis in Zouk and Jiyeh near Beirut, Lebanon. Each plant will be based on four and 10 x Man Diesel 18V48/60 medium-speed HFO diesel engines, respectively.

GE signs contracts for EMAL

GE has received a number of contracts to provide power generating equipment and long term services for the Emirates Aluminium (EMAL) smelter complex in Abu Dhabi.

GE will supply gas and steam turbines, generators and a plant-wide control system for the Phase 2 expansion project. In addition, GE will provide technology upgrades for its gas turbines currently operating in Phase I of the EMAL complex.

Under a separate contractual service agreement (CSA), which will replace the existing CSA for Phase 1, GE will deliver long-term maintenance support for GE gas turbines at both EMAL Phase 1 and Phase 2.

The equipment contract for the phase 2 expansion contract includes three Frame 9F 3-series gas turbine generators and two SC5 steam turbine generators. When complete, the EMAL Phase 2 power plant will have the capacity to generate more than 1000 MW of power to support EMAL's expanded operations.

Saudi firm bids for Turkish lignite plant

A Saudi firm has applied for the construction of a coal fired power station, to be built in the Central Anatolian province of Konya's Karapınar district, where lignite reserves have recently been discovered.

"A Saudi Arabian company has applied and we are also waiting for Turkish companies," said Halil Alış, director general of Electricity Generation Company (EÜAŞ).

Some 1.8 billion tons of lignite reserves have been discovered at the site, enough to fuel a thermal power station generating 5000 MW of electricity for 30 to 40 years.

Joint bid for Turkish nuclear plant

Japan's Itochu Corp. and Mitsubishi Corp. and France's GDF Suez S.A. have made a joint bid to build a nuclear power plant in Turkey's Sinop on the Black Sea.

Citing officials from the Turkish energy ministry and GDF Suez, a *Reuters* report said officials from Japan and Turkey held talks in Ankara on an intergovernmental agreement regarding the country's second nuclear plant.

Mozambique orders solar panels

South Korean firm Hyosung is to build a solar photovoltaic (PV) plant with a capacity of 1.3 MW in Mozambique after winning an order from the Mozambique government's Energy Fund.

It has also signed a contract with the Mozambique national electricity company, EDM, to provide infrastructure.

Financing for both contracts, together worth $85 million, will come from the South Korean Exim Bank's Economic Development Cooperation Fund.

The PV facilities will have capacities of 400-500 kV and will be built in the northern province of Niassa, providing energy for homes, schools and health centres.

H-Class planned for Turkey

Siemens is to supply a single-shaft power island equipped with H-Class gas turbine technology to the Samsun Cengiz Enerji combined cycle power plant in Turkey.

IPP firm Cengiz Enerji Sanayi ve Ticaret A.S. is to build and operate the 600 MW power plant, which will operate with an efficiency of 61 per cent. The plant is scheduled for commissioning in 2015.

Siemens' scope of supply includes an SGT5-8000H gas turbine, an SST5-5000 steam turbine and an SGen5-3000W generator. It will also supply a Benson heat recovery steam generator, the electrical system, the SPPA-T3000 control system, and auxiliary and ancillary systems.

Siemens also signed a long-term service contract for the equipment, which will help reduce emissions, and ensure reliability and availability of the plant

GE signs MOU with Sakhalin Island

GE and the Sakhalin provincial government have signed a memorandum of understanding (MOU) to work on developing power projects to meet the energy needs of Sakhalin Island, off the east coast of Russia. The MOU covers a range of GE technologies, including aeroderivative gas turbines, gas engines, coal gasification and wind power.

Part of the MOU covers the development of the 60 MW Nogliki project on Sakhalin Island, based on two LM2500+G4 aeroderivative gas turbines.

Oil

Crude prices expected to remain "reasonable"

- Price levels "would not deter further economic growth" in Asia
- IEA lowers estimates for global oil demand

David Gregory

If, as Saudi Oil Minister Ali al-Naimi says, oil at $100/b is reasonable, then markets are in good shape. In mid-March West Texas Intermediate (WTI) was trading at just under $94/b and Brent crude was selling at a little over $109/b.

Several years ago, when the price of crude crashed as a result of the global financial meltdown in 2008, Saudi Arabia said that $75/b was a fair price, suggesting that crude at a price of $40-50/b was not. As the price of crude recovered and hit $100/b and higher in recent years, economist have argued that high oil prices are hindering global economic recovery.

But perhaps it is more relative than reasonable. Speaking at the Credit Suisse Asia-Pacific conference in Hong Kong on March 18, Mr. Naimi said: "My first speech in Asia as minister was in Singapore in 1996. Oil was just over $20/b and I told the audience that the price, at the time, seemed 'reasonable.' Four years later, I spoke at the Institute of Energy Economics in Japan and the price was around $27/b. I told the audience that, at the time, the price also seemed reasonable. Today, it's up around $100/b – and guess what? Yes, it seems reasonable."

Naimi added that he was sure that current price levels would not deter further economic growth in Asia, and he also said that Saudi Arabia's "central interest lays in global economic growth increasing, regardless of the price… The reality is that our economic growth, and the economic growth of the wider Middle East, depends on the health of the global economy."

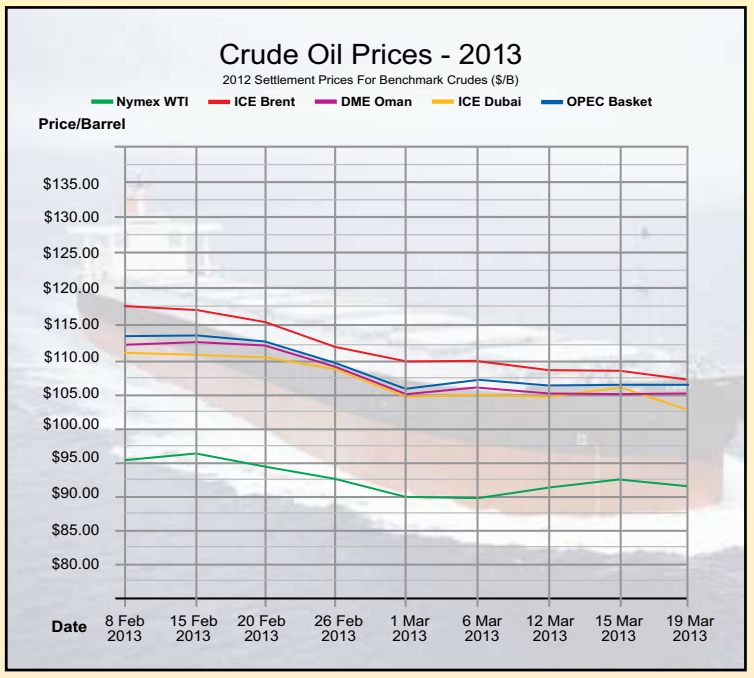
A few days earlier, the Paris-based International Energy Agency (IEA) lowered its estimates for global oil demand for the second month in a row because of "sluggish economic signals spanning several key economies".

In its latest monthly report, the IEA cut 200 000 b/d from its demand forecast for 2013 and added 200 000 b/d to its supply growth projection from non-Opec sources.

"The subdued growth rate of oil demand now looks increasingly entrenched in the face of high oil prices and weak economic growth," the IEA report said. Crude oil demand during 2013 will increase by only 820 000 b/d to 90.6 million b/d, according to the agency's projections.

US spending cuts, worsening business sentiment in China and continued deterioration in European employment were the primary factors in a string of sluggish economic signals that were depressing any improvement in the demand for oil, the IEA said.

"These three economic 'hits', affecting as they do the world's three largest economies and oil consumers, appear to further delay an elusive turnaround in global economic, and in turn oil demand, growth," the IEA said, adding: "The subdued growth rate of oil demand now looks increasingly entrenched in the face of high oil prices and weak economic growth."



Opec, in its latest *Monthly Oil Market Report,* reduced its estimate for oil during 2013 to 89.67 million b/d, showing an increase in demand over 2012 of only 840 000 b/d. The group forecast that demand for Opec crude would decline during 2013 to 29.7 million b/d from 30.1 million b/d given the increase in non-Opec supply.

Opec cited growing US shale oil production as one of the prime reasons for the decline in demand for Opec crude. The group said rising US oil output could cause a further fall of 100 000 b/d in demand for Opec oil this year, bringing a total decline of some 350 000 b/d from 2012.

The US Energy Information Administration (EIA) said in the March issue of its *Short-Term Energy Outlook* that US crude oil production exceeded an average of 7 million b/d during November and December 2012, the highest volume since December 1992. It said US crude output averaged 6.5 million b/d during 2012, an increase of 0.8 million b/d from the previous year and projected US crude production to average 7.3 million b/d in 2013 and 7.9 million b/d in 2014.

"North America accounts for almost three-quarters of the projected growth in non-Opec supply over the next two years because of continued production growth from US tight oil formations and Canadian oil sands," the EIA report said.

As more non-Opec supply comes onto the market, Opec, and Saudi Arabia in particular, can be expected to adjust its production in order to keep prices reasonable.

Gas

East African gas exploitation faces big challenges

East Africa could potentially produce more LNG than Qatar but commercial challenges, the region's remoteness and technical obstacles will have to be overcome.

Mark Goetz

If there is one region of gas discovery that holds the promise of being a game changer, East Africa is it. According to Edinburgh-based consultant Wood Mackenzie, 100 trillion cubic feet (3.5 trillion m^3) of natural gas have been discovered in the waters offshore Mozambique and Tanzania.

This ranks the Rovuma Basin as one of the most prolific conventional gas plays in the world, the consultancy said in a report on the area last year. Furthermore, it estimates that yet to be found are 80 tcf of gas offshore Mozambique and 15 tcf offshore Tanzania. "There is clearly plenty of gas to supply the likely commercialisation route of LNG – theoretically enough to support up to 16 trains," Wood Mackenzie stated.

The size of the resource offshore East Africa is potentially of the same size as the gas discovered offshore Australia – some 200 tcf, according to a recent report in the *Financial Times*. East Africa could at some point in the future wind up producing more LNG than Qatar, which is currently the largest LNG producer in the world with a capacity to export 77 million tons per year. Wood Mackenzie said in its report that the offshore gas resources could support as many as 16 LNG trains.

The two East African states, however, face an array of problems in bringing this newly discovered gas to market. Building the basic infrastructure needed to enable the construction of numerous LNG trains – roads, ports, power generation, etc. – will be primary.

Wood Mackenzie points out that the region's remoteness, no skilled workforce and other technical obstacles will have to be overcome. Furthermore, there are looming commercial challenges to address and overcome.

"There is the question of government capacity – whether there is sufficient impetus and capability within the governments and national oil companies to advance the huge legislative, bureaucratic, customs and financial challenges that such a development would bring," the consultancy pointed out.

For example, Platts reported recently that there are questions about whether Tanzania's parliament will manage to vote on a national gas policy before October 2013, something that will delay the country's fourth licensing round. Meanwhile, the country is in the process of reviewing the existing 26 exploration and production sharing contracts that it has already signed, the energy information service reported.

The companies involved are keen to get work underway. Statoil and its partner ExxonMobil announced in mid-March a new discovery at the Tangawizi-1 well in Block 2. Statoil put the size of the resource at 4-6 tcf and said it brings the total in-place volumes to 15-17 tcf.

"We have so far completed five wells within 15 months and will continue with further wells later this year," Statoil's executive vice president for exploration, Tim Dodson said in a statement. "Recoverable gas volumes in the range of 10-13 tcf brings further robustness to a future decision on a potential LNG project," he said.

The Tangawizi-1 well is the joint venture's fourth discovery within a year and is preceded by two discoveries with Zafarani-1 and Lavani-1, and a deeper discovery in a separate reservoir with Lavani-2.

According to the *Financial Times*, the Statoil/ExxonMobil partnership will team up with BG and its partner Ophir Energy to plan a $14 billion LNG plant in Tanzania. The Tanzanian government says it is currently looking for a suitable onshore site in the south of the country.

Wood Mackenzie estimates that a two-train greenfield development in the region could cost as much a $25 billion.

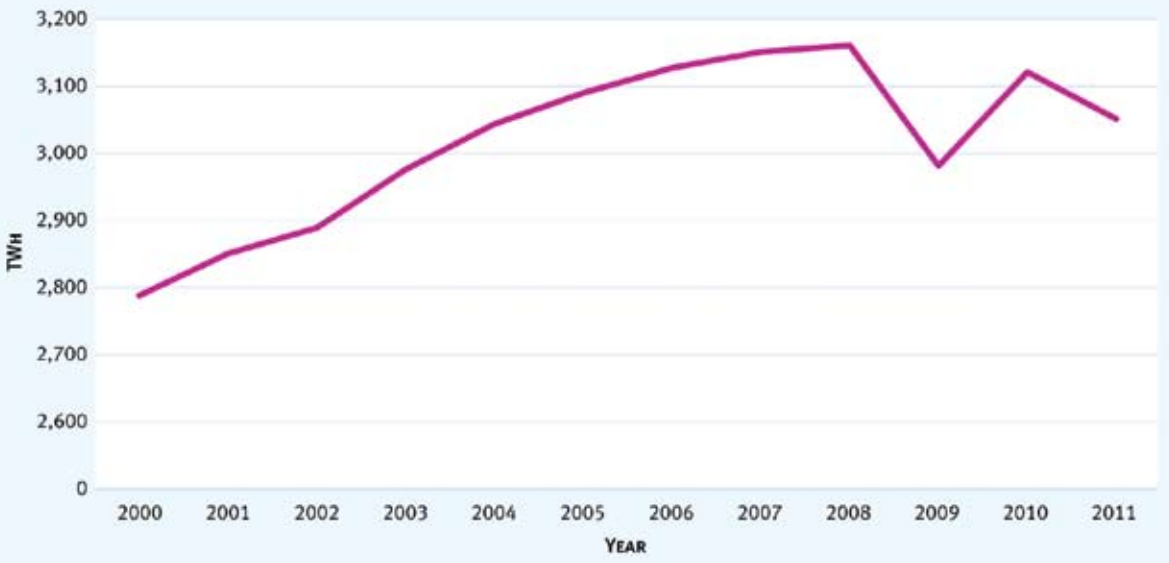
Ophir Energy on March 18 announced that the first deepwater test at the Jodari-1 well in Block 1 was complete and successful with a maximum flow rate of 70 million ft^3/day (21.3 million m^3/day) of gas.

BG and Ophir are partners in Tanzania's Blocks 1, 3 and 4 with a share ratio of 60:40.

In Mozambique, Italy's Eni and Anadarko of the US, operators respectively of Area 4 and Area 1, have agreed to combine their efforts to develop an LNG facility, which will be located on the country's northern coast. The companies hope to bring the first LNG on-stream in 2018.

Eni has discovered 75 tcf in the Mamba field of Area 4, and some 27 tcf of the field extend into Anadarko's Area 1. Discoveries in the two areas amount to 100 tcf and government estimates for future discoveries are put at 150 tcf.

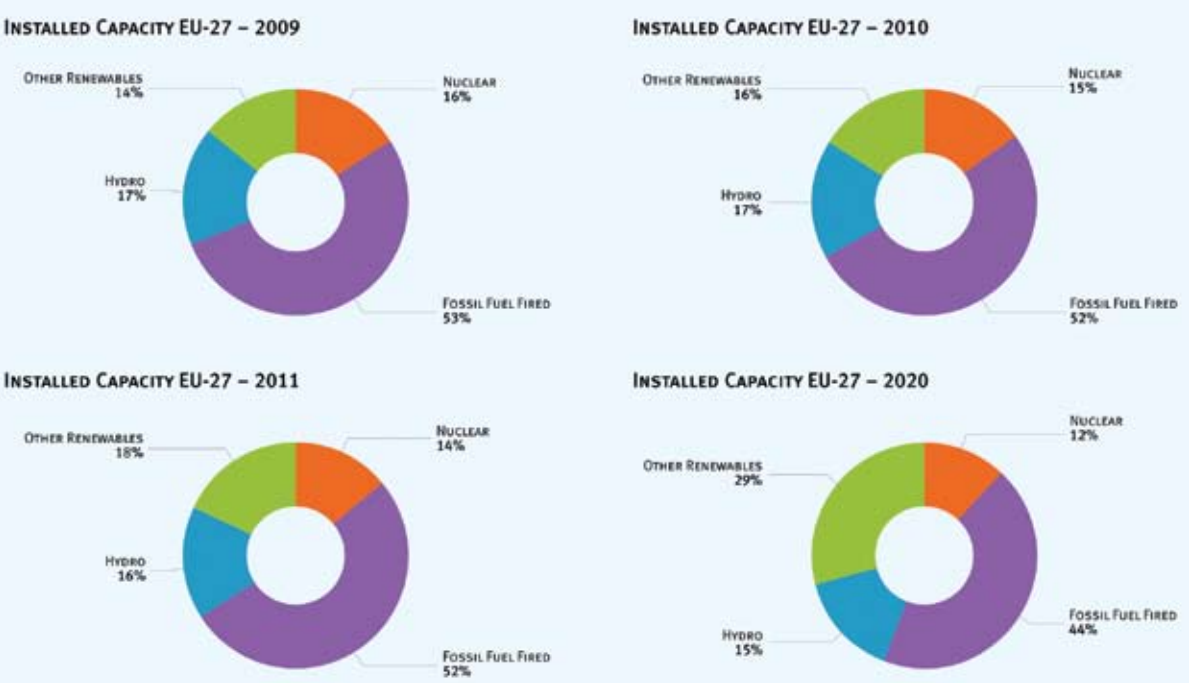
Electricity demand (including network losses) in the EU-27, 2000-2011



Evolution of electricity demand and year-on-year changes in the EU-27 (TWh)

Country	2009	2010	2011	2020	Year-On-Year 2010/2009	Year-On-Year 2011/2010	Annual Growth Rate 2020/2010
Austria	64.0	65.0	66.8	72.8	1.6%	2.8%	1,2%
Belgium	83.6	90.4	86.0	94.3	8.1%	-4.9%	0,4%
Bulgaria	30.4	32.5	31.3	52.7	6.9%	-3.7%	6,2%
Cyprus	4.7	4.8	5.0	6.4	2.8%	4.6%	3,4%
Czech Republic	61.6	63.7	65.2	77.5	3.4%	2.4%	2,2%
Germany	534.8	565.0	565.8	507.0	5.6%	0.1%	-1,0%
Denmark	34.0	34.7	34.7	38.2	2.1%	0.0%	1,0%
Estonia	8.7	8.3	7.8	10.1	-4.9%	-5.8%	2,2%
Spain	274.0	278.0	273.1	340.0	1.5%	-1.8%	2,2%
Finland	81.3	87.7	84.4	99.0	7.9%	-3.8%	1,3%
France	486.7	513.2	478.2	523.1	5.4%	-6.8%	0,2%
United Kingdom	347.0	354.0	342.3	346.0	2.0%	-3.3%	-0,2%
Greece	58.9	59.2	58.6	63.9	0.5%	-1.0%	0,8%
Hungary	38.9	39.8	40.2	47.0	2.3%	1.0%	1,8%
Ireland	25.1	25.4	26.8	31.4	1.2%	5.5%	2,4%
Italy	320.3	330.5	332.3	370.0	3.2%	0.5%	1,2%
Lithuania	10.2	10.3	10.4	13.3	1.0%	1.0%	2,9%
Luxembourg	6.2	6.7	6.6	7.2	7.9%	-1.3%	0,8%
Latvia	7.0	7.3	7.2	8.9	4.3%	-1.4%	2,2%
Malta	2.0	2.0	2.2	2.4	-2.7%	9.1%	2,1%
Netherlands	114.1	117.1	118.1	131.7	2.6%	0.9%	1,2%
Poland	135.9	141.6	145.8	171.8	4.2%	3.0%	2,1%
Portugal	52.6	55.0	53.1	52.0	4.6%	-3.5%	-0,5%
Romania	55.2	50.6	52.3	64.2	-8.3%	3.3%	2,7%
Sweden	137.9	147.0	139.2	146.4	6.6%	-5.3%	-0,04%
Slovenia	12.3	16.1	12.6	14.9	30.9%	-21.7%	-0,7%
Slovakia	25.4	26.6	26.8	35.2	4.7%	0.8%	3,2%
	3,012.8	3,132.5	3,072.8	3,327.4	4.0%	-1.9%	0,6%

Evolution of installed capacity in the EU-27



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Source: Eurelectric, Power Statistics & Trends 2012

Blade Runners of the future

To survive in the energy markets of the future, today's utilities must transform themselves by bringing in IT services related to home energy management systems and demand response.
Ugo Govigli

"I've seen things you people wouldn't believe. Utilities on fire off the shoulder of Orion. I watched prosumers selling power in the dark near the Tannhauser gate. All those moments will be lost in time... like renewable energy without storage systems... Time to die."

Paraphrasing the poetic monologue of Rutger Hauer in the movie *Blade Runner* seems a strange way to explain the tricky situation of the energy industry in Europe today; but looking closer, perhaps it is not as strange as it seems.

According to energy experts, there is no alternative to change if utilities are to enhance their role in the future market. The question is what kind of change? The answer could be less about power generation and more about IT services related to energy management – in short, the creation of 'super utilities'.

However, before analysing the power market it is useful to recall the changes that have swept over the telecommunications sector. Like electric power, it was a heavily regulated network of wires and equipment that was transformed by a convergence of regulatory and technology changes.

Since the transformation, the telecom sector has seen a proliferation of new telecoms companies (telcos) pushing new technologies such as cell phones, unified communications, multi-line phones, voice over internet protocol (VOIP), and now smart phones and tablets.

If 20 years ago the big players were telcos, today's winners are Google, Apple, Microsoft, Facebook etc.

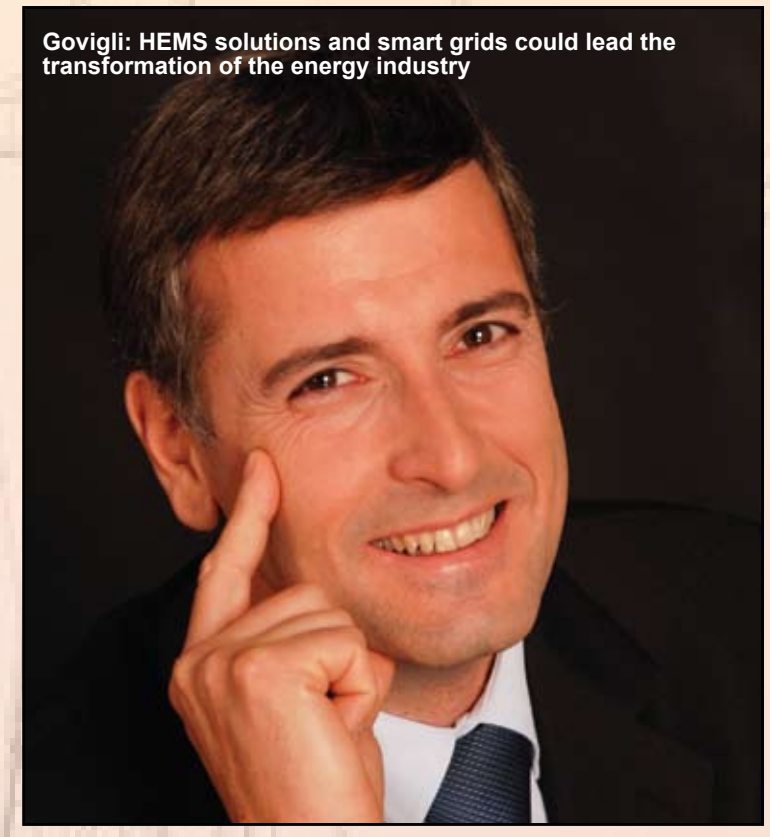
In the energy market, the profound impact of renewable energy sources (RES) and the tremendous growth of green power have severely disrupted what was once considered a stable business model of European utilities, based on the profitability of thermal generation power plants.

The global energy map is becoming predominantly (and profitably) green, as forecast in the latest International Energy Agency (IEA) reports. According to the IEA, electricity from renewables will triple by 2035 and account for almost one third of total electricity output. By 2015 renewables become the world's second largest source of power generation (roughly half that of coal) and by 2035 approaches coal as the primary source of global electricity.

This trend is on track and global investment in RES is reaching new highs, creating a deep negative impact on power prices and consequently on the competitiveness of traditional power generation companies in Europe. Notwithstanding the criticism of many analysts about the imbalanced subsidy policies of the major OECD governments and despite the recent strong counter-offensive to block feed-in tariffs supporting renewables, the battle now seems a foregone conclusion.

In the global race to renewables, European countries installed 75 per cent of total capacity in a few years benefitting from lower solar panel prices and guaranteed premiums for the clean energy. But the new era of unsubsidised RES is just beginning.

The latest UBS report on utilities forecast that unsubsidised solar will replace conventional generation by utilities, calculating that up to 14-18 per cent of electricity demand in Germany, Spain and Italy could be met by self-produced solar electricity. At the same time the study estimates that 120 GW of solar capacity will be installed by 2020 in the three markets.


Govigli: HEMS solutions and smart grids could lead the transformation of the energy industry

NEC's Italian job

In October last year, Enel Distribuzione (Enel), Italy's largest distribution system operator, awarded NEC Corporation a contract for the supply of one of the largest storage systems based on lithium-ion-manganese technology in Europe.

NEC's 2 MVA/2 MWh energy storage systems (ESS) will improve service quality and continuity for alternative energy generation by compensating for power fluctuations due to wind gusts or moving clouds, mitigating the variability of renewable energy generation.

Enel is installing NEC's ESS in the Chiaravalle power substation site in the Calabria Region and investigating the possibility of a new energy distribution service. With the ESS, Enel will conduct a pilot project to optimise the flow of renewable energy in the Italian transmission grid while reducing the imbalance between forecast power and actual production, and minimising energy loss due to grid congestion. The storage system will enable Enel to smoothly control the exchange of energy via the power grid.

> By 2015 renewables become the world's second largest source of power generation

One third of this new capacity will come from unsubsidised solar power, and the bad news for the utilities is that the additional PV capacity will lead to a decline in overall demand in the range of 6-9 per cent between 2013 and 2020.

The barrier to the widespread penetration of renewables will not be their cost (grid parity is near) but their characteristic of being non-dispatchable sources. Moreover there are other reasons that put Europe in the middle of an energy revolution.

Firstly, restrictions on fracking mean natural gas prices will not experience the same declines as those seen in the US due to shale gas. Secondly, the EU has also adopted a new Directive on energy efficiency that relies heavily on Information and Communications Technology (ICT)-based technologies in order to improve the Union's security of supply by reducing primary energy consumption. Finally, the EU Parliament recently voted in favour of setting a binding renewable energy target for 2030 that should increase to 30 per cent (the decision was part of a report on the 2050 low carbon economy roadmap).

In addition many think that climate change remains a huge problem even if there is a massive exploitation of shale gas. Effectively the global energy demand will probably double in the next two decades and if China and European countries start fracking in a sizeable way, actual emissions would not reduce and the worst climate scenario will be just delayed for a decade.

Of course declining dependence on external sources is a crucial development but it is not enough to secure higher energy efficiency, which is essential to making the switch to a new and clear path for economic growth and employment.

According to the World Economic Forum renewable power became a significant global industry, with $184 billion revenues in 2012. Bloomberg New Energy Finance said that utilities worldwide spent $13.9 billion in 2012 (up 7 per cent on the previous year) on smart grid technologies. The London-based company also expects global smart grid spending to reach $25.2 billion by 2018, corresponding to a compound annual growth rate of 10.4 per cent.

Around the world the electricity grid model is undergoing a significant transformation, passing from a hierarchic centralised architecture to a decentralised one, with a growing number of prosumers and microgrids. The end of natural oligopolies in the electricity market is causing problems and traditional utilities are being forced to reposition themselves. The same future is likely for all players involved in the energy value chain.

All these players are therefore looking at the field of Home Energy Management Systems (HEMS) and there are a lot of trials ongoing in Europe (mainly in Germany). According to an interesting study by Business Integration Partners (Bip) there is low interest in standalone HEMS. End users are only willing to buy an HEMS device if it creates value by enabling other services, such as home automation, demand response or integration with distributed generation. Utilities and telcos, as well as manufacturers of appliances, are still searching for profitable business cases.

The Bip study provided a lot of crucial information in understanding the energy market of tomorrow. First of all, investing in energy efficiency technologies is crucial and is far more cost-effective than spending on RES generation. Initiatives such as HEMS and demand response (DR) will play a significant role in reaching climate targets. Secondly, without a reduction in future consumption, the electrical system would require significant investment to accommodate the increasing demand and production variability. DR is able to reduce investment needs by up to 10 per cent.

Going back to the utilities' need to change their business model and how they operate, HEMS solutions and smart grids could lead the transformation of the energy industry. This market segment requires that the value chain gathers heterogeneous competences and needs cooperation from contiguous businesses, meaning players have no need to cover the entire value chain.

Furthermore, as no player is going it alone, risks related to this business model are reduced. Many pilot projects are ongoing. They are still small, but popping up all over Europe. For example, the interest in industrial investment in Italy in electricity storage systems and smart grid applications, has seen NEC enter into a strategic partnership with Enel (see box).

Over time, it is likely that companies will shift their focus away from smart grid technology and operations as they build confidence and insight needed to experiment with the new business models. The focus will be on new revenue streams and routes to market and it will occur in both the consumer and grid-centric contexts.

For example Germany, with 8 million of the potential 25 million potential European end-users, is the forerunner in the market for RES, smart grid and HEMS. Sixteen solutions will be introduced to its market, of which 10 are by cross industry alliances that involve energy players, telco service providers, telco manufacturers, appliance manufacturers, electro-technical manufacturers and IT companies.

HEMS, like smart grid embodies, the intersection between power engineering and information and telecommunication technologies. Building a culture that encourages rich dialogue and compelling solutions among these competencies is difficult but necessary. Few companies are able to develop all these competencies in-house, with large investments and significant risks (specially in the pilot phase).

For most players, the ability to identify, form and manage partnerships, alliances, and more informal consortiums is growing in importance. If today these partnerships are a source of competitive advantage how might they evolve in the future?

The emergence of new entrants in the utility value chain is the beginning of the development of innovative services and business models, and investment in pilot consortia. Changes will probably be so radical that these consortia will be transformed into super utilities – with almost all the key competences and technologies needed in the future energy market where all players are "Blade Runners" – and avoid being "on fire off the shoulder of Orion".

Ugo Govigli is Vice President, Smart Grid Solutions, NEC Europe.

On a slow burnout?

The shale gas boom in the US combined with higher gas prices has led to an increase in coal fired power generation in Europe. But is coal's comeback a short-lived phenomenon? **Junior Isles**

The shale gas boom in the US has significantly impacted the energy equation in the US, with natural gas displacing coal as the leading source of energy for power generation due to a significant drop in natural gas prices, which recently reached levels below $3 per million Btu. This has forced many US miners to export their surplus of displaced coal.

This, combined with a slowdown in energy demand in China, has negatively affected international coal prices in recent months. For many European utilities imported coal is now a cheaper option than burning natural gas from Russia or LNG from Africa, which often have contract prices linked to crude oil.

According to international management consulting firm Arthur D. Little (ADL), this trend is likely to continue for a few years aided by the growth of shale development in North America. The company also believes the US will soon become an important exporter of LNG, which will have two important effects in the medium term.

Rodolfo Guzman, Partner at ADL's Global Energy Practice explained: "Firstly, it will help provide some support for US domestic natural gas prices which are likely to recover somewhat from their rock bottom levels. Secondly, the exploitation of arbitrage opportunities will help moderate the large price differentials between European and US natural gas prices. This should eventually help improve again the competitiveness of natural gas versus coal in the European markets. Gradual developments of some indigenous shale gas resources in Europe combined with a potentially higher value for carbon credits should also help natural gas recover its position in the European power sector."

The low carbon price, which is currently languishing at around €4/t of CO_2, has certainly made coal fired plant more competitive than gas plant in Europe. This combined with the growing amount of renewables in the generation mix has hit gas fired generation, and a number of utilities are finding it uneconomical to run gas fired plant.

According to the Italian Coal Association, coal's share in Europe's generation mix rose from 30 per cent in 2011 to 33 per cent in 2012. Yet these gains could be short-lived.

The recent vote in the European Parliament to prop up the European Emissions Trading Scheme (ETS) may eventually help tip the economics back in favour of gas. The Large Combustion Plant Directive (LCPD), and its successor the Industrial Emissions Directive (IED), will also result in the closure of coal fired plant that are not compliant by 2015.

Research and consulting company Wood Mackenzie said in a recent report that environmental policies and initiatives to reduce industrial emissions would halt the renaissance of coal. Its analysis shows that the controls of the LCPD and IED will obligate the retirement of around 15 GW of coal fired generation capacity by 2015, with a further additional loss of 20 GW by around 2020.

Peter Osbaldstone, Lead Analyst for Wood Mackenzie's European Power team said: "Coal's recent role in European power is much more likely to represent one last push rather than the recovery of a long-term player."

Recent analysis by its European Gas & Power Service, covering Germany, France, the UK, Italy, Spain, the Netherlands, Belgium and Portugal notes that Europe's coal import is steady at 200 million tonnes but says that 55 GW of coal fired power capacity will be lost by 2023.

Assessing coal's competitive advantage over natural gas, it says that while coal prices will remain competitive – with reliable supplies from the US and Colombia – Europe's environmental policies will fundamentally weaken its role in Europe beyond 2020.

Osbaldstone explained: "During 2012, we saw a clear swing to coal at the expense of gas in the European power market. Within the year, the contribution of coal fired power supply rose some 15 per cent to 602 TWh, with coal commanding an overall market share of around 25 per cent. In contrast, power supply from gas dropped by around 20 per cent to 466 TWh – the lowest level of gas fired generation in Europe since 2002."

Osbaldstone says the driver behind this change is largely due to coal's price advantage over gas. "European gas prices ranged from around $8.5 to $10.6 per million Btu in 2012 while coal prices were between $85 and $105 per tonne. Given the low carbon prices we saw, it would have taken coal prices of the order of $160/t for coal to gas fuel switching to become an attractive prospect for power generators – a level of coal prices some $55-75/t above those seen in 2012 to bridge the gap between the fossil fuels in European power."

Jonny Sultoon, lead coal analyst for Wood Mackenzie commented on the flood of cheap coal from the US.

"With extra exports from the Eastern US, around 15 million tonnes of coal needed to be absorbed by Europe, i.e. around 9 per cent extra supply for the major European importing nations. Europe was already well-stocked so prices had to fall – and fall they did from around $110/t at the start of the year to around $85/t in June 2012. At these levels, coal prices were far more competitive than gas."

Wood Mackenzie says that European import demand for coal is likely to remain steady for the next three to four years at around 200 Mt and predicts its advantage over gas is likely to remain for several years.

Platts, a global energy, petrochemicals and metals information provider also sees little change on the immediate horizon.

Gareth Carpenter, Managing Editor, *Platts International Coal Report* said: "The profit margins of coal (the dark spreads) versus gas have been very attractive for the last two years or so, which has made coal the fossil fuel of choice in Europe."

European physical thermal coal spot prices have fallen by about 15 per cent in the last four months – from $93-94/t in late November to currently about $80/t.

Carpenter attributes this erosion of prices to a persistent oversupply with minimum disruption. Even a strike at the largest thermal coal mine in Colombia in February had little impact on prices.

"Some argue that prices have reached bottom but we were hearing this $10 ago, and we are still going down," said Carpenter. "Looking at the fundamentals, a lot of tonnage has to be swept up before there's a change in the current situation."

Prices could be further depressed this year as the UK, one of the largest coal importers in Europe, takes about 7 GW of coal plant off line.

The prospect of new coal plant is also unlikely to make much difference to prices. Wood Mackenzie asserts that the scope for new coal fired capacity is relatively limited, forecasting that around 10 GW of new capacity will be installed over the next two to three years – around 50 per cent of the total coal plant build expected in the period to 2030.

While coal will continue to squeeze gas generation out of the European market for the next couple of years, Wood Mackenzie expects to start to see the loss of coal fired capacity weakening the fuel's position beyond 2014.

Yet Europe is not the only show in town for coal. China and India will continue to drive global demand. Meanwhile, Japan, in contrast to 2011 due to the exit from nuclear power, has seen a 10 per cent growth of its steam coal imports, which accounted for 132 million tonnes.

At the same time, the development of supercritical and ultra-supercritical technology will make coal plants more attractive by raising efficiency and thus reducing their environmental impact. Also, the eventual deployment of carbon capture and storage (CCS) will arguably have the biggest role to play in tackling climate change and so will help keep coal in the mix.

Certainly China is making a tremendous effort to reduce the negative effects of coal fired generation on its environment.

Milton Catelin, chief executive of the World Coal Association said: "China is investing in low carbon technologies in a manner that puts the west to shame. Today China leads on deployment of renewables and even accounts for 36 per cent of all global investment in advanced coal technologies, including CCS. Chinese action in the low carbon space contrasts markedly with western rhetoric."

Governments certainly need to replace rhetoric about climate change with practical actions and investments. Compared to other technologies, investment in CCS has been severely lacking. According to the WCA, since 2005 public funds for CCS have barely past $12 billion in total.

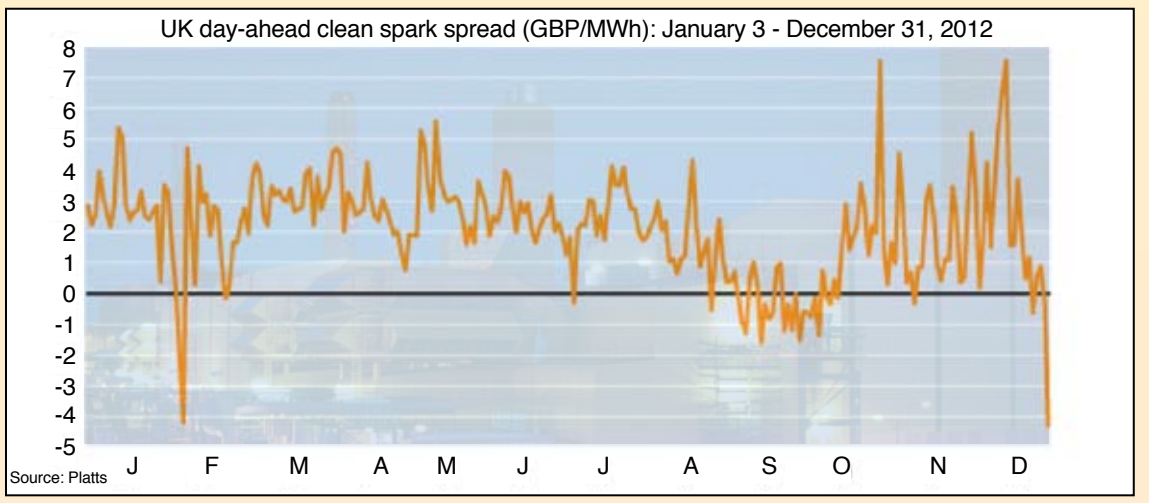
"Yet public funds invested in nuclear are running at $45 billion every year, and in renewables at $64 billion every year," said Catelin. "This is despite the fact that according to IEA analysis renewables and advanced coal technologies, and to a lesser extent nuclear, are all expected to provide roughly the same proportion of the solution to global warming."

Catelin also points out that industry also needs to play its part, noting that WCA members are investing "substantive amounts of time and money" in CCS projects globally, including in the USA, Australia and China. "In 2013, the WCA with generous support from the Shenhua Group started its own WCA Strategic Research Institute in Beijing to contribute even more to CCS and sustainable development."

Catelin said: "The good news is coal is here to stay. It's good news for economies concerned with rising electricity costs and it's good news from the perspective of climate change. The IEA has calculated that efforts to stabilise global warming at 2°C without coal plus CCS in the global energy mix, would be 70 per cent more expensive and likely fail."

Coal has provided almost half the world's incremental energy since the turn of the century and, according to the IEA will be needed to provide half of the on-grid energy.

Coal is in imminent decline in the US and faces mid- to long-term challenges in Europe, yet on a global scale it is likely here to stay – at least for the foreseeable future.



The profit margins of coal (the dark spreads) versus gas have been much more attractive in countries such as the UK and Germany

> Europe is not the only show in town for coal. China and India will continue to drive global demand

Wasted potential?

Waste-to-energy plants can be a useful way of addressing a country's waste problems, while producing electricity as an added bonus. ***TEI Times*** looks at two projects under development in Scotland and examines the issues surrounding the technology's uptake in the UK.

The UK produces a reported 400 million tonnes of waste each year. Household waste accounts for approximately eight per cent of this figure, with the rest coming from industrial processes such as quarrying and mining, and demolition and construction in the buildings industry. Although it is now achieving over 60 per cent recycling on municipal waste, this represents a small fraction of the total with the balance finding its way into landfill sites.

Needless to say this practice is unsustainable. Estimates suggest that, at current disposal rates, the UK has a meagre 10 years supply of landfill left. As a consequence of disposal authorities' inability to recycle the vast majority of their solid waste streams, coupled with concerns over the security of the energy supply chain, there is now considerable interest in the more widespread use of waste-to-energy. So much so that the Department for Environment, Food and Rural Affairs (Defra) has stated the government's commitment to investing in the creation of 15 000 new waste-to-energy facilities by 2020.

Two such plants are currently in development in Scotland. The first, a £145 million project, the South Clyde Energy Centre (SCEC), which Glasgow City Council recently announced has been granted consent by planning officials; the second, a £35 million North Clyde Recycling Centre (NCRC) at Rothesay Dock, Clydebank, approved by West Dunbartonshire Council.

Bob Fletcher, managing director of Fletcher Rae architects, which designed the facilities, commented: "EU emissions targets, landfill tax and ever increasing energy consumption demands have created a market in waste and recycling treatment that is driving the development of large-scale municipal waste facilities like those in Glasgow."

The SCEC facility will process residual waste left after recycling, generating up to 20 MW of electricity for export to the grid – the equivalent of powering 38 000 homes, 55 per cent of which will be renewable. The facility, which is being developed by Peel Environmental, is also expected to process around 250 000 tonnes of commercial and municipal waste from the area, as well as refuse-derived fuel (RDF) from other facilities including the NCRC facility.

The SCEC plant is designed to generate energy from waste using a familiar process. 'Black bin' waste together with pre-sorted waste is delivered to a receiving hall and dumped into a huge pit that is around 7.5 m deep. A grabber then transfers the waste into a hopper that feeds a large boiler. Typically, such a boiler will measure 42 m from top to bottom. The boiler is started up on oil before switching to waste. The waste has to be incinerated at 1200°C for 4 minutes in order to destroy any undesirable chemicals within the waste. Steam produced by the boiler is used to drive a steam turbine.

The boiler house will occupy one third of the building; the remainder is predominantly dedicated to flue gas treatment, where the flue gas is chemically treated and filtered to remove pollutants in accordance with Waste Industry Directive air quality standards. Around 80 per cent of the waste is converted leaving a residual ash, around 15 per cent of which can be used in road construction and building materials.

Unlike the SCEC facility, the NCRC plant will use mechanical biological treatment (MBT) for converting waste to energy. The facility will include a Recyclables Sorting Facility (RSF), where mixed recyclables such as glass, metals and plastic are sorted. This will sit alongside a recyclables recovery facility (RRF) and an anaerobic digestion (AD) plant.

MBT involves first taking off the organic waste fraction and feeding it through the AD plant. AD is a series of processes in which micro-organisms break down biodegradable material in a sealed reactor or holding tank in the absence of oxygen. The process generates a biogas, which can then be used to drive a reciprocating engine or gas turbine to generate electricity.

The remainder of the waste following the removal of the organic waste and recyclables is cured over a period of 6-8 weeks to produce RDF that is sent to the SCEC facility to be used as fuel.

Explaining the design of the facilities Fletcher said: "One of the main challenges we experience when designing these schemes is the diversity of the waste stream and the requirement for different treatments and disposal regimes. In order for planning consent to be obtained, a commitment to a technology solution is required for the generation of residual waste-to-energy, having removed all recyclable material.

Fletcher: "the message is beginning to trickle through"

"The solution has to be established and reliable, with proven levels of performance, reliability and fully compliant with important EU standards on such matters as emissions and air quality. There are a number of alternative advanced thermal process treatments being advocated. However, these are simply not proven to be effective or perform in a way unique from mass burn technology."

Fletcher believes there is tremendous potential for waste-to-energy conversion. South of the Scottish border, there are currently 40 plants, many of them also incorporating elements of energy generation. While cost and value drivers to developing these facilities are often complex, schemes have been accelerated by a shift towards renewables in the national environmental agenda and increased pressure caused by the diminishing fossil fuel supply.

"It's difficult to underestimate the impact of stimuli, like carbon trading schemes, feed-in tariffs and investment subsidies (ROCs, LECs and PFI Credits), as well as measures such as landfill gate fees and taxes and the EU Landfill Diversion Directive. Macro issues, like carbon emissions targets and environment protection notwithstanding, job creation, contribution to the regional economy and income improvement are also key local impetuses for supporting new facility construction," noted Fletcher.

Yet while the UK government claims to be taking steps to encourage investment in energy-from-waste infrastructure, there are barriers to its widespread uptake. Not least of which has been the complex bidding and planning process construction operators and providers in the waste sector have faced when trying to secure project funding.

Energy-from-waste projects are typically procured on a build-own-operate basis, so potential schemes must offer a strong business case to secure potential investment, and overall viability will be subject to a wide range of pricing, deliverability and performance predictions.

Planning continues to be contentious and high-risk. Even with a smooth running process, projects can take up to five years to receive approval, plus three years for construction. Fletcher notes: "Project completion rates could be greatly improved by support for smaller-scale facilities, which are co-located in a mixed community of industrial, commercial, residential and retail schemes – think sustainable eco-villages, where a full mix of uses are aggregated. Smaller schemes would also go some way to alleviate the public's 'not in my back-yard' antagonism, which often makes larger, more efficient schemes, difficult to get through planning."

Waste-to-energy can be a crucial component of the kind of sustainable energy landscape that the UK and other countries are attempting to deliver as part of ambitious carbon reduction plans.

The issue of surplus waste is not confined to British shores. At least four million tonnes of UK industrial, commercial and household waste continues to be shipped overseas – much of it to India, China and South-east Asia.

Despite facing a unique and often conflicting set of economic challenges, recent analysis from Pike Research suggests that the Asian-Pacific region is the fastest growing market for waste-to-energy systems, with a predicted revenue stream of $13.6 billion by 2016. China currently treats 55 per cent of its municipal solid waste, as compared with the UK, which treats closer to 50 per cent, and a EU average of 40 per cent.

Although the economics are project specific, Fletcher believes waste reduction technologies are becoming increasingly bankable, a trend he says will continue to open up the market for further investment.

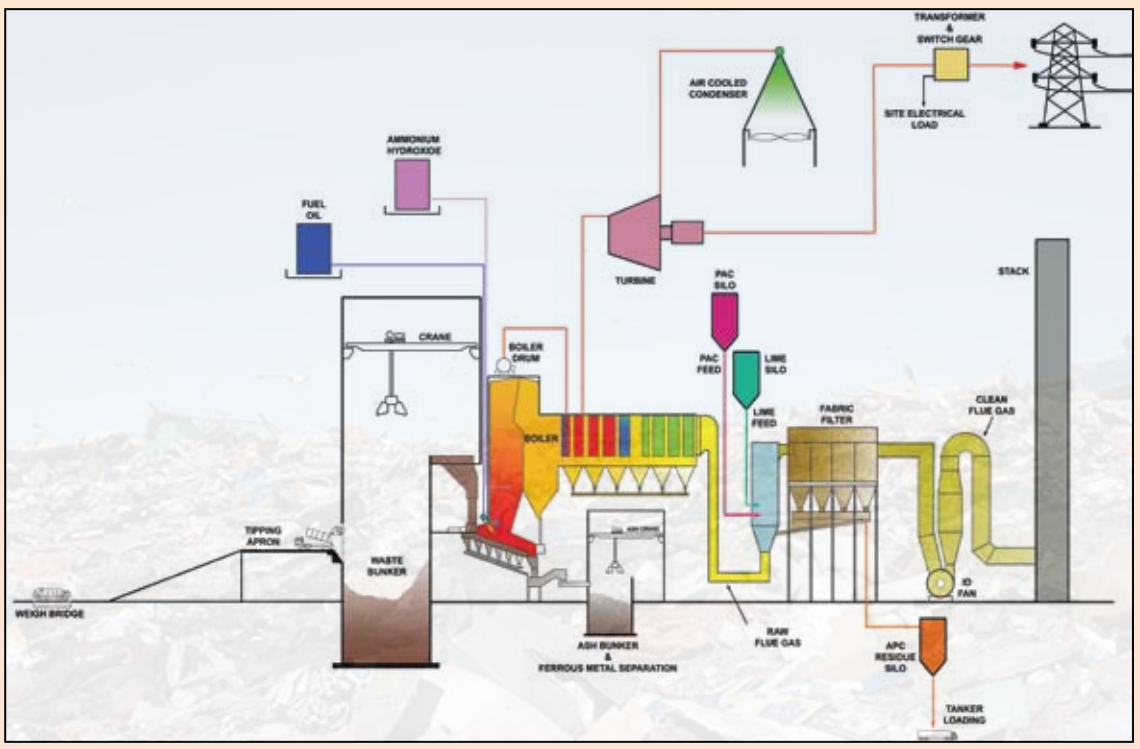
"Here in Britain, the ultimate long-term success of waste-to-energy projects will depend on substantial support from local authorities, design advisory panels and other stakeholders. From a design and development perspective, the message is beginning to trickle through, with a growing number of waste-to-energy proposals being submitted by local authorities," he says.

However, it is important to note that the conversion of waste to an inert form through MBT does nothing to resolve the problem of where this material goes, or indeed create viable energy from the material.

Fletcher pointed out: "Passing it on to another location, out of the Borough or County, does not solve the national problem of what we do with our waste. The development of energy from waste technologies has significantly advanced the sustainable potential of our society, but it's not a silver bullet.

"Moving towards the goal of a 'zero waste' economy requires a renewed emphasis to be placed on tackling our systemic wastefulness throughout our supply chains, combined with the use of effective energy recovery technologies in strategic locations."

Configuration of a waste-to-energy facility of the type planned for SCEC



Junior Isles

Anyone smell a rat?

Two years on from the disaster at the Fukushima Daiichi plant in Japan, nuclear is again in the spotlight. While a power failure at the crippled plant in Japan disabled critical cooling systems last month, halfway around the globe in the UK, Britain's coalition government granted planning approval for the Hinkley Point C nuclear power plant.

Apart from reminding the world of what is still a delicate situation at Fukushima, the power failure provided fuel for anti-nuclear lobbyist that would see the UK government pour cold water on its plans for Hinkley Point and its entire nuclear programme.

According to Tokyo Electric Power Co. (Tepco), the owner of the Fukushima Daiichi plant, the power failure was brief at its command centre but continued for hours at three of the seven fuel storage pools and at several other facilities, including one that treats water that has been contaminated by radioactivity.

Tepco said it suspected a 'rat-like animal' of short-circuiting a makeshift switchboard after finding burn marks on the switchboard and the dead animal nearby.

With the situation now under control, Japan's government will not be put off the nuclear path by rats or anything else. The costs associated with the disaster have been astronomical. In February, the government agreed to provide $7.5 billion more in funds to Tepco to compensate those affected by the worst nuclear disaster since Chernobyl. Tepco officials said in November the costs of compensation and decontamination may double to Yen10 trillion ($106 billion).

Meanwhile, a recent a survey by Japanese newspaper *Asahi Shimbun*, said it would cost Japan's 10 nuclear power plant operators about $10.87 billion to comply with new safety standards related to disaster preparedness in the wake of Fukushima.

Operators also noted the final cost to comply with the standards could rise as they cannot accurately estimate the expenses because parts the standards are yet to be determined. The costs were estimated for 15 plants, not including the Fukushima plant.

> … there are other countries that remain as undeterred as Japan by the human impacts of the accident or the rising cost of nuclear

Yet while the likes of Germany, Italy, Switzerland and others have turned away from nuclear in the wake of Fukushima, there are other countries that remain as undeterred as Japan by the human impacts of the accident or the rising cost of nuclear.

Last month the UK government gave the go-ahead for Nuclear New Build (NNB) Generation, a subsidiary of EDF Energy, to construct the Hinkley Point C power plant. The plant would be the first of a new fleet of reactors, which the government says will add 16 GW of low carbon generating capacity by 2025. Under the Department of Energy an Climate Change's (DECC) *"low cost" 2050 Pathways* scenario there is the possibility a further 24 GW could be added by 2050.

The cost of building Hinkley Point C, which would have two 1.6 GW Areva-designed EPR nuclear reactors, is estimated at £14 billion ($21 billion). EDF Energy head Vincent de Rivaz said that lessons learned from the construction of the new reactors at the plant could lead to lower costs for other reactors that would be built under the UK programme.

No doubt the UK government and its taxpayers hope Mr. de Rivaz is right. Although EPR reactors of the same design being built in China are said to be on time and on budget, the escalation of budgets at Olkiluoto in Finland and Flamanville in France give cause for concern.

Nevertheless, the UK government seems determined to stand by its decision to build a fleet of new nuclear plants and appears willing to bend over backwards to make it happen.

Just five years ago the Department of Energy said new nuclear plants would come in at around £33 to £41 per MWh. Today the price looks set to be more than double that. Further, the government is now also prepared to be locked into nuclear contracts for far longer than the originally envisaged 20 years.

The decision to have nuclear as part of the energy mix makes sense for a number of reasons, yet there are those who smell a rat. Certainly the objections by environmental groups who question its financial sensibility, especially at a time when many consumers are already suffering from high energy prices, are understandable.

Greenpeace executive director John Sauven said: "With companies now saying the price of offshore wind will drop so much it will be on par with nuclear by 2020, there is no rationale for allowing Hinkley C to proceed."

WWF-UK argued that continued cost escalations and construction delays facing the nuclear industry should not be allowed to undermine the UK's ambitions to decarbonise its economy.

Keith Allott, chief advisor on climate change at WWF-UK, said: "Backing nuclear means shifting a huge liability to British taxpayers for the cost of building, electricity and crucially, dealing with the waste."

It is also surprising that the government is not giving more consideration to how much longer the existing fleet could actually operate.

The UK currently has 16 operating reactors with a total generating capacity of 10 GW, normally generating around 19 per cent of the UK's electricity. Most of these began commercial operation in the 1970s and 80s – yet all but one will be retired by 2023. The exception is Sizewell B, the UK's only pressurised water reactor (PWR), which began operations in 1995.

Extending the lifetime of a nuclear plant so it operates reliably for another 20 years on top of the typical 30 to 40-year operating period is not uncommon.

This has been a trend in markets like the US where retrofits of the conventional power island have not only extended the plant's lifetime but, through the use of modern steam turbine technology, has allowed operators to generate extra megawatts from the plant.

Jonathan Lane, GlobalData's head of consulting for power and utilities, commented: "Although not without safety concerns, the government should consider granting a five-year extension to the plants scheduled to close by 2023 with the exception of Hunterston B and Hinkley Point B, which have already received extensions."

The last operating Magnox reactor – Wylfa 1 – is due to shut down when its fuel runs out in September 2014. This will leave seven twin-unit AGR stations and one PWR, all owned and operated by EDF Energy.

EDF Energy is planning life extensions averaging seven years for the AGR units and announced a 7-year life extension for Hinkley Point B and Hunterston B in December 2012. It will seek a 20-year life extension for Sizewell B, taking it to 60 years as for similar US plants.

The fact that EDF owns and operates the UK's entire nuclear fleet puts the company in a privileged position when it comes to determining how much longer existing plant will run for. And being behind plans for the lion's share of the proposed new build certainly gives it a strong negotiating position over the price of new nuclear contracts. It is an uncomfortable position for a government desperate to keep nuclear in the mix to be in.

Unlike Fukushima there is no evidence of a dead rat at Hinkley Point but environmental groups and taxpayers could be forgiven for smelling one all the same. Yet one thing is almost certain, when politicians are faced with tough questions and the backlash from taxpayers over the prices guaranteed for nuclear generation, no doubt they will disappear faster than a rat up a drainpipe.