THE ENERGY INDUSTRY TIMES

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Bringing order from chaos

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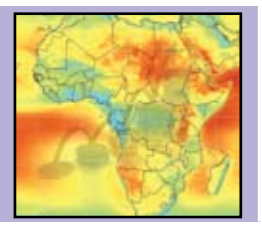
Clearing the clouds over Africa

Solar has huge potential but attracting investors requires a careful balancing act by governments. *Page 14*



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"Sub-optimal" renewable deployment proves costly

WEF Chairman Klaus Schwab

A recent report reveals that the EU has wasted billions in the way it has deployed renewables. As the renewable sector rebounds with the cost of generation falling, the industry must be careful in optimising the future use of renewable resources. **Junior Isles**

A report released by the World Economic Forum (WEF) on the eve of its annual meeting in Davos claims that poorly thought-out deployment of renewables is costing Europe dearly.

The WEF's 'Future of Electricity – Attracting Investment to Build Tomorrow's Electricity Sector' puts a figure on a point that many industry observers have long argued. It calculates that Europe could have saved $100 billion by installing solar power panels in sunnier countries and wind turbines in windier places. The report, written with consultancy Bain, adds that better cross-border coordination and higher capacity power cables between countries could have saved another $40 billion.

It said that even though Spain gets about 65 per cent more solar energy than Germany (1750 kWh/m²/year compared to 1050 kWh/ m²/year for Germany), Germany has installed about 600 per cent more solar photovoltaic (PV) capacity than Spain (33 GW compared to 5 GW).

At the same time Spain has less wind than northern European countries, yet has still installed 23 GW of wind power capacity.

The report, which urges policy-makers to incentivise investments that help minimise or avoid unnecessary costs, said: "Such sub-optimal deployment of resources is estimated to have cost the EU approximately $100 billion more than if each country in the EU had invested in the most efficient capacity given its renewable resources."

It explained how valuable lessons on policy design, market design and business models can be learnt from the European Union's experience as a "first mover" in switching to sources of renewable energy.

Renewable energy has made strong advances in the power generation fuel mix in many developed and developing nations in the past decade.

According to Frost & Sullivan's Annual Renewable Energy Outlook 2014, renewable energy installations in 2013 saw the continued, gradual shift in market power to emerging economies where economic growth and revised energy priorities is driving a sustained increase in the adoption of renewable energy.

At the same time, the cost of renewable energy has declined dramatically in recent years.

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Falling oil prices take their toll

Falling oil prices are beginning to take their toll on large energy companies, and some argue that the dramatic decline poses a risk to clean energy development.

Speaking on the sidelines of last month's World Future Energy Summit, France's ecology and energy minister said the fall in oil prices is a threat to global efforts to boost renewable energy use and lower carbon emissions.

"There is a real risk of the re-orientation of consumption towards fossil fuels, the ones that cause global warming and thus very severe climatic changes," Segolene Royal said.

Royal told *AFP* the challenge to switch to cleaner forms of energy was "not insurmountable".

"We must take regulatory, fiscal and strategic decisions to ensure that this decrease (in oil prices)... can provide new flexibility to invest in renewable energy and energy savings," she added.

Royal's comments came after the price of crude dropped by more than half since June, raising fears of a setback for renewables.

While some analysts argue that the falling oil price could hamper the transition towards a low carbon energy system, others say the renewables sector is sufficiently established to maintain its growth.

In December the International Energy Agency (IEA) said world leaders have a "golden opportunity" now, with falling crude oil prices, to put a price on carbon emissions as cheaper fuel makes the move less risky politically.

While the debate continues, what is clear is that the falling oil price is having a clear impact on energy companies.

Lawyers representing BP recently told the court hearing the trial over the 2010 Deepwater Horizon disaster that the value of BP's operations in the US Gulf of Mexico has dropped more than two-thirds in the past five months as a result of the slump in oil prices.

Last month, the bleak outlook for North Sea oil forced the company to announce that it was cutting 200 onshore workers and 100 contractor roles from its 3500 staff in the North Sea.

The price of a barrel of Brent crude – the global benchmark – has more than halved since June and stands at around $48 (£31.50). It could tumble to as low as $31 (£20.44) by April, according to forecasters at Bank of America Merrill Lynch.

The collapse in oil prices has already seen a number of major firms scrap projects, cut jobs and slash wages – and the North Sea sector is now at 'crisis' point, according to experts.

US-based North Sea oil producer Conoco-Phillips is to cut 230 British jobs, while Royal Dutch Shell and Qatar are to shelve a £4.3 billion project in the Middle East.

In recent years oil majors have turned to harder-to-reach sources of oil, such as the Arctic or the Canadian tar sands, as conventional wells dry up. The Carbon Tracker Initiative, a think-tank, suggests the oil price needs to be around $95 a barrel to make such investments worthwhile.

A low oil price could also disrupt the fracking industry. The North American shale boom has led to a glut of new oil on the market, driving down prices.

Continued from Page 1

Liebreich: figures "exceeded expectations"

A report issued by International Renewable Energy Agency (Irena) last month said that biomass, hydropower, geothermal and onshore wind are all competitive with or cheaper than coal, oil and gas-fired power stations, even without financial support and despite falling oil prices.

In mid-January data from Bloomberg New Energy Finance (BNEF) revealed that world clean energy investment soared by more than 16 per cent last year to $310 billion.

It said investment rebounded strongly in 2014, boosted by demand for solar PV on the back of its greatly improved competitiveness, and by the financing of a record $19.4 billion of offshore wind projects. The figure is more than five times the $60.2 billion attained a decade earlier, albeit still 2 per cent below the all-time record of $317.5 billion reached in 2011

Michael Liebreich, chairman of the advisory board for BNEF, said: "Throughout last year, we were predicting that global investment would bounce back at least 10 per cent in 2014, but these figures have exceeded our expectations. Solar was the biggest single contributor, thanks to the huge improvements in its cost-competitiveness over the last five years."

He said healthy investment in clean energy "may surprise" some commentators, who have been predicting trouble for renewables as a result of the oil price collapse. "Our answer is that 2014 was too early to see any noticeable effect on investment, and anyway the impact of cheaper crude will be felt much more in road transport than in electricity generation."

Ian Thomas, managing director at Turquoise International, a merchant bank specialising in energy and the environment, commented: "The cleantech sector is experiencing welcome growth… This strong upsurge reflects more projects moving from feasibility to final stages, as well as increased levels of support for smaller companies looking to break into the market with new and exciting technologies."

According to BNEF China last year extended its lead over the US as the world's largest investor in renewable energy. China's investment in "clean" energy, including renewables and efficiency improvements, rose 32 per cent to a record $89.5 billion, with about three quarters of that going into wind and solar power.

The WEF report, however, raises concerns over the sector's ability to attract future investment. It said the electricity sector had invested heavily during the last decade in making the transition.

"OECD countries have invested heavily to achieve this, spending $3 trillion on new renewable and conventional power plants, transmission and distribution (T&D) infrastructure, and energy efficiency measures.

"Yet more has to be done, especially as the industry is less than 30 per cent through the process, with a further $8 trillion needed from now until 2040 to meet policy objectives."

India-US nuclear "understanding" opens door to investment

A deal between the US and India looks set to finally unlock the investment that India needs for its nuclear power sector. **Junior Isles**

The nuclear agreement between India and the US marks a significant step in India's plans to bring energy to all by 2019. It also unlocks the potential for billions of dollars of investment by US companies into the country.

The landmark deal struck between India's Prime Minister Narendra Modi and US President Barack Obama has been hailed as a "breakthrough understanding" that would allow the commercialisation of the Indo-US civilian nuclear deal first framed in 2005.

The two countries finally signed the so-called 123-Agreement on civil nuclear cooperation agreement in 2008 but have been in a deadlock for six years over its implementation.

The new understanding removes both the US demand for tracking its nuclear supplies and US suppliers' liability in case of a nuclear accident.

Obama used his executive powers to waive the demand for tracking nuclear material and agreed that from now on, inspections of India's use of fissile materials by the IAEA will suffice.

The US had also raised objections to India's Compensation for Nuclear Liability and Damages law of 2010. The law included two sections, which the US felt would indemnify companies supplying nuclear reactors and parts to India beyond what was required by international law or the Convention on Supplementary Compensation (CSC).

Indian officials were able to convince US officials that transferring the "risk assessment" to the commercial operators and suppliers, i.e. GE-Hitachi and Westinghouse, could circumvent the obstacle.

According to US Ambassador Richard Verma, the liability issue is to be resolved through a "memorandum of law within the Indian system" that would not require a change in India's law. "We think we came to an understanding of the liability issue," Verma said. "The deal now opens the door for US and other companies to come forward and help India develop its nuclear, non-carbon-based energy production. Ultimately it's up to the companies to go forward but the two governments came to an understanding."

The US also said it would provide insurance cover to companies that want to build nuclear plants in India. India also agreed to a state-backed insurance scheme that would cap the exposure of nuclear suppliers.

However, it remains unclear what would happen if unlimited claims come in the wake of a disaster, according to Debasish Mishra, Mumbai-based partner at Deloitte Touche Tohmatsu. "This is a government-to-government agreement and ultimately the final deals will be signed between companies," he said. "There's a feeling that not everything has been resolved."

GE Hitachi Nuclear Energy, a partnership between GE and Tokyo-based Hitachi Ltd. that provides reactors and services to the industry, applauded the move to resolve the issues but is waiting for more details.

"We look forward to reviewing the governmental agreement in due course," said GE spokesman Dominic McMullan.

Westinghouse President and CEO Danny Roderick expressed "strong support" for the efforts of the governments as they "work to resolve issues" that will enable Westinghouse and other US companies to participate in India's nuclear energy market. "We are already in discussions with potential partners within India as part of our effort to provide nuclear energy plants in a manner that is mutually beneficial...," he said.

India plans a $182 billion expansion of its nuclear industry to produce electricity for the almost one-quarter of the country's 1.2 billion people who routinely go without it.

WEC outlines energy leaders' top concerns

Energy leaders see energy price volatility and the future of a climate framework as their top critical uncertainties, according to the latest research by the World Energy Council (WEC).

The 7th annual edition of the World Energy Issues Monitor, entitled 'Energy price volatility: the new normal', is a barometer of the top issues set to shape the energy sector for the year ahead. This year the report gathered the views of more than 1000 energy leaders, including ministers and chief executives from nearly 80 countries.

The uncertain impact of volatile energy and commodity prices, first highlighted in last year's report as an emerging priority, has now established itself as the number-one issue for energy leaders worldwide. Energy leaders are worried about the recent sharp plunge in the oil price to its five-year low. They are kept busy by the continual reduction in the cost of renewable energy technologies, which have increased their share in the energy mix, but have also put strains on the energy system. In some parts of the world that do not have viable energy storage solutions, the grid is not yet able to cope with large shares of intermittent forms of energy and lacks effective market signals to deliver back-up capacity or storage.

Climate framework is perceived as the next most critical uncertainty ahead of a global climate agreement being reached at the Conference of the Parties meeting (COP 21) in Paris at the end of this year. This issue – which could spell the presence or absence of a meaningful carbon price – has been a top critical uncertainty since the first World Energy Issues Monitor in 2009.

Leaders from North America and other OECD countries believe that a climate framework will strongly impact on their energy sectors, and this reflects these countries' historic and expected commitment to legally binding climate targets. By contrast, while African leaders see climate change as a top concern, they are more worried about the physical impacts of climate change such as extreme weather events, rather than about the uncertain outcomes of negotiations on a climate framework.

The 10th edition of the Global Risks report, published last month by the World Economic Forum, also cited failure of climate change adaptation as one of the top global risks.

Christoph Frei, Secretary General of the World Energy Council, said at the launch of the WEC report: "High price volatility has become the new normal facing energy leaders. This is the context in which we expect them to take investment decisions at an unprecedented scale. The unprecedented uncertainty, the need to redefine infrastructure resilience in response to emerging risks, the expectation of changing market designs and evolving business models, as well as the changing geopolitical balance have placed energy among the top strategic issues globally for at least the next decade."

Wind companies exit market

The number of companies in the wind power sector has dwindled in the face of tough market conditions over the last two years, according to a report by global business advisory firm FTI Consulting.

The company says that more than 120 suppliers have collapsed or stayed out of the wind business in the past two years, including 88 from Asia, 23 from Europe and 18 from North America.

It also said a prolonged market contraction has forced major turbine OEMs to divest in-house non-core production assets and opt for extensive outsourcing in order to insulate from market fluctuations while remaining profitable.

"The challenging economic and political climate has forced large wind turbine vendors to shed low value assets and to opt for outsourcing," said Aris Karcanias, Managing Director at FTI Consulting and Co-Lead of the Company's FTI-CL Clean Tech practice in Europe. "Large turbine OEMs have adopted lean organisation models from other industries to deal with market instability and increase flexibility and capacity utilisation."

The report, 'Global Wind Supply Chain Update 2015', examines the supply chain situation for 12 key components (350+ suppliers) and three key materials (150+ suppliers), which account for more than 95 per cent of a wind turbine's total cost.

Another key finding according to the report, is that competition is now taking place in areas other than product quality and price.

It says suppliers are also required to provide value-added products and services to assist turbine OEMs and the end users to bring down the LCOE in order to compete with conventional energy sources.

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Mexico poised for growth

Companies are outlining plans for investment in Mexico's energy sector, with wind energy a key area of focus.

Siân Crampsie

Mexico is set to boost power generating capacity as a result of energy reform legislation passed last year.

Private firms such as Iberdrola and Gamesa have outlined plans for investment in Mexico, while projects for new capacity are taking shape.

In January Iberdrola, Gamesa and Acciona announced that they would invest a combined $14 billion in Mexico's energy industry between 2015 and 2018.

The three Spanish firms will direct investments into natural gas projects, renewable energy, the supply chain and service centres.

Meanwhile a fourth Spanish company – Abengoa – has been awarded a contract by Mexico's CFE to build Norte III, the country's largest gas-fired combined cycle plant.

Private companies have shown increased interest in Mexico since energy reform legislation was implemented in 2014.

The legislation is designed to make Mexico's energy sector an engine for economic growth and encourage private investment in the power sector. CFE is keen to boost generating capacity as well as diversify generating sources.

Abengoa's $1.55 billion contract will see the construction of the 924 MW Norte III power plant in the northern Mexican border city of Ciudad Juarez. The project falls under Mexico's National Investment Plan 2014-2018 recently announced by the Mexican government, and will increase electricity supplies in northern Mexico.

Separately CFE awarded a $386.4 million contract to build a 240 MW hydropower plant in southern Mexico to a consortium comprising a unit of China's Sinohydro Corp.

The plant, called Chicoasen II, is due to start operating in 2018.

In January Capstone Turbine Corporation announced it has received an order for 14 of its C1000 microturbines for multiple CHP projects in Mexico. It said that two of the units had already been shipped and the rest would be commissioned over the course of 2015.

"This substantial order was received just weeks after we received the order for six C800 microturbines and 16 C30 microturbines for the second phase of the Los Ramones pipeline project in Mexico," said Darren Jamison, President and CEO at Capstone Turbine. "These two orders combined total approximately $17 million and should make Mexico a top-five market for calendar year 2015."

The wind energy sector is also likely to see growth this year, following a record 1 GW of new wind power capacity added in 2014. CFE alone has outlined plans to add eight wind projects totalling 2.3 GW.

Gamesa said that it would invest $950 million in new wind farms in Mexico to add around 500 MW of capacity by the end of 2017. Acciona says it will invest some $650 million in Mexico to add to the 556 MW that it already operates there. Iberdrola, Gas Natural and Enel are also planning wind projects in Mexico.

Mexico's current installed wind energy capacity is 2.6 GW, according to the Mexican Wind Energy Association, Amdee.

The government wants that figure to reach 9.5 GW by 2018.

EPA accused of playing politics

The US Environmental Protection Agency (EPA) has been accused of playing politics in delaying a final rule on the control of carbon dioxide (CO_2) from new power plants.

The rule is one of two new regulations that together form a key part of President Barack Obama's action on climate change. It was due to be finalised in January, a year after it was proposed, but the EPA said that it would now be issued in the summer at the same time as the other regulation, which is aimed at controlling CO_2 emissions from existing coal fired power plants.

The delay is thought by some to be an attempt to thwart the possibility of the regulation being blocked by the Republican-controlled Congress, but the EPA maintains that it makes sense to issue the regulations at the same time.

The EPA says it will also issue in the summer a template of a compliance plan for states to follow when drafting their own compliance plans for the new rules.

The template plan could also be forced on states that choose not to comply, said EPA.

Janet McCabe, acting assistant administrator for EPA's Office of Air and Radiation, said that because of the need for clarification over technology and an overlap in issues, the two sets of regulations should be issued at the same time.

The regulations would prevent new coal fired power plants being built without carbon capture technology, and also put stringent emission limits on existing plants. Coal lobby groups are concerned about the impact of the rules on the USA's coal industry, and say that they would lead to the closure of 69 GW of coal fired capacity.

About 12 US states are suing the EPA over the proposed rules, as is Murray Energy Corp., the country's largest privately held coal mining company.

SunEdison seeks growth in wind

SunEdison will develop up to 1.6 GW of wind energy projects which qualify for the US federal production tax credit (PTC) after sealing a deal to purchase turbines from an unnamed supplier.

The order comes two months after SunEdison said it would acquire First Wind, a wind energy project developer, for $2.5 billion. It said that it "moved very quickly" to secure the turbines at the end of 2014 when a two-week extension of the PTC was announced.

The purchase of First Wind included over 1.6 GW of pipeline and backlog projects of which 1.4 GW were already PTC qualified, and an additional 6.4 GW of project development opportunities. SunEdison will develop the 1.6 GW of wind capacity and then sell the projects on to subsidiary TerraForm Power once commercial operation is achieved.

"The purchase of these PTC qualified wind turbines will further enhance our renewable energy development engine and increase its already impressive growth trajectory," said Ahmad Chatila, President and Chief Executive Officer of SunEdison. "The acquisition of First Wind accelerates our ability to capitalise on the attractive growth opportunities in the global wind power markets."

Last month TerraForm said it had completed the acquisition of 21 solar power plants in the USA from SunEdison with a combined capacity of 26 MW for $47 million.

It said that the distributed generation market was "one of the most profitable and fastest growing clean energy market segments."

The International Renewable Energy Agency (Irena) said in January that growth prospects for renewable energy in the USA were good given the right policy environment.

In a new report, Irena said that the share of renewable energy in the US power generation mix could reach 50 per cent by 2030, up from its current level of 14 per cent. It added that the additional investment needed to reach such levels would be offset by the benefits of reduced emissions and a healthier population.

Renewables add up in Chile

- Investing $400 million over three years
- Could add up to 975 MW of new solar in 2015

Chile is set to expand its renewable generating capacity as developers complete new projects and announce new investments.

Acciona and Enel have completed wind and solar power plants, respectively, while firms including Greenwood Energy, Mainstream Renewable Power, Enel and Acciona have announced plans for new power plants.

Acciona Energia said in January that it had inaugurated the 45 MW Punta Palmeras wind farm, the first installed in Chile by the company. It also said that it would invest around €400 million over three years in wind and solar photovoltaic (PV) plants, adding 255 MW to the grid.

In a speech at the inauguration of the plant, Chilean President Michelle Bachelet said that Chile was "taking firm steps towards diversifying its energy matrix" and that her government's energy policies had helped the country to emerge "from a state of slumber" in which "investments in energy suffered".

Enel Green Power has completed three new PV plants in Chile – Lalackama, Diego de Almagro and Chañares. The solar parks, located in the regions of Antofagasta and Atacama, have an overall installed capacity of 136 MW and required a total investment of $240 million.

The Italian firm also announced in December that it had completed construction of the 99 MW Taltal wind farm in the Antofagasta region. It is planning to add a further 161 MW of wind energy capacity to the grid after winning a 15-year power purchase agreement in a competitive tendering process run by the Chilean National Energy Commission last year.

Mainstream Renewable Power also won in that process, bagging the concession for 343 MW of wind energy capacity. It has pledged to add 600 MW to the Chilean grid by 2016 in conjunction with partner Actis.

In January Greenwood Energy announced it would develop and operate an 80 MW PV project in the Antofagasta region through a partnership with Pacific Solar SA. The Inti project will be located on 190 hectares of public land and will sell electricity into the Chilean spot market as a merchant power plant.

The project could start operating in early 2016. "Chile's advanced electricity market makes it an ideal location for large-scale solar generation," said Camilo Patrignani, CEO of Greenwood Energy.

Chile is projected to be one of the world's fastest growing solar markets. Average electricity demand has increased 5-6 per cent annually on the country's main transmission networks since 1998, and is projected to reach 5.4-6.4 per cent annual growth through 2022. Bloomberg New Energy Finance forecasts Chile will add 470-570 MW of new solar capacity in 2014, and could add up to 975 MW of new solar capacity in 2015.

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China's clean energy sector offers investment opportunities

- FDI will double to £19.3 billion in 2020
- Clean energy investment rises for first time in three years

Junior Isles

Opportunities for investment in China's clean energy sector are predicted to increase dramatically in the coming years.

According to a new study called 'Branching Out: Investment Opportunities in China 2020', Foreign Direct Investment (FDI) opportunities in the Chinese energy sector will increase, as the government focuses its attention on green growth.

The study by King & Wood Mallesons says FDI in energy will double from £9.8 billion in 2014 to £19.3 billion in 2020 as the country implements plans to clean up the sector.

George Zhao, Partner, Beijing said: "The new Environment Protection Law demonstrates a step change in the Chinese government's commitment to environmental protection. The days of conducting business in China without considering the environmental impacts of your activities are over. This will create new markets for cleantech, particularly in the energy sector as enterprises are forced to invest in new plant and equipment to reduce their emissions and improve their operating efficiency."

According to the report, the government plans to invest £1.8 trillion in the power industry by 2021.

There was strong evidence of this in January with reports from Bloomberg New Energy Finance (BNEF) that clean energy investment rose for the first time in three years in 2014. According to BNEF China's support for solar power and record spending on wind farms overcame a slump in oil prices that unsettled the outlook for the industry. Figures showed new funds for wind, solar, biofuels and other low-carbon energy technologies gained 16 per cent to $310 billion last year.

According to experts, further growth in the wind sector is likely after the National Development and Reform Commission (NDRC) announced a price cut of Yuan0.02/kWh (0.3 ¢/kWh) last month for category I, II, and III wind resource areas.

Renewables as a well as nuclear are an important part of China's efforts to fulfil its promise to cut carbon emission intensity by 45 per cent to 40 per cent by 2020. China plans to triple its nuclear energy capacity by 2020.

Its nuclear plans, however, received a setback last month with the announcement that there would be a further delay to the start of one of its new reactors.

China's State Nuclear Power Technology Corp (SNPTC) said a project it is developing with Westinghouse Electric Co. faces new development problems and now is not expected to start up until 2016 at the earliest.

"We discovered some new problems during tests so we need to delay it more until next year," Wang Zhongtang, chief engineer of SNPTC, said on the sidelines of an industry conference in Bejing.

The delay is the second for the project, which had been slated to start by the end of 2013.

Westinghouse has been working with SNPTC to help China develop its own version of the AP1000, called the CAP1400, which the company wants to deploy widely in the domestic market and possibly sell for export.

The delay is a blow to those plans for export. Li Ning, a nuclear industry expert at China's Xiamen University said that Chinese officials "are certainly very frustrated".

The World Nuclear Association (WNA) said Asia's projected $781 billion nuclear energy investment needs continuing international cooperation. It added that the strong cooperation between Chinese and international nuclear companies will ensure that China can play its part in the global nuclear supply chain.

WNA Director General Agneta Rising said: "We must build on the international partnerships forged in developing China's nuclear generation programme so that China can play its part in delivering the global expansion of clean and reliable nuclear energy the world so clearly needs."

Japan raises renewables budget

Japan is making renewed renewable efforts

Japan is to renew its drive in FY2015 to promote the use of renewables, after its feed-in tariff ran into trouble just two years after its introduction.

The government is expected to spend Yen4.4 billion ($37 million) for measures to lower the costs of solar power generation. It also plans to earmark Yen8 billion to further promote geothermal power and Yen7.9 billion for developing technologies related to offshore wind power.

The government also decided to earmark Yen75.8 billion as part of the costs to build temporary storage facilities for contaminated soil and other waste generated from radiation cleanup activities within Fukushima Prefecture, following the nuclear disaster in March 2011.

The International Atomic Energy Agency recently said will send a team of nuclear experts in mid-February to conduct a fresh review of the ongoing efforts to scrap the Fukushima Daiichi nuclear plant.

- In January Japan signed a treaty with the IAEA allowing an international pact on nuclear disaster compensation to enter into force on April 15.

Indonesia promises new capacity and boost for local industry

Sofyan Basir, the newly appointed President Director of state-owned electricity firm PT PLN says the utility will add 3000 MW to Jakarta's energy grid over the next five years to meet surging electricity demand.

"Jakarta's electricity needs are quite large. Therefore, we plan to add 3000 MW to the city's electricity capacity in the next five years. We will add capacity to PLTUs in Muara Karang and Tanjung Priok in North Jakarta," said Sofyan.

He said that this year the capacity of the Muara Karang and Tanjung Priok coal fired plants would be increased by 500 MW and 250 MW, respectively.

Jakarta's mega-projects, including the MRT, will drive much of the new demand. Sofyan went on to say that PLN would build a gas-fired power plant in Thousand Islands regency to support the city administration's plan to build resorts and hotels on the islands.

In a separate announcement, Sinar Mas Group said it plans to develop biomass power plants with a total capacity of up to 1000 MW in South Sumatra within eight years. The estimated investment has been put at approximately Rupiah10 trillion ($781 million).

Indonesia has set a target of adding 35 000 MW target by 2019. In January it was announced that the government would source components for the construction of the new capacity from domestic companies.

Coordinating Maritime Affairs Minister Indroyono Soesilo said that local engineering, procurement and construction (EPC) companies had been given the green light to participate in the projects, whose investment was expected to reach more than Rp 1 quadrillion ($79 billion).

The minister also said the government would impose a 40 per cent minimum for local content on certain power plants in accordance with regulations.

"In an effort to increase local content, we have agreed to support the national industry as much as possible," Indroyono said.

India and US outline clean energy initiatives

Syed Ali

India is demonstrating its commitment to tackling climate change with the announcement of a raft of clean energy initiatives during a visit by US President Barack Obama for the nation's Republic Day celebrations.

India says it will establish a goal for the overall share of renewable energy in its energy mix, building on its recently increased solar energy target to upward of 100 GW by 2022; a new wind energy target of 60 GW is also under consideration.

The clean energy initiatives also include new bilateral efforts to generate investments in renewable energy, build smarter cities and curb urban air pollution. Both leaders also agreed to cooperate closely during the coming year to achieve a successful outcome at the climate summit to be held in Paris in December.

Commenting on the news Manish Bapna, Executive Vice President and Managing Director, World Resources Institute said: "This agreement further solidifies India's significant commitment to expand its share of renewable energy. In setting a national renewable energy target, India will boost its economy and bring more and cleaner electricity to its people.

"This suite of actions reflect India's multi-pronged approach to limit carbon emissions and shift to a more sustainable economic pathway. The announcement demonstrates a transition from intention to an action plan for execution."

In January the Ministry of New and Renewable Energy (MNRE) issued updated draft guidelines explaining how the bidding process for the next tranche of the Jawaharlal Nehru National Solar Mission (JNNSM) auction will work.

Phase II, Batch II, Tranche I of the JNNSM project, amounting to a 3 GW solar power auction, is expected to get under way in the first quarter of this year. The MNRE revealed that the minimum capacity size for projects awarded under this tranche is 10 MW, rising in multiples of 10 and no greater than 300 MW in size.

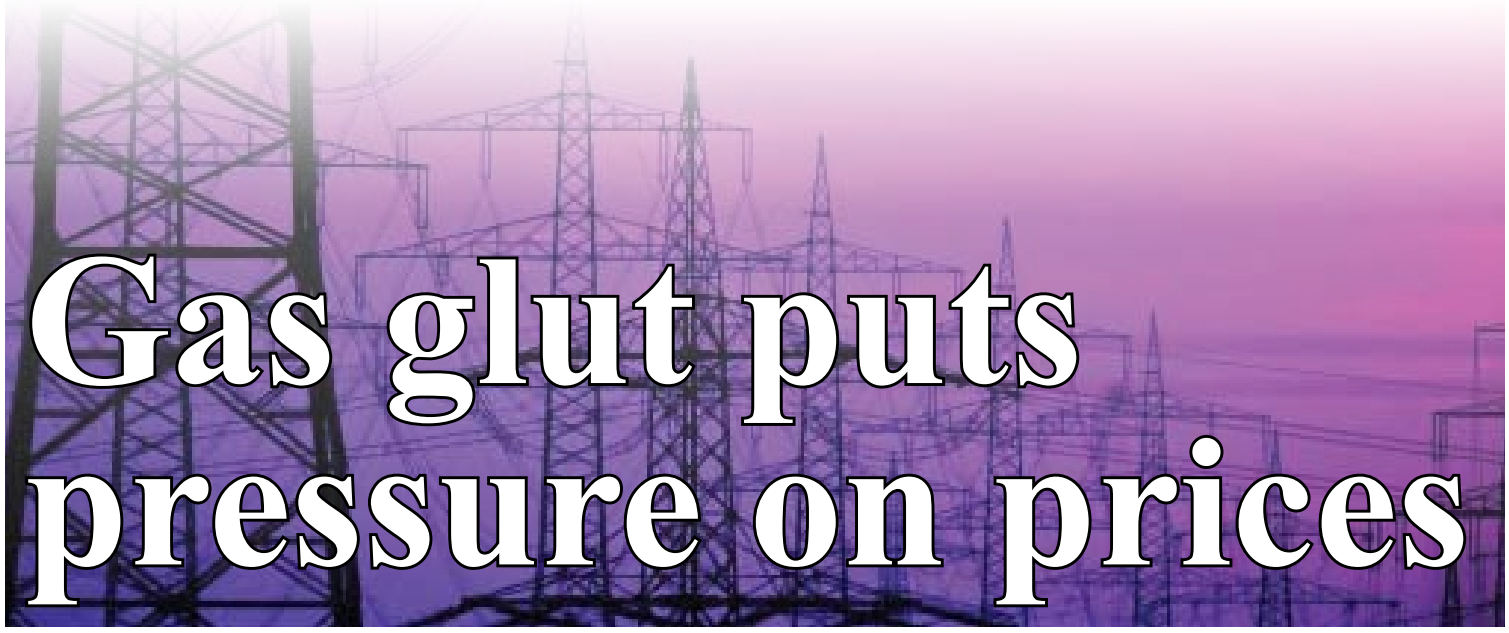
The auctions are expected to attract a record number of solar developers, many of which are already flocking to this burgeoning solar market.

US solar manufacturers First Solar and SunEdison recently participated in their first successful solar auction, with the latter securing a deal to develop 5 GW of solar PV capacity in the state of Rajasthan.

The MNRE also confirmed that a large proportion of the 3 GW of capacity set to be deployed under this latest round of the JNNSM would have to come from domestically manufactured sources.

Early last month India also said it will give as much as 10 billion rupees ($158 million) to state-run companies for building 1 GW of grid-connected, solar-photovoltaic power projects in the next three years.

Such moves are spurring local activity. Pune-based Suzlon Group recently announced its plans to invest Rs24 000 crore ($4.44 billion) over the next five years on energy projects to generate 3000 MW in Gujarat. This will mark the first foray of Suzlon into solar energy.



Gas glut puts pressure on prices

- UK prices hit four-year low
- Mild weather, gas imports continue

Siân Crampsie

Mild, windy weather and a glut of gas are continuing to suppress wholesale power prices in Europe.

Platts reported falls in continental European day-ahead electricity prices for December while ICIS reported that in the UK prices hit a four-year low and would remain under pressure during 2015.

Although early December witnessed year-high power prices in Germany and France due to cold, low-wind conditions, prices plunged in mid-December because record wind production boosted supplies.

"German day-ahead baseload power, which reached €56/MWh on December 3, settled below €30/MWh as wind output peaked at just below 30 GW December 12," said Andreas Franke, *Platts* managing editor of European Power.

German wind production of 8.9 TWh in December was almost double November's output and up 20 per cent from December 2013, according to data from *Platts*' PowerVision.

"That amount is equal to the monthly output from Germany's entire fleet of nine nuclear reactors," Franke said.

In the UK, wholesale power prices declined to their lowest value in four years in early January, according to ICIS, whose IPI power index reached £44.627/MWh on 8 January 2015. IPI also shows that wholesale power prices fell 11 per cent from December 2013 to December 2014.

"Electricity prices have lost a lot of value in 2014, and many of the same factors that depressed values last year, in particular the oversupply of gas and more renewable energy, are still in place for 2015," said Zoe Double, Head of Power, ICIS.

In the UK energy prices are being affected by relatively mild winter weather and continued flows of LNG into the country. Warm weather last winter left plenty of gas in storage, and LNG is being diverted to the UK as demand for the fuel from other regions has fallen.

In addition, says ICIS, more renewable power generation has also been installed in the UK, and energy efficiency measures have helped reduce demand. These measures have reduced wholesale electricity prices.

The data will put utilities under pressure to reduce prices for end users at a time when companies' balance sheets are already under pressure from slack energy demand resulting from weak economic conditions in Europe.

In the UK, utilities have already started reducing gas prices to consumers, with both E.On and British Gas cutting prices by an average five per cent. The price cuts were labelled as "measly" by consumer groups and the firms have also been criticised for failing to reduce electricity prices.

Constraint payments set to rise

Payments made to British wind farm generators to switch off their turbines when the grid is constrained are set to increase and there is concern about the impact this could have on consumer bills.

Industry data shows that wind farm generators were paid around £52 million in 2014 in constraint payments under National Grid's 'connect and manage' regime. This is a considerable increase from the 2012 figure of £6 million and although the regulator, Ofgem, is implementing measures to reduce payments, they are expected to increase over the next five years.

The payments are made when power cannot be transmitted to where it is needed, usually due to congestion at a certain point on the network. This happens most frequently in Scotland.

According to the government, the payments are made on a competitive basis and rules were tightened in 2012 to prevent generators profiting unfairly. Since then, prices paid to wind generators have more than halved, it says. It also argues that the impact of constraint payments on bills are negligible because coal and gas generators were given such payments long before wind farms were being built.

According to RenewableUK, less than three per cent of potential wind generation was called off by National Grid in 2014.

But the Renewable Energy Foundation, a think-tank, says that payments to generators to stop generating are a new phenomenon and are the result of lost subsidy. It adds that the prices charged are in excess of lost income.

Business groups call for ETS reform

Getting the details of the proposed market stability reserve will be crucial and will impact the EU's path to climate goals.

Siân Crampsie

Early introduction of a market stability reserve (MSR) into the EU emissions trading scheme (ETS) will help Europe meet its climate goals, a group of business leaders has said.

The Prince of Wales's Corporate Leaders Group (CLG) has written to Members of the European Parliament calling for ETS reform to be made and to include an MSR by 2017.

It said that introducing the MSR earlier rather than later would "give the necessary signals to investors and industry to effectively transition to a low carbon economy and energy system" and "mitigate any downward pressure on the carbon price from structural economic changes or from other energy policies."

The MSR is a proposed amendment to the ETS put forward by the European Commission. It would reduce the amount of EU allowances (EUAs) that can be auctioned if the upper threshold of EUAs in circulation is exceeded, and release them if there is a shortfall.

The reserve would consist of 900 million EUAs that were 'backloaded' by the European Parliament in 2013 to help prop-up the carbon price. Establishing the MSR by 2017 would help to rebalance the emissions trading market, enable a more robust carbon price and stimulate the transition to a low carbon economy, says CLG.

According to ICIS Tschach Solutions, the question of the MSR start date and the handling of the backloaded allowances will have a significant impact on the price path of carbon. By implementing an early start in 2017 and transferring backloaded allowances to the reserve rather than the market, the MSR could reduce emissions earlier and provide a steadier, less volatile price curve up to 2030, its analysis shows.

"By having a strong effect earlier, a 2017 MSR that includes a direct transfer of backloaded allowances to the reserve makes it easier for the EU to achieve the emissions reductions it aims for by 2030," explains Philipp Ruf, Lead Analyst, EU Carbon Markets at ICIS. "Moreover, by providing greater price stability, it provides a much friendlier, more predictable environment for companies to invest in low-carbon technologies – allowing further reductions in turn.

"Though the price signal will be similar in 2030 when focusing on the start date and the backloading allowances, it would be a mistake to think the details of the MSR don't matter – in fact it's quite the opposite: they're crucial. If you then add in the discussion about the threshold levels – which do have the power to change the long-term price – you have some very important questions to answer."

Data shows Energiewende on track

Electricity production data from Germany shows the dramatic shift the country has made to renewables.

Figures from Agora Energiewende, a Berlin think-tank, indicate that the share of renewables in energy production hit a record high in 2014 and exceeded 25 per cent for the first time in history.

The data shows that Germany is on track to meet its ambitious energy transition targets, said German energy association BDEW.

"Renewable energies have become the most important source of power and exceeded conventional energies with the largest share in electricity mix," said BDEW.

Nearly 26 per cent of Germany's power generation came from renewable sources in 2014, according to Agora Energiewende, up from just over 24 per cent in 2013. Electricity output from renewables has grown eight-fold in Germany since 1990.

However the data also shows that Germany remains reliant on lignite-fired power plants, and how generation from natural gas has declined because of competition from renewables and coal.

Lignite accounted for 25.6 per cent of the country's electricity generation in 2014, up slightly from 25.4 per cent in 2013. The share of electricity from natural gas fell to 9.6 per cent, down from 10.7 per cent a year earlier.

Overall energy consumption in Germany has continued to fall and greenhouse gas emissions dropped to 301 million tonnes in 2014, the lowest level since 2009. Energy consumption was down four per cent year on year.

Of the energy derived from renewables in 2014, 8.6 came from wind, 8 per cent from biomass, 5.8 per cent from solar and 3.4 per cent from hydropower.

Last year was also notable in Germany with the offshore wind sector reaching 1 GW of installed capacity.

At the end of the year, 258 offshore wind turbines were grid connected with a combined capacity of 1049 MW. In addition, the construction of a further 268 turbines with a capacity of 1218 MW was completed in 2014, but these had not been fully grid-connected by the end of the year.

The increase in installed turbines confirms that the revised EEG law, which came into effect in August 2014, triggered massive investment in Germany, according to the German Wind Energy Agency.

Under its policy of transitioning from nuclear to renewables, known as *Energiewende*, Germany aims to generate up to 60 per cent of electricity from renewables by 2035.

Chinese firm boosts Angola output

A new power plant set for construction in Angola will help to ease daily blackouts in the country.

Angola's Ministry of Energy and Water has signed a contract with the China Machinery Energy Corporation (CEMC) to build the $982 million combined cycle power plant in Soyo, northwestern Angola.

The project is part of Angola's Public Investment Programme and will boost socio-economic development in the country. "CMEC will begin construction of a power plant in Soyo, after receiving the first instalment of $147.7 million from the Strategic Financial Oil Reserve for Basic Infrastructure," said a statement from Angola's president's office.

Angolans suffer daily blackouts. The country has an installed capacity of 1800 MW but the government plans to increase this to 9000 MW by 2025.

Lake Turkana takes shape

The partners in the Lake Turkana wind power project in Kenya say that the achievement of full financial close is a milestone for the project and the culmination of several years' work.

Lake Turkana Wind Power (LTWP) announced financial close of the project in December and said that it had received the first disbursement of funds. The project is the largest private investment in the history of Kenya and "arguably one of the most complex and challenging project financings undertaken in the renewable energy space in sub-Saharan Africa" LTWP said in a statement.

The 310 MW wind farm in north-eastern Kenya is the largest single wind project to be constructed to date in Africa and will comprise 365 Vestas wind turbines. It will take 32 months to build.

"This transaction is a good example of how to successfully bring private players into the renewable energy sector and serves as a good vote of investor confidence in the Kenyan economy," said Kwame Parker, Standard Bank's East Africa Head of Power and Infrastructure.

"The project is designed to provide a clean source of electricity to Kenya. It will not only contribute to the social and economic development of Kenya, but will also contribute towards Kenya's goal of significantly increasing its installed capacity and reducing its reliance on more expensive sources of power."

As part of the project, LTWP will rehabilitate 204 km of an existing road leading to the wind farm site while the Kenya Electricity Transmission Company Ltd. will construct the required 428 km overhead transmission line as well as a substation to be located at in the town of Suswa, 90 km north of Nairobi.

The power generated by the project will be fed into Kenya's national grid under a 20-year power purchase agreement between LTWP and the Kenya Power & Lighting Company.

"The innovative and unique structure of this transaction is the culmination of four years of hard work together with our arranging partners with the aim of bringing the right funding solution to the participants in this deal," said George Kotsovos, Executive, Power and Infrastructure Finance at Standard Bank Group.

■ GDF Suez and its Moroccan partner Nareva Holding have started operations at the 301 MW Tarfaya wind farm on Morocco's southern Atlantic coast. The wind farm consists of 131 wind turbines installed across an area of 8900 hectares and was built at a cost of $560 million.

Shams Ma'an financing pact

■ $129 million deal signed ■ Jordan plans grid expansion

Siân Crampsie

One of Jordan's most important renewable energy projects has sealed a financing deal from an international consortium of banks.

The Shams Ma'an solar project will be the largest of its kind in Jordan and represents an important step forward in boosting the country's energy security.

Last month Japan Bank for International Cooperation (JBIC), Nippon Export and Investment Insurance (NEXI), Mizuho Bank and Standard Charter Bank signed a $129 million, 18-year finance deal for the project, which will have a generating capacity of 52.5 MW.

Shams Ma'an is owned by Nebras Power, Diamond Generating Europe and Kawar Group. Up until August 2014, US-based First Solar also held a stake in the project, which has a 20-year power purchase agreement with the National Electric Power Company (NEPCO). Once up and running, the Shams Ma'an solar park will produce around 160 GWh of energy per year.

Jordan is aiming to secure a €100 million loan to support the expansion of its transmission grid and the growth in renewable energy.

"We are in the final stages of preparing the deal, which will be signed soon with the French Development Agency and the European Investment Bank," Minister of Energy and Mineral Resources Mohammad Hamed said.

A tender will be floated soon and work on expanding the grid will begin in the first quarter of 2015, he added.

Green Duba will support Saudi growth

Saudi Arabia's landmark Green Duba project will be "tremendously important" in supporting economic growth in the Kingdom, according to the Saudi Electricity Company (SEC).

Green Duba will be Saudi Arabia' first integrated solar and combined cycle (ISCC) power plant and will also offer fuel flexibility with the option to use gas condensate, natural gas or crude oil. SEC last month signed an agreement with GE for the supply of the equipment package for the combined cycle plant, which will integrate a 550 MW combined cycle plant and a 50 MW solar facility.

"This part of Saudi Arabia is a developing region with limited grid interconnection, so the additional power generated by the Green Duba project will be tremendously important in supporting growth," said Eng. Ziyad M. Alshiha, President and CEO of SEC.

"We expect the plant to provide cost-efficiencies over its lifecycle, along with the fuel flexibility and solar capabilities needed to support the Kingdom's fuel conservation and renewable technology initiatives."

The order includes two F-class gas turbines – a 7F.05 and a 7F.03 –steam turbine, generators, heat recovery steam generators, condenser, boiler feed pumps, Mark VIe distributed control system and a long-term service agreement, GE said in a statement.

GE has supplied the 7F.05 gas turbine to operate on condensate and the 7F.03 to operate on natural gas, with Arabian Super Light (ASL) crude oil as backup. The F-class gas turbines are the first to offer customers the ability to operate on ASL.

The plant, to be located in the port of Dhuba on the Red Sea coast, will be commissioned in 2017.

Eskom warns of rolling blackout reality

With a severe maintenance backlog and low reserve margin, rolling blackouts are likely to be a daily occurrence for South Africans over the next few months.

Siân Crampsie

Eskom has warned that the South African power system will be forced to implement rolling blackouts for the next few months and has reiterated its plea for consumers to save electricity.

The utility said at the end of January that its available capacity stood at 32 976 MW while evening peak demand was expected to be around 30 500 MW. The utility has been running its open cycle gas turbines as much as possible to cover demand and says that its decision to delay its maintenance programme to boost capacity availability is now having repercussions.

In January Eskom CEO Tshediso Matona said that any abnormal event would push the South African system into load shedding because the reserve margin is so low. The utility started load shedding in early January and says that there is a high probability of load shedding every weekday throughout the summer.

The higher-than-normal use of open cycle gas turbines has also pushed up Eskom's diesel bill, further adding to the utility's woes.

According to Matona, there has been a significant increase over the last few months in unplanned maintenance and breakdowns, with between 5000 and 9000 MW out of action. This has further constrained Eskom's system and is the result of a severe maintenance backlog because the utility prioritised the need to keep the lights on over its maintenance philosophy, said Matona.

Some of Eskom's plants have partial load losses and there is no available time window to carry out the required maintenance. The summer is traditionally maintenance season and Matona said that Eskom must now address maintenance issues.

"Now we have arrived at a point that does not allow us to ignore the health of our plants," said Matona. "Our reserve margin is so thin that every incident creates a major system issue and could have safety implications for the plants."

Eskom's liquidity situation is under pressure not just because of increased diesel needs, but also lower sales, capital expenditure needs on new capacity and a tariff system that is not cost-reflective, added Matona.

Matona said the answer is new capacity. "New generating capacity and other levers are needed in order to ease the pressure on the system," he said.

Eskom has added over 6 GW of new generating capacity to its grid since 2004 and is planning to add a further 11 GW under its capacity expansion programme. The first 794 MW unit of the Medupi power plant project is due to start operating commercially in June 2015 and Eskom is also expecting to commission a 100 MW wind project in the first half of the year.

In 2016 the first unit of the 4 x 333 MW Ingula pumped storage hydropower plant is due to start operating, and in 2017 the first of six 800 MW units at the Kusile power plant is due on-line.

RWE cuts renewables investment

■ Investments hit lowest levels since 2008 ■ Arbitration launched against Spain

Siân Crampsie

RWE says that it will forge ahead with renewable energy projects in parts of Europe in spite of plans to drastically cut spending in the renewable energy sector.

The company's renewable energy arm, RWE Innogy, says that it will spend €1 billion between 2015 and 2017, down from its usual budget of €1 billion per year.

RWE has also launched arbitration proceedings in a Washington, D.C. court seeking compensation from the Spanish government for changes it made to renewable energy support mechanisms.

The decision to cut renewables spending means that the company's investment levels for the renewable energy sector will be at their lowest levels since 2008, but will help RWE to cut debt levels and overcome the challenging market conditions that have strained its business.

RWE says it will continue with planned renewable energy investments in key markets such as the UK, Germany, the Netherlands and Eastern Europe.

The company recently announced a new 17 MW onshore wind farm project in Opalencia, Poland, its seventh in the country.

RWE's debt levels have climbed to €31 billion while its profits have been squeezed because of slack energy demand and low economic growth in Europe as well as a shift to renewables in Germany.

RWE Innogy said that it expects its operating profit to fall in 2014 from the €196 million it achieved in 2013. In 2015 and 2016 its profits outlook is slightly better due to the expected full commercial operation of two major offshore wind farms – Gwynt y Mor and Nordsee Ost – to the grid.

Last month RWE filed a request for arbitration in the International Centre for Settlement of Investment Disputes (ICSID) seeking a low-triple digit million euro amount from the Spanish government as a result of legislative changes for wind and hydro power.

RWE owns 16 wind farms in Spain with a capacity of 447 MW, four mini hydropower plants and Andasol 3, a solar thermal plant. It has filed the case alongside eight other investors in the Andasol 3 power plant and claims that Spain breached the Energy Charter Treaty, which is designed to protect investments from changes to state legislation.

RWE Innogy reported in November 2014 that its operating profit fell from €111 million for the first nine months of 2013 to €29 million for period in 2014. It said this was in part due to the reduction in subsidies for renewable energy plants by the Spanish government.

GDF Suez accelerates renewables investment

GDF Suez plans to place a particular emphasis on marine renewable energy as it looks to double its renewable installed generating capacity in Europe by 2025.

The European giant operates some 17.8 GW of renewable energy capacity worldwide, of which 7.8 GW is in Europe. By 2025 it hopes to have 16 GW of renewable capacity in Europe, and is planning to invest in new technologies such as hydrokinetics and marine geothermal.

According to GDF Suez, it has increased its renewable energy capacity by 58 per cent since 2009. Some 42 per cent of projects now under construction outside Europe are related to renewables.

Of particular interest to the group are marine energy technologies such as tidal power. It also wants to boost investment in more advanced renewable technologies, including floating offshore wind and marine geothermal power.

Last year GDF subsidiary Cofely Services signed an agreement to build France's first marine-powered heating and cooling plant. The facility will pump seawater to heat exchangers and heat pumps that will produce heat or refrigeration to buildings near the Port of Marseille.

In offshore wind, GDF Suez is building 1000 MW of capacity in France and is also studying a possible 250 MW project in Belgium.

GDF Suez is also building a pilot tidal project in the Alderney Race to the west of the Cherbourg peninsula. The project will feature four 1.4 MW Alstom turbines and will enable the company to assess the technical performance and commercial viability of tidal energy.

■ GDF Suez has appointed Judith Hartmann as its new CFO. Hartmann will join GDF Suez at the beginning of February as a special advisor to Gerard Mestrallet, and become CFO on 16 March 2015.

REC approves Elkem deal

REC's shareholders last month approved a deal, under which Bluestar Elkem will purchase REC and combine the firm with Norway-based Elkem for a cash purchase price of NOK4340 million ($559 million).

REC Solar says that a deal for the sale of its business to Bluestar Elkem Investment Co. Ltd. will enable it to take advantage of growth opportunities in the solar energy sector.

Since 2011, the Norway-based Elkem Group has been fully owned by China National Bluestar, which in turn is a joint venture between the conglomerate ChemChina and Blackstone. Elkem is a leading supplier of silicon while REC's core business is the manufacture of solar wafers, cells and panels for companies worldwide.

REC says that combining with Elkem will enable it to benefit from synergies higher up the value chain as well as from improved access to financing.

"The Elkem Group has a strategic goal to grow its presence in the solar industry," said Helge Aasen, CEO of Elkem. "The ambition is to establish a leading integrated PV player.

"The Elkem Group and REC Solar have developed a strong business relationship and there is a good strategic match between the companies ensuring that a combined entity will have a strong basis for further development of the business by leveraging REC Solar's leading global brand, strong distribution channels and reputation for quality."

EPH buys E.On Italian assets

Teyssen says Italian assets are "high-performing"

■ EPH expands in Europe ■ TVO cuts jobs

Czech firm Energetický a Průmyslový Holding (EPH) is expanding its European presence with the purchase of E.On's thermal generating assets in Italy.

The move is part of a programme that is seeing the company rapidly expand its European portfolio. The firm last year bought the Eggborough power plant in the UK and is thought to be interested in Vattenfall's lignite assets.

The power plants being bought have a combined generating capacity of 4500 MW and were put up for sale by the German utility in 2013 as part of E.On's plans to reduce debt. They comprise a 600 MW coal-fired power plant in Sardinia and 3900 MW of gas-fired capacity across six sites on the Italian mainland and Sicily.

Commenting on the sale, Johannes Teyssen, E.On CEO, said: "Our conventional generation activities in Italy are high-performing assets with a climate-friendly and diversified generation fleet. We continue to assess a possible divestment of our other businesses in Italy as well."

Weak power prices and Germany's energy transition have brought difficult trading conditions for E.On, which in December announced plans to restructure its business to help it cope with changing global energy markets.

The company said in December that its current broad, global business model is no longer sustainable because of recent dramatic changes in the energy sector driven by the growth of renewables and technology innovation.

It will spin off its fossil and nuclear power generation businesses, upstream activities and trading activities into a new company, allowing it to focus on renewables, distribution and customer solutions.

Other utilities have also been moving to cut debt in the face of difficult market conditions. Last month Finland's Teollisuuden Voima Oyj (TVO) said weak power prices and delays in the construction of its Olkiluouto 3 nuclear power plant will force it to cut up to 110 jobs, equivalent to around 14 per cent of its workforce.

Valmet strengthens through automation acquisition

Valmet says that the purchase of Metso's Process Automation Systems business will make it a "unique" company in its field.

The two companies have signed a deal to sell Metso's automation and information management systems business unit for €340 million. The unit employs around 1600 people and had net sales in 2013 of around €300 million.

The purchase will give Valmet a more complete offering in the automation sector, and will strengthen its competitiveness combining paper, pulp and power plant technology offering, services, process know-how and automation into one customer entity.

"Through the acquisition of Process Automation Systems, Valmet will become a technology and service company with full automation offering," said Pasi Laine, President and CEO of Valmet. "The acquisition will help Valmet in increasing its business stability, while also improving profitability. This transaction has an excellent fit with our existing strategy and the timing is right for Valmet."

Americas

Gamesa enters Jamaican market

Gamesa has signed a contract with Wigton Windfarm Limited, a subsidiary of Petroleum Corporation of Jamaica, for the turnkey construction of the 24 MW Wigton III wind farm.

Gamesa will install 12 of its G80-2.0 MW wind turbines at the Wigton III facility being built in Manchester, to the south of the island. The turbines are due to be delivered during the third quarter of this year and the facility is slated for commissioning by February 2016.

At present, renewable energy sources account for roughly 9 per cent of Jamaica's electricity mix. Under the country's National Energy Plan for 2009-2030, Jamaica expects the contribution of clean energy to rise to 12.5 per cent of the total energy mix in 2015 and to 20 per cent by 2030.

Areva awarded contract for Angra 3

Areva has signed a contract for about €75 million with Brazilian utility Eletrobrás Eletronuclear (ETN) to supply additional mechanical and electrical equipment to the Angra 3 nuclear power plant. The scope includes diesel engines, electrical appliances and controls, as well as equipment for used fuel storage.

Areva is supplying engineering services as well as the components and the digital instrumentation and control system for the reactor.

Google signs Scatec Solar

Google and independent solar power producer, Scatec Solar ASA, have entered into financing agreements totalling $157 million for the construction of the 104 MW Red Hills solar power plant in Parowan, Utah, USA.

Total investment for the plant is estimated at $188 million. The power plant will be owned by Google and Scatec Solar, while Scatec Solar will manage and operate the plant when it goes into operation.

Power produced will be fed into the grid under a 20-year power purchase agreement (PPA) with PacifiCorp's Rocky Mountain Power.

The plant is expected to enter into operation by the end of 2015.

Hanwha One to supply Chile project

Hanwha SolarOne Co.Ltd has signed a deal with a leading photovoltaic (PV) developer for the supply of 80 MW of solar PV modules to a project in the Antofagasta Region of Chile.

The delivery of 258 000 HSL 72 S Poly polycrystalline modules will begin in the first quarter of 2015 and is scheduled to be completed in the second quarter. Power generated by the project will be sold under a power purchase agreement.

Asia-Pacific

Alstom T&D wins NTPC order

Alstom T&D India has secured an order worth around €23 million from India's NTPC Limited to supply a 765 kV switchyard at the 2 x 800 MW Darlipalli super thermal power project in Sundergarh, Odisha.

Alstom will design, engineer, manufacture, install and commission eleven 765 kV bays and fourteen 132 kV bays for the switchyard, which will evacuate the energy from the Darlipalli power plant to the Odisha state grid.

CEB orders ABB substations

The Ceylon Electricity Board (CEB) has placed an order with ABB for the supply of two new 220 kV substations and the upgrade of an existing substation in Sri Lanka.

The new substations will be constructed at Polpitiya in the Central Province and Padukka near the capital, Colombo, in the Western Province, while the existing substation at Pannipitiya, a suburb of Colombo, will be augmented. The project is scheduled for completion in 2017.

The new infrastructure is being deployed as part of the country's Clean Energy and Network Efficiency Improvement Project, which aims to strengthen the national grid by increasing capacity and enabling greater integration of renewables as well as reducing losses and enhancing power reliability.

XZT to build WTE plant

Doosan Lentjes' Chinese licensee XZT has been awarded a contract to design and build a new 100t/d hazardous waste incineration plant in Nantong, China, based on Doosan Lentjes' rotary kiln technology.

The plant will minimise the need for landfilling of hazardous waste, and is the sixth of its kind to be built under Doosan Lentjes' license agreement with XZT. Steam produced by the facility will be used as an energy source for several industrial applications.

Doosan Lentjes will provide engineering support to the project.

SPX pump packages for China

SPX has been awarded a contract by China Nuclear Power Engineering Company (CNPE) to supply its CladeUnion Pumps Medium Head Safety Injection (MHSI) pump packages for the Fuqing 5&6 Hualong 1 nuclear reactors in China.

The pump packages use multi-stage, centrifugal, radially split Nuclear Class II pumps designed according with HAF 604 certification and to RCC-M nuclear code.

Hualong One is a pressurised water reactor with a net power output of 1000 MWe and a 60-year design life. Fuqing will be one of the first to deploy the Generation III Hualong One reactor design, which merges ACP1000 and ACPR1000 designs to form one standardised reactor.

Gamesa signs China contracts

Gamesa has signed deals to supply wind turbines to two power projects in China.

Under an agreement with Hebei Construction & Investment Group (HCIG), Gamesa will supply, install and commission 25 of its G97-2.0 MW turbines at the Nandianziliang wind complex located in the province of Shanxi, in northern China. The turbines are slated for delivery in May 2015, while the facility is expected to be commissioned by the third quarter of this year.

Under a deal with Chinese wind farm developer UPC, Gamesa will supply, install and commission 21 G97-2.0 MW turbines at the Huangyan wind farm in the province of Zhejiang, in eastern China. These turbines are to be delivered in April of this year and the project is expected to be fully commissioned by the third quarter of 2015.

Europe

Vestas seals Poland turbine supply deal

Vestas is to supply the turbines for a 36 MW wind project in the Lodzkie region of Poland.

Under the deal, Vestas will deliver, install and commission 12 of its V112 turbines. The contract also includes the option of adding a 13th turbine and a Vestas online SCADA solution with a 15-year service agreement.

The delivery of the turbines will start in the second quarter of 2015.

Utiligroup supports Tempus

Tempus Energy has appointed Utiligroup to provide software solutions and services that will enable it to become an electricity supplier in the UK.

Utiligroup will provide Tempus Energy with its 'Supplier in a Box' solution, which includes a pre-accredited supply company and state-of-the-art data management software and services via Utiligroup's managed services arm, Utiliserve.

As a new electricity market entrant, Tempus will become one of a growing number of 'challenger brands' competing with traditional energy suppliers.

Nordex turbines for Poland project

RWE Innogy has placed an order with Nordex for seven N117/2400 wind turbines for the Opalenica project in Poland.

The wind farm is RWE's seventh in Poland and will be built in the summer of 2015 in the Poznan region. The turbines are a good match for the wind conditions at the site, according to Nordex, which has also signed a 15-year premium service contract for the turbines.

Terna Energy selects Vestas

Terna Energy has chosen Vestas to provide 23 wind turbines for a 73 MW wind project in Greece.

The Agios Georgios wind power plant will consist of nine V90-3.0 MW turbines and 14 V112-3.3 MW machines. Vestas' order includes supply, installation and commissioning of the turbines as well as a five-year Active Output Management (AOM) 4000 agreement, a full-scope service package to maximise uptime and performance.

Turbine delivery is scheduled for the third quarter of 2015 and the wind power plant is expected to start production by end of the year and be fully commissioned in the second quarter of 2016.

International

Akkuyu draws bids

Nine companies and consortia have placed bids in a tender for the construction of the hydraulic structures of the Akkuyu nuclear power plant.

The nine groups are Tekfen Insaat, STFA-Makyol-Ronesans, Nurol Insaat, Limak Insaat, Cengiz Insaat, Kolin Insaat, IC Ictas, and Dogus Insaat.

Akkuyu will be built in the city of Mersin with the first reactor expected to start operating in 2020. The tender commission will select the winning bidder by mid-February.

BHEL wins EUAS contract

Elektrik Uretim A.S. Genel Mudurlugu (EUAS) has placed an order with BHEL for the rehabilitation of three electrostatic precipitators (ESPs) at the 430 MW Tuncbilek thermal power project in Turkey.

Valued at €16.96 million, the engineering, procurement and construction (EPC) contract will involve the dismantling, supply, civil works and erection and commissioning of the ESPs.

Alstom awarded Kirikkale CCGT contract

Alstom has been awarded two contracts worth over €220 million in total for the supply and maintenance of the power island of the 950 MW Kirikkale combined cycle power plant in Turkey's central Anatolia region.

The Kirikkale independent power project is being developed by Acwa Güç Elektrik Işletme ve Yönetim Sanayi ve Ticaret A.Ş. (ACWA Guc), a subsidiary of ACWA Power and which includes Samsung C&T Corporation as a shareholder.

Alstom will supply the main power train equipment components including two GT26 gas turbines, two heat recovery steam generators (HRSGs), one steam turbine and three turbogenerators to Samsung Construction and Trading (SCT), responsible for the engineering, procurement and construction (EPC).

Alstom will also provide installation and commissioning field advisory services to SCT during the construction phase, and ensure long term maintenance services for up to 20 years after commissioning.

The greenfield project will operate on a merchant basis selling the dependable power capacity and electricity dispatched via bilateral contracts and in the balancing/day-ahead market.

International consortia win Uganda solar project

Two consortia comprising firms from Italy, Uganda, the UAE and Spain are to build two solar energy projects in eastern Uganda.

Simba Telecom and Building Energy SPA will invest $18 million in the Tororo solar power project, while Access and TSK Electronica will invest $20 million in the Soroti solar power plant. Both power projects have a capacity of 10 MW and will be supported by Uganda's GET FiT solar feed-in tariff.

ABB to supply Mirfa eBoP

Hyundai Engineering & Construction has placed an order with ABB to supply the electrical balance of plant (eBoP) for the $1.5 billion Mirfa independent water and power project (IWPP) in the UAE.

Under the $28 million contract, ABB will design, supply, install and commission the new plant's electrical system, including major equipment such as generator circuit breakers, medium and low-voltage switchgear and distribution transformers. Energy-efficient ABB variable frequency drives will help reduce pump energy consumption and extend motor life.

When complete Mirfa will generate 1600 MW of energy and produce 240 000 m^3/day of water for the northern Emirates.

Dewa awards Dh1.2 billion solar plant contract

Dubai Electricity and Water Authority (Dewa) has doubled the capacity of its 100 MW solar power plant and named Saudi Arabia's Acwa Power-led consortium as winner, its CEO and Managing Director said.

The project will be built at a cost of Dh1.2 billion and completed in April 2017, said Saeed Mohammed Al Tayer, Managing Director and CEO of Dewa.

Dewa had originally planned to build a 100 MW plant but later decided to double its capacity after receiving the winning consortium's bid.

Oil

Saudi oil policy unchanged as crude prices slide

- Markets could be volatile as new Saudi king settles in
- Current $45/b price seen as "temporary phenomenon"

David Gregory

Despite the initial knee-jerk reaction in the oil market to the death of Saudi Arabia's King Abdullah, who died on January 22, the price of oil has shown little reaction and is expected decline further as long as Riyadh sticks to its current oil production policy.

No immediate changes are expected in Saudi oil policy from the country's new leader, King Salman, who is 79. Oil markets could be volatile as the new Saudi king settles in, but Saudi Arabia is expected to maintain its production rate of nearly 10 million bpd despite calls from its fellow members in Opec to cut production, a move that would expectedly see crude prices rise. To Saudi thinking, that would only provide other oil producers with the opportunity to step in and fill whatever shortage a Saudi production cut would create.

Saudi oil minister Ali al-Naimi is expected to remain in his post and continue with Riyadh's current course to maintain market share by forcing the price of oil down to the point where it will force competing producers out of the market. He stated recently that even if the price falls to $20/b, Saudi Arabia is determined not to cut production.

Market analysts say that the Saudi strategy is primarily targeting US shale oil production, but lower crude oil prices are also expected to take their toll on the economies of Russia, Iran and Venezuela – countries whose government are not particularly friendly to the US or Saudi Arabia.

Some analysts argue that while Saudi Arabia has vast financial resources to see it through a prolonged phase of low oil prices, others believe that government spending will ultimately force Riyadh to make production cuts.

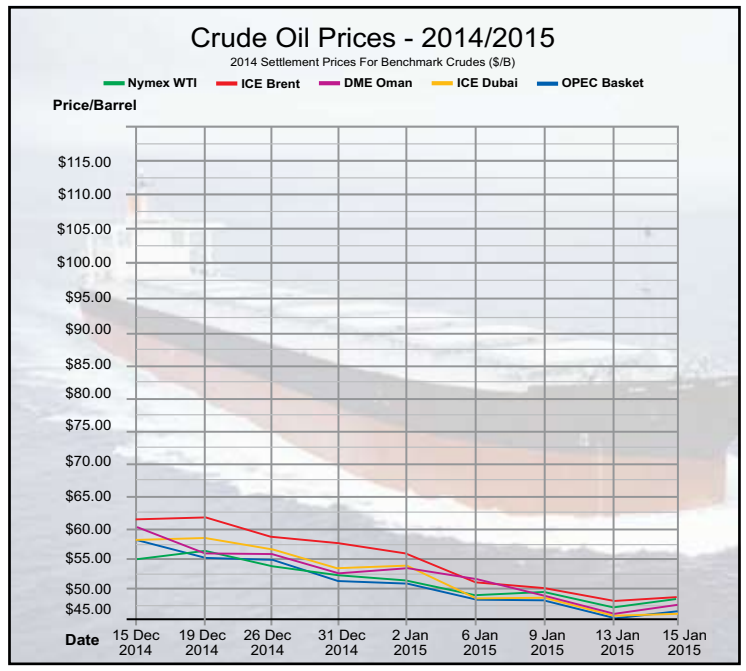
Earlier this month, then Crown Prince Salman read a statement on behalf of the late King Abdullah addressing the circumstances that have led to this policy and Riyadh's resolve to cope with any adverse effects that it may itself have to bear.

"These tensions aren't new to the oil market, and we've dealt with them in the past with a solid will, with wisdom and experience, and we will deal with the current developments in the oil markets in the same way."

The price of Brent crude settled at $48.52/b on the day of King Abdullah's death, down from $49.03/b on the previous day. West Texas Intermediate (WTI) settled at $46.31/b, down from $47.78/b. Oil prices have fallen considerably since last June when the price of Brent was around $115/b. Some market analysts argue that they could fall further and stay low for months, if not years.

In late January the International Monetary Fund (IMF) said Arab Gulf states could lose an aggregate $300 billion in oil revenues during 2015 due to falling oil prices. But the Washington-based agency said their sizeable financial reserves will enable those countries to fund their deficits for up to five years.

In the latest update of its report on the Middle East and Central Asia, the IMF said that most oil exports will need prices that are considerably above the expected 2015 average price of $57/b in order to balance their budgets.



The IMF's director for the Middle East and Central Asia, Masood Ahmed, told a press conference in Washington that the Gulf states "have large enough buffers in the form of foreign assets accumulated during a time of rising oil prices. This is the time to use the buffers and not act in a knee-jerk way to disrupt economic activity."

He said if oil prices remain low for a long time it means that oil exporting countries will have to adjust their spending programmes.

Among the region's oil importers, Lebanon, Egypt and Morocco will benefit the most, the IMF report said.

Meanwhile, during the annual meeting of world leaders in Davos, Switzerland, officials from the International Energy Agency (IEA), Opec, Iraq and Saudi Arabia warned that low prices will likely result in lower investments that will lead to a subsequent rise in crude prices.

IEA chief economist Fatih Birol described the current oil price of $45/b a "temporary phenomenon" adding that by the end of the year there could be upward pressure on oil prices.

He estimated that upstream investment would decline by $100 billion in 2015, with most of that from "high cost areas".

"This will have implications in 2016 and 2017, and these may well be significant implications. If this comes together with stronger demand, this will have a strong implication for the market and for prices," Birol said.

Gas

Gazprom urges Europe to prepare for 'Turkey Stream'

Russia intends to stop shipping gas through Ukraine and will instead deliver natural gas to Europe through the proposed Turkey Stream gas pipeline. Gazprom has urged Europe to put in place the necessary infrastructure starting from the Turkish-Greek border or risk having the gas go to other markets.

Mark Goetz

Europe's gas relationship with Russia is about to change – at least that is what Moscow is telling Brussels.

Last month during a meeting in Moscow between the European Commission Vice President for Energy Union Maros Sefcovic and the CEO of Gazprom Aleksey Miller, the EU was informed that Russia intends to stop shipping gas through Ukraine and will sometime within the next couple years deliver natural gas to Europe through the proposed Turkey Stream gas pipeline, Russia's replacement project for the scrapped South Stream gas pipeline.

Miller told Sefcovic that Europe would have "no other options" other than to construct the required infrastructure in order to take delivery of Russian gas at the Turkish border. It would be the "only route" through which Russian gas would be delivered to Central and Southeast Europe said Miller.

"We have informed our European partners and now it is up to them to put in place the necessary infrastructure starting from the Turkish-Greek border," Miller said after his meeting with Sefcovic. He urged Europe to act quickly to construct pipeline infrastructure, "otherwise, these gas volumes might find their way to other markets".

Sefcovic responded by saying he had been surprised by Gazprom's position.

"The idea that Gazprom would ship 50-60 billion cubic metres of gas to Turkey and then the European Union will decide what to do with it from there, I don't think would work," he said. "Trading works in a different way and it could jeopardize Gazprom's reputation as a reliable supplier to Europe."

Last year has clearly been a disappointment for Russia. There was the collapse of the Ukrainian government, then the annexation of Crimea which led to US and EU sanctions against Moscow for its continuing support of Russian separatists in eastern Ukraine. Then the EU would not adjust its rules to allow Russia to sidestep the third party access regulations for gas pipelines. When it comes to pipelines, Russian policy is that it owns the pipeline and the gas inside it, and no one else gets involved.

With the EU adamant to the point that it forced EU member Bulgaria to stop work on the South Stream project, Russia decided to scrap South Stream and President Vladimir Putin announced while on a visit to Turkey in early December that gas would be made available to Europe through a new pipeline project that would cross the Black Sea and make landfall in western Turkey near the EU border.

Work is to get under way as soon as Gazprom locates a spot on the Turkish Black Sea coast where the subsea pipeline will make landfall. The pipeline will have a capacity to transport 63 bcm/year, 50 bcm/year of which will be available to Europe with the balance going to Turkey, which receives Russian gas via the Blue Stream pipeline across the Black Sea and an overland pipeline that comes through Ukraine.

For its part, Bulgaria has expressed its concern to Brussels about being left without any gas as it relies on Russian supplies, as do many in the region. Differences about gas between Russia and Ukraine in 2006 and 2009 left Bulgaria and other European states short of energy. Those episodes also demonstrated to Brussels that Europe needed to diversify its sources of supply.

Bulgarian Prime Minister Boyko Borisov over the last two months suggested to the EU that it tries to persuade Gazprom to reconsider South Stream, and barring that, provide financing for the creation of a natural gas hub in Bulgaria.

Despite the urgings of Aleksey Miller, it may take the EU some time before they take his comments seriously and embark on new infrastructure plans.

But, if Moscow carries through with Turkey Stream, it could bring about the revival of two European gas projects that fell by the wayside during the bidding process to transport Azerbaijan's Shah Deniz gas to Europe.

The Nabucco West pipeline was designed to meet Shah Deniz at the Turkish border and carry it through Bulgaria, Romania, Hungary and Austria. The Interconnector-Greece-Italy (IGI) pipeline also would have met Azeri gas at the Turkish border and carried it across Greece to Italy.

Though meant to carry gas that would have been an alternative to that supplied by Russia, both projects could reappear and be used to transport Russian gas. But that is probably not what the EU has in mind. A peaceful conclusion to the war in Ukraine and the smooth shipment of gas using infrastructure that is already in place is the likely preferred option.

Renewables-based electricity generation by region in the New Policies Scenario

	Renewables electricity generation (TWh)				Share of total generation		Share of variable renewables* in total generation	
	2012	2020	2030	2040	2012	2040	2012	2040
OECD	**2 219**	**3 039**	**3 996**	**4 893**	**21%**	**37%**	**4%**	**17%**
Americas	998	1 329	1 770	2 200	19%	33%	3%	14%
United States	527	766	1 081	1 397	12%	27%	4%	15%
Europe	1 026	1 376	1 739	2 056	28%	47%	8%	23%
Asia Oceania	195	334	487	637	11%	28%	1%	13%
Japan	128	212	288	364	13%	32%	1%	13%
Non-OECD	**2 588**	**4 224**	**6 221**	**8 336**	**22%**	**31%**	**1%**	**9%**
E. Europe/Eurasia	294	366	466	602	17%	24%	0.4%	3%
Russia	169	209	272	361	16%	24%	0.0%	1%
Asia	1 395	2 565	3 863	5 081	19%	28%	2%	10%
China	1 010	1 933	2 646	3 209	20%	30%	2%	12%
India	177	315	620	993	15%	26%	3%	11%
Middle East	22	42	123	317	2%	17%	0.0%	10%
Africa	118	232	463	780	16%	35%	0.4%	7%
Latin America	759	1 019	1 306	1 556	66%	69%	0.6%	7%
Brazil	456	616	779	904	83%	78%	0.9%	9%
World	**4 807**	**7 263**	**10 217**	**13 229**	**21%**	**33%**	**3%**	**12%**
European Union	788	1 136	1 447	1 712	24%	46%	8%	25%

* Variable renewables here include solar PV and wind power.

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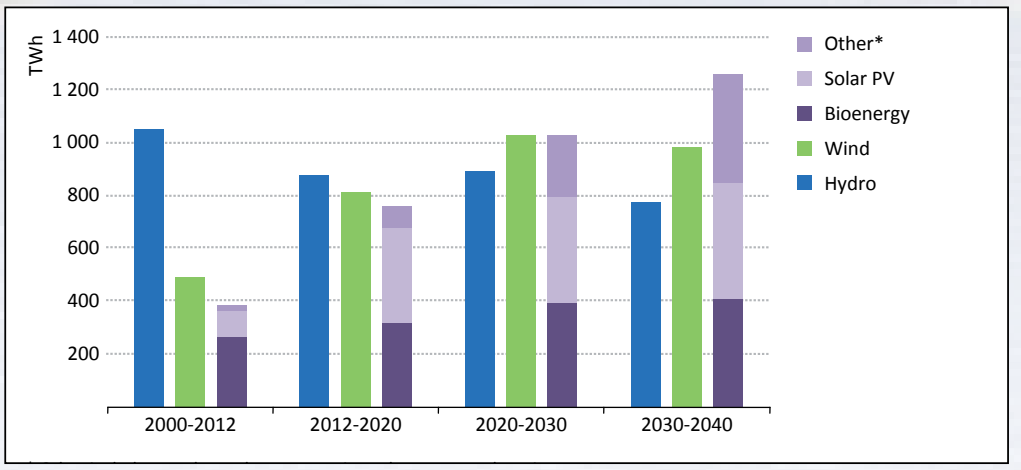
Incremental global electricity generation from renewables by type in the New Policies Scenario



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Cumulative renewable capacity additions by region and source in the New Policies Scenario (GW)

	2014-2025						2026-2040						2014-2040
	Hydro	Bioenergy	Wind	Solar PV	Other*	Total	Hydro	Bioenergy	Wind	Solar PV	Other*	Total	Total
OECD	**84**	**39**	**237**	**167**	**21**	**548**	**90**	**59**	**450**	**285**	**57**	**940**	**1 488**
Americas	34	18	87	55	12	207	36	26	189	98	18	367	574
United States	19	14	64	49	9	155	20	20	148	85	12	286	441
Europe	40	16	129	59	4	249	40	25	223	123	26	436	685
Asia Oceania	10	5	21	52	5	93	14	8	39	63	13	137	230
Japan	7	3	7	44	2	64	10	5	16	49	6	86	150
Non-OECD	**338**	**59**	**266**	**203**	**19**	**885**	**341**	**92**	**476**	**366**	**86**	**1 360**	**2 245**
E. Europe/Eurasia	21	3	8	3	1	36	32	11	20	8	2	73	109
Russia	12	2	3	1	1	18	19	8	6	1	2	36	54
Asia	212	46	231	170	7	666	188	59	371	269	35	921	1 587
China	123	32	184	126	3	467	51	29	251	143	22	496	964
India	36	6	37	32	1	112	69	12	78	93	6	258	370
Southeast Asia	22	5	4	8	3	42	34	9	14	18	6	83	124
Middle East	7	1	4	8	3	23	5	3	45	36	19	109	131
Africa	30	4	8	15	6	63	52	7	18	39	25	140	203
Latin America	68	5	15	7	1	97	64	11	22	15	5	118	214
Brazil	38	4	13	5	-	59	36	8	16	7	2	69	128
World	**422**	**98**	**503**	**370**	**40**	**1 433**	**431**	**151**	**926**	**650**	**143**	**2 301**	**3 734**
European Union	31	15	120	58	4	229	29	24	209	121	25	408	637

* Other includes geothermal, concentrating solar power and marine.

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Source: World Energy Outlook 2014

Bringing order from chaos

A chaotic EU electricity market and now falling oil prices is giving the European Commission plenty to think about. **Dr Colette Lewiner** explains.

The European Union has adopted some measures to improve the situation

The present situation on the wholesale markets is chaotic with excess generation capacity, decreased security of supply and negative prices giving no incentives to operators to invest in the needed infrastructures to the 2035 horizon. The European Union has adopted some measures to improve the situation but they come late and are insufficient to restore a sustained market.

Now, the steep oil prices decrease observed since the 2014 summer is creating a new paradigm that will impact positively and negatively the electricity wholesale markets.

It is a challenging situation. Electricity cannot be stored industrially at a competitive price, so there is a need to balance both supply and demand on the transmission grid at any given time. Demand fluctuates during the year and now as the renewables' share in supply increases, supply becomes less schedulable. Grid operators have to implement digital operations tools (smart grids) to continue to provide safe electricity.

These technical constraints have been largely underestimated by European regulators. In addition, the impact of the economic crisis has not been taken into consideration. Both factors have created serious malfunctioning of the electricity markets, to the extent that it can be described as chaotic.

The situation continued throughout 2014 with longer periods of negative prices, more closures of the gas fired plants needed to guarantee security of supply (more than 10 GW were decommissioned in 2013), CO_2 prices too low on the EU Emissions Trading Scheme (ETS) to encourage low carbon investments, and higher retail prices.

There are several root causes for this situation.

One is the Climate-Energy package. To comply with the 20 per cent renewable energy source (RES) share in the energy mix target by 2020, EU countries have to invest massively in renewable energies and subsidise them. Home to around 7 per cent of the world's population, the EU spent around €500 billion on renewable energy between 2004 and the end of 2013, nearly half of the investment worldwide. The RES share in the electricity mix thus increased from 14.3 per cent to 23.5 per cent over the same period.

Dr Lewiner: long-term rules are needed for this liberalised short-term market

Another contributing factor is flat or decreasing consumption (-0.5 per cent for electricity, -1.4 per cent for gas). This is linked to the economic crisis and, to a certain extent, to energy efficiency measures. As usual, gas consumption is affected more than electricity, because the latter is favoured by new applications such as information and communication technologies (ICT) and electric vehicles.

Another root cause was the lack of anticipation of the economic and environmental impact on CO_2 emission allowances. Between 2005 and 2011, CO_2 emissions were reduced by 1.1 billion in installations covered by the EU ETS.

As a consequence, by the end of 2013, there was a surplus of more than 2.1 billion allowances, resulting in low prices. As a short-term measure to mitigate the effects of the surplus, the EU decided to postpone (backload) the auctioning of 900 million allowances in the early stages of phase three. However, this had little effect on prices, which stayed at a low €7/t on average.

A sustainable solution to the imbalance between supply and demand would require structural changes to the EU ETS. The EC is thus proposing to establish a "market stability reserve" at the beginning of the next trading period in 2021. This market stability reserve would function by triggering adjustments to annual auction volumes in situations where the total number of allowances in circulation is outside a certain predefined range.

However, this measure comes late and will probably not be sufficient to restore a meaningful ETS market.

Very generous feed-in tariffs subsidising the development of renewables is another main reason behind the chaotic situation. Thanks to these subsidies, the 20 per cent target for RES should be met. However, these subsidies have led to an increase in electricity retail prices, which has triggered customer dissatisfaction.

There have been several recent developments at the EU level. In October 2014, the European Council adopted the new framework for climate and energy policies for the 2030 horizon. It replaces the three 2020 objectives with a single objective on CO_2 emissions (a 40 per cent decrease compared to 1990 levels). No compulsory targets on renewables or energy efficiency will be set at Member States level, only at EU level (27 per cent RES in the final energy consumption mix and 27 per cent energy efficiency).

On April 9, 2014, the Commission adopted new rules on public support for projects relating to environmental protection and energy. They promote a gradual move to market-based support for RES through the introduction of competitive bidding processes for allocating public support and the gradual replacement of feed-in tariffs by feed-in premiums. This exposes RES to market signals, which is normal for maturing technology. These rules should slow down but not stop the development of renewables.

New rules on the promotion of European industry competitiveness provide criteria to relieve companies that are particularly exposed to international competition, in a limited number of energy-intensive sectors, of certain costs.

Combining this with measures aimed at decreasing electricity bills for low-income consumers (up to 30 per cent of customers in some EU countries), means that only a subset of retail customers will carry the burden of higher retail prices.

Another important development has been the move to allow Member States to introduce capacity remuneration mechanisms. These are designed to ensure security of electricity supply during critical periods and to make new capacity investments profitable.

Different types of capacity remuneration mechanism will be implemented in Europe. They are based on three different principles: security through prices (e.g. Spain's capacity payment mechanism), security through volumes (e.g. Sweden strategic reserve) and capacity markets (e.g. capacity obligation in France and capacity auctions in UK).

The gradual adoption of capacity markets in different EU countries should enhance security of supply in the years to come.

Falling oil prices has, however, added a new dimension to the market. The unpredicted oil prices decrease (they have more than halved in the last seven months) will lead to a decrease in gas prices in Europe, as long term gas contracts prices are linked at 40 per cent to oil prices.

The situation in Japan is also likely to lower gas prices. The country, which had significantly increased its LNG use following the Fukushima nuclear accident, will soon re-start at least two reactors and thus lower its gas consumption.

Gas prices have already decreased significantly and should continue. Even if coal prices also decrease, gas fired plants could again become as competitive as coal plants.

Before the Lima climate change conference in December 2014, the German Chancellor Angela Merkel, announced, very ambitious CO_2 emissions reduction targets of 40 per cent by 2020 compared to 1990 levels. More coal plants closures will be needed to reach this goal.

These closures would come in addition to closure of conventional plants linked to the EU's Large Combustion Plants Directive and Industrial Emissions Directive, removing extra supply capacity from the market.

Also lower oil prices and a weakened euro, should boost consumption and European exports. This should see electricity and gas demand rebound, as well as CO_2 prices.

Taking into account all these factors, the remaining gas fired plants should become again competitive in the coming two to five years.

In summary, low oil prices could accelerate the return to a better balanced wholesale electricity market, which is good news.

On the downside, low fossil fuel prices will undermine energy savings actions and renewable development.

In fact, by letting oil prices decrease, Saudi is not only protecting its oil market share – threatening higher cost oil production countries like Venezuela or Russia , Canadian oil sands and US shale oil – but is also destroying alternative energy sources profitability.

In this environment – which could last for a couple of years – nuclear, renewable as well as "nega-watts" or energy saving projects, will be less profitable and more difficult to finance.

In the longer term, the International Energy Agency (IEA) estimates that, despite slow growth in electricity demand, Europe needs to invest the huge amount of $2200 billion by 2035, of which 70 per cent will be for power plants and 30 per cent for grids.

To give investors the right economic signals, long-term rules need to be introduced into this liberalised short-term market, as happened in the UK with CO_2 floor prices and "Contracts for Difference" favouring carbon free generation. Moreover, the new European Commission will have to adopt a pragmatic position and flexible rules, which is difficult when the agreement of 28 countries is needed on each legislation change.

Dr Colette Lewiner is an energy expert with more than 30 years experience. Since July 2012 she has been adviser to Capgemini's Chairman for energy matters.

Clearing the clouds over Africa

Sub-Saharan Africa faces challenges in bringing power to a population that is largely without access to electricity. Yet while developers increasingly see opportunities for renewables, especially solar, governments still have to ensure policies are carefully balanced to keep prices affordable without destroying the business case for projects. **Junior Isles**

Frei stresses the need to strike a good balance in the energy trilemma in order to attract investors

There is no doubt that sub-Saharan Africa holds huge potential for investment in its energy sector. Yet while no one denies the considerable challenges, many believe they will ultimately be overcome as more investors begin to seize the opportunities, especially in the renewables sector.

In its '*Africa Energy Outlook 2014*', focusing on key projections for Sub-Saharan Africa out to 2040, the International Energy Agency (IEA) forecasts that power generation capacity will quadruple to 385 GW during the period. Almost half of the growth in electricity generation to 2040 comes from renewables. Total power sector investment averages about $46 billion per year, with just over half of it in transmission and distribution.

The rapid growth is partly driven by the large portion of the population still in need of access to electricity. According to the IEA, over the period to 2040, 950 million people are projected to gain access to electricity in sub-Saharan Africa. Urban areas experience the largest improvement in the coverage and reliability of centralised electricity supply. Elsewhere, mini-grid and off-grid systems provide electricity to 70 per cent of those gaining access in rural areas.

The IEA notes cumulative investment of more than $200 billion lowers the total without access by 15 per cent, acknowledging that this is a major step forward. However, it stresses that it does not go far enough – a 15 per cent reduction still leaves 530 million people in the region, primarily in rural communities, without electricity in 2040.

While limited access to electricity is a common thread, numerous complexities in different forms across the continent contribute to the problem.

Africa offers big opportunities but risk is one of the major hurdles to attracting financing to power projects. With money more likely to flow to countries and sectors where political risk is lowest, sub-Saharan African countries face an uphill struggle. Political risk is high in many countries and the energy sector is seen as higher risk today than a couple years ago.

The World Energy Council (WEC) recently issued two reports that are very relevant to the challenges associated with bringing power to the masses – its '*World Energy Trilemma 2014*' report and the '*2015 World Energy Issues Monitor*'.

The Trilemma report shows that many countries across the world struggle to attain the right balance between energy security, affordability and environmental impact.

Christoph Frei, Secretary General, WEC says that South Africa is a clear example of that trilemma. "Everything was about low prices for a very long time, which made investment difficult. The results are obviously very painful today. Without striking a good balance in the energy trilemma, it is hard to attract investors."

The Energy Issues Monitor looks at the concerns that keep leaders awake at night. It finds that in addition to climate framework and energy price volatility, the top critical uncertainties in Africa are energy subsidies, energy affordability and capital markets.

Frei says the subsidy issue has two sides. On one side, he says it is a case of how to subsidise the consumption side. "It's about how much burden you can put on a resource. You have to ensure the resource is widely used without destroying the business case for investment.

"The other side of the subsidy issue is about what is needed to get renewables and IPP (independent power producers) projects off the ground and whether more [subsidies] are needed. What is most important, is providing the right framework. South Africa has shown the way and a few other countries are doing the same."

Other observers agree with Frei. Speaking ahead of the Africa Energy Indaba in Johannesburg, South Africa, Scott Brodsky, an energy lawyer and partner at international law firm Macfarlanes, said the current power crisis in South Africa and other African nations has given rise to huge investment opportunities.

He said many African countries view IPP projects as a way to address the acute shortage of power, keep the lights on and industry producing.

"South Africa's IPP programme has also brought the first substantial renewable output in a country dominated and severely constrained by its dependence on coal-fired power… Whilst the programme has encountered challenges such as grid connection and there is no one size-fits-all solution for Africa, the programme is an example of how real results can be achieved in a short time frame," said Brodsky.

In spite of the recent success in South Africa there are still places where it is not easy for IPPs. Building projects requires project financing, long-term contracts and a bankable off-taker, something that some describe as a "rarity" in Africa. This, combined with under-developed power grids, has led to governments depending on expensive emergency diesel or gas engine solutions in many countries.

This scenario creates a problem but is also an opportunity for some.

Solaire Direct is one solar developer that has had a measure of success in South Africa and elsewhere. In its global portfolio, the France-based company has projects in operation in South Africa and Ghana, while projects in Senegal, Uganda and Zambia are at an advanced stage.

Thierry Lepercq, the company's CEO, notes that its success is as much down to the business case for solar as anything else.

"If you think of a solution that is just as easily deployed [as diesel] – and by the way can be combined with engine technology – at a fraction of the price, solar has an immense opportunity around the continent."

When Solaire Direct started up eight years ago, its vision was to reduce the cost of development, construction and financing of solar so it was cost competitive.

Lepercq noted: "In some parts of the world we are now seeing prices in the $60-90/MWh range. This is lower than coal in South Africa. We have seen a major shift of solar from an incentivised business to one that is competing head-on with other energy sources in the spot wholesale market without incentives in countries like Chile."

He points out that even though these prices may not have yet been reached in Africa, they would still be 50-60 per cent lower than what utilities can achieve. "The case for solar in Africa is absolutely mind-boggling; Africa will be the solar continent."

Lepercq says that the case for solar in South Africa is obvious but concedes that it is not all plain sailing.

"Until two years ago, solar was considered very expensive. The government originally started solar for environmental reasons but there was about a 75 per cent fall in prices between Round 1 (in 2011) and Round 3 (2013) – from Rand 2.5/kWh to a lowest bid of Rand 0.86/kWh. This suddenly made solar competitive with other energy sources," he said.

"This should have made a strong case for using more solar. However, there is a regulatory political issue with Eskom standing in the middle. The economy has been difficult; Eskom is in a very difficult situation and the government is not in liberalising mode.

"Eskom sees solar as a threat as it offers decentralised power at half the price of Medupi and Kusile [two of its current large coal fired projects]. So we have an interesting situation whereby even though the prices are extremely competitive, the current Round 4 tender for 400 MW [of solar] has been delayed. Also, there is no open access for grid. So to be frank, although we have high hopes, having built systems there as well as a module manufacturing plant, for us the real market is elsewhere."

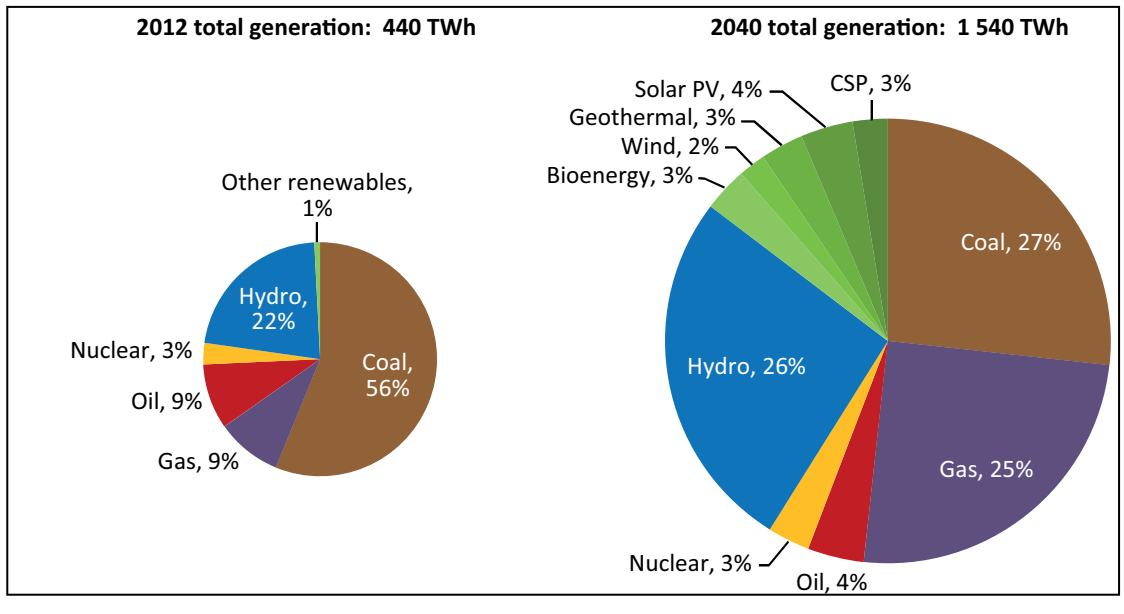
Lepercq sees opportunities for on-site generation for large consumers such as mining companies and cement companies in countries like Zambia, Senegal and Mali.

With financing remaining an issue, power purchase agreements and financing are being tailored to suit projects. Also the last six months have seen a large number of funds ranging from €100-500 million each being set up across the continent to support renewable developments.

Private, government, and private-government partnership projects are all options that can be used to bring power to the continent. The model will vary from country to country but all are needed. The key is how to attract investment while keeping prices affordable.

Frei commented: "Many of the right things are being done but it takes leadership from the top to stand behind the agenda, which comes back to policy and adopting smart policy options."

He concluded by using Ecuador as an example. "President Correa stood behind the policy of doubling cheap, abundant hydropower capacity by 2017. At the same time they will subsidise the introduction of efficient, locally manufactured electric stoves. This means they are replacing an ongoing subsidy for LPG with a one-time subsidy [for electric stoves]. At the same time they are transforming fuel dependence into a domestic value chain. This is a smart policy that addresses the trilemma – it makes the overall energy system more efficient, cleaner and keeps prices down."



Electricity generation by fuel in sub-Saharan Africa in the IEA's New Policies Scenario, 2012 and 2040. © *IEA/OECD 2014. Africa Energy Outlook: A focus on energy prospects in sub-Saharan Africa*

Taking superconductors to the limit

A project is under way to install a superconducting fault current limiter in Augsburg, Germany. The device could solve one of the major problems associated with integrating renewables and other decentralised energy sources into distribution grids.

Junior Isles

The increasing amount of renewables and distributed generation on today's power networks is creating problems for grid operators. When fed into medium-voltage power grids, large loads of renewables (generated when winds are strong or the sun is very bright) or other decentralised energy can produce short circuit currents that endanger the power supply.

One promising solution soon to go on trial will see the use of superconducting technologies to ensure reliable grid operation even under these conditions. In a pioneering project announced in December, Siemens is installing a superconducting fault current limiter (SFCL) for Stadtwerke Augsburg, the municipal utility in Augsburg, Germany.

The project, known as 'ASSIST', is sponsored by the Bavarian State Ministry for Economic Affairs and Media, Energy and Technology. It is part of Bavaria's Innovative Energy Technologies and Energy Efficiency (BayINVENT) Programme.

SFCLs can limit short-circuit currents in power transmission and distribution grids very quickly, effectively, automatically and thus with a high degree of intrinsic safety, making reliable grid operation possible even under difficult conditions.

Commenting on the uniqueness of the technology, Dr. Tabea Arndt, Head of Superconducting Components and Applications at Siemens Corporate Technology, noted: "A SFCL is quite a special device in principle because it performs very differently to conventional equipment in several aspects. And for some applications, there is no comparable conventional equipment."

There are several different technologies for handling short-circuit currents. A conventional reactor coil is one example. Another is an IS limiter – a device that incorporates a "melting fuse" which has to be replaced after a short-circuit is cleared. These technologies are used, if at all, in distribution grids (up to 30 kV) primarily in the industrial sector.

An SFCL exploits the properties of high-temperature superconductors. The heart of the device is a special arrangement of superconducting wire on coils. These coils are arranged as a stack inside a cryostat and kept at -196°C using liquid nitrogen. Superconducting wires completely lose their direct-current resistance in the superconducting state. In alternating current applications, an extremely small residual resistance remains.

This resistance normally has virtually no impact on current flows. If a certain current value is exceeded, e.g. during a short-circuit, the superconductor reacts immediately and generates resistance. This resistance limits the current generated by short-circuits extremely quickly and effectively, thereby protecting the power grid. The superconductor is heated during the limitation process. After a short regeneration phase, the current limiter can return to normal operation. Regeneration – like current limitation – is fully automatic and takes place without external intervention.

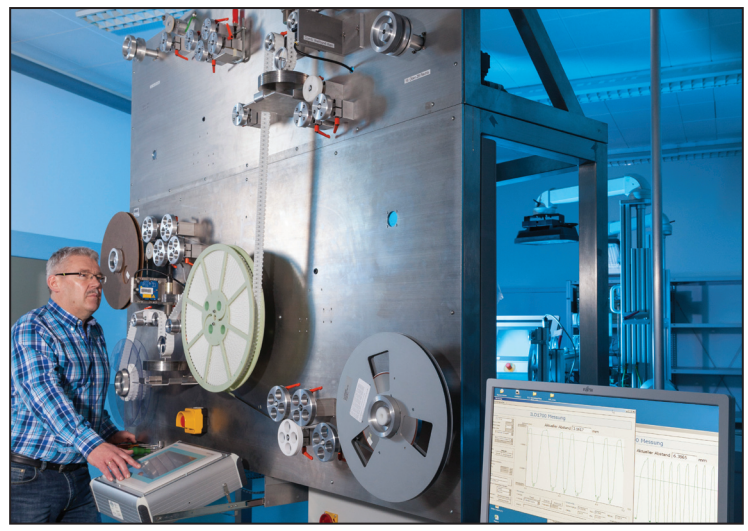
Dr Arndt explained: "An SFCL reacts at more or less the speed of light, and no additional control equipment is needed to trigger the device. There are no electronics to control the process; it's [controlled by] the physics itself. The SFCL limits the first peak of the fault current [AC] right from the start. A conventional digital controlled limiter or breaker first has to detect the fault and does not react instantaneously."

SFCLs have an additional advantage over conventional technologies. Short-circuit limiting reactors have a continuously high resistance or inductance and therefore introduce losses into the network. On average, about 25 kW of electricity is lost per conventional limiting reactor.

Dr Arndt gave an example of the problems this can create. "There is a power transmission ring around Moscow and there are a lot of these inductances, which leads to voltage drops in the grid."

Siemens' SFCL is of the resistive (or ohmic) type as opposed to an inductive type, as is the case with coil reactors. A resistive limiter is particularly useful in medium voltage networks as it avoids phase shifting and subsequently the conversion of reactive to active power and vice versa.

Further, as it has no inductance there is no negative impact on a grid's stability. Essentially it protects grids when short-circuits occur but is "invisible" to the grid during normal operation. Although there are energy penalties resulting from the need to cool the superconductor, the losses are less than the ohmic or inductance losses experienced with conventional devices.



Ensuring that an embedded ceramic superconductor is precise to within one-one-hundredth of a millimetre when deposited on a substrate and coiled onto a bifilar winding *© Siemens AG/Reprinted from Siemens' Pictures of the Future magazine*

Apart from short-circuit protection, a SFCL can be used to provide controlled coupling of feeders or previously unconnected branches in a grid. This ultimately increases grid security since supply can come from alternative branches.

"Coupling cannot be done using conventional devices, at least not without having a lot of control equipment. Connecting branches usually dramatically increases the short-circuit potential in the grid. But the SFCL prevents higher short-circuit currents," said Dr Arndt.

Another possible application, says Dr Arndt, could be to keep short-circuit currents at a low level in industrial or public grids. "Transformers are often used for this but installing SFCLs could eliminate the need for transformers to step-up or step-down voltages," said Dr Arndt. There has been a study in Germany that shows it is possible to get rid of the high voltage level in cities by switching to superconducting solutions."

An important aspect of the Augsburg project is not just the use of an SFCL, but its integration with conventional switching equipment and the addition of a very fast switch. Siemens says the introduction of such a switch provides an attractive device in terms of cost.

"The Augsburg device uses the superconductor for quickly limiting the short-circuit current and a fast reacting conventional switch to transfer the current to a conventional reactor coil. This parallel reactor coil takes care of the current while the superconductor is cooled back down to its normal state," explained Dr Arndt.

According to Siemens this arrangement not only reduces the cost of the device, it also maintains the look of a conventional device. "Even if they have some doubts about introducing new 'disruptive' technology into a conservative grid arrangement, this configuration allows them to fall back into a more or less conventional parallel solution. It's a low-risk installation," noted Dr Arndt.

The Augsburg project will demonstrate how renewable or distributed energy can be integrated into a MV grid, something that is likely to become a hot issue in Germany.

"Utilities in Germany are obligated to grant grid access to renewable energies and if they cannot, they still have to pay for the power that would have been produced by the renewable plant. It's therefore in their interest to connect these plants, in which case an SFCL will be helpful," explained Dr Arndt.

The SFCL sits on the 10 kV network in Augsburg, which is the link between the public grid of Stadtwerke Augsburg and the industrial network of MTU Onsite Energy.

Having kicked off in April last year, the project is now at roughly the mid-way point. Critical components have been ordered and, if all goes as planned, the SFCL will be installed at the end of this year. The device will then be monitored for six months under the funded programme.

Dr Arndt added: "The official programme will close in April 2016 but after this it will be operated for several years. It's not a demonstration or proof-of-principle project. The contracts are arranged so that it will be a permanent installation."

She notes that the aim is not only to test the technology. The European Patent Office (EPO) has already granted Siemens several key patents for the technologies used in resistive SFCLs and Siemens says it has already conducted years of research and testing. Instead, says Dr Arndt, it is more about increasing confidence and showing that the technology has a "high state of maturity", ready to be deployed in the field.

"Most of the known issues or challenges have already been addressed. Of course we still have to build it – get all of the components in time and integrate them. But this is an advantage of Siemens, we have the support of all the relevant business units."

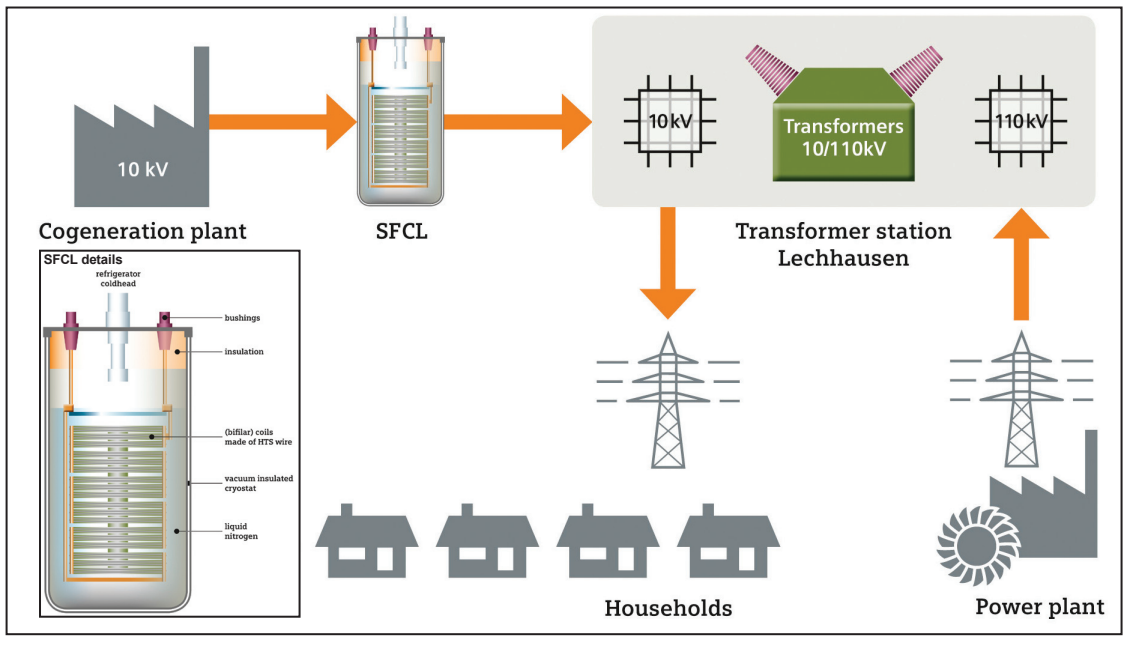
The technology's economics will depend on the installation. In some cases, Siemens says it will payback immediately. In others, Dr Arndt says it will be "like an insurance fee".

She said: "For example, some industrial grids cannot afford to have a short-circuit that causes any loss of production. The cost of one outage would immediately payback the cost of such a device."

The actual capital cost of SFCLs is said to be still in the "R&D regime" but Siemens says this will come down as volumes increase. Asia is already active and there are some orders worldwide.

Dr Arndt is excited about the prospects. "It is not our biggest project in terms of project volume or money but in terms of potential impact and leading-edge technology, this is really an exciting story for us."

A superconducting current limiter will be installed between the city of Augsburg's electrical grid and a CHP plant owned by MTU



Junior Isles

Here comes the sun

It has been a long time coming but it seems to be finally here – the cost of generating electricity from the main renewable technologies has reached parity and even gone below the cost of fossil fuel generation in many parts of the world.

According to the recent *Renewable Power Generation Costs in 2014* published by the International Renewable Energy Agency (Irena), biomass, hydropower, geothermal, solar and onshore wind are all competitive with or cheaper than coal, oil and gas fired power plants, even without financial support and despite falling oil prices.

Certainly the cost of hydropower has long been below the cost of fossil fired generation but with regards to wind and solar in particular, the news will come as a ray of sunshine for environmentalists and proponents of renewables.

Notably, solar photovoltaic (PV) is leading the way, with solar PV module costs falling 75 per cent since the end of 2009 and the cost of electricity from utility-scale solar PV falling 50 per cent since 2010. Residential solar PV systems are now as much as 70 per cent cheaper than in 2008, according to Irena figures.

According to the report, the total installed costs of utility-scale solar PV systems fell by as much as 65 per cent between 2010 and 2014. The most competitive utility-scale solar PV projects are delivering electricity for $0.08/kWh without financial support, and lower prices are possible with low financing costs. Their cost range in China, North America and South America has fallen within the range of fossil fuel fired electricity, says Irena.

Not surprisingly, solar power prices are falling dramatically in the Middle East, with a recent tender in Dubai, UAE, coming in at $0.06/kWh.

Adnan Z. Amin, Director-General of Irena commented: "The game has changed; the plummeting price of renewables is creating a historic opportunity to build a clean, sustainable energy system and avert catastrophic climate change in an affordable way." He added: "Now is the time for a step-change in deployment for renewables."

The Middle East is already pouncing on the opportunity. In January Dubai more than doubled the target for renewables in its overall energy mix. The change came days after the emirate doubled the size of a planned solar plant from 100 MW to 200 MW after receiving what the consortium building the scheme said was the cheapest cost ever proposed to generate power from a solar project.

Dubai's plans had envisaged 1 per cent of power generation coming from renewables by 2020 and 5 per cent by 2030. This has been revised to a minimum of 2.3 per cent by 2017 and 15 per cent by 2030, said Saeed Mohammed al-Tayer, Chief Executive of Dubai Electricity & Water Authority (Dewa).

At the start of the year, India officially ramped up its solar target. Indian Prime Minister Narendra Modi increased the government's solar ambitions from 20 GW by 2022 to a staggering 100 GW – 33 times the current installed solar capacity. This would raise solar power's share in India's total energy mix to more than 10 per cent.

Such plans are certainly good news, especially as the world works toward signing a new climate deal at the end of this year. But it is still too early to crown renewables as the saviour. There is the not so small issue of developing suitable storage technology to make them truly effective.

Further, the Irena report goes on to explain that offshore wind and concentrated solar power (CSP) technologies are in the earlier stages and deployment costs remain higher than those of fossil fuels.

More importantly, it notes that renewable energy price improvements are not universal, and that costs range widely according to resources and the availability of financing.

These are two crucial points especially in regions such as Africa, which is being touted as one solar market with a very bright future.

A conversation with Thierry Lepercq, CEO of international solar developer, Solaire Direct, furnished some interesting market insights. He believes Africa will be a major solar market three years from now but notes there are issues to be considered and obstacles that need to be overcome.

"Firstly, when we talk about solar, we mean ground-mounted projects bigger than 10 MW. At this size you can get the efficiencies and economies of scale. Anything smaller and costs go through the roof. But at the same time, it's arguable they don't have to be much bigger; you could have 50 MW but then they start to have an impact on the grid.

"There are several issues: one is land. These are different [from country to country]. For example, if it is Ghana there is a tribal dimension. So you need to make sure there is full cooperation with local players."

Interestingly, the land issue is also becoming a hot topic in India where some environmentalist argue that large solar projects are occupying too much of the natural landscape.

Another key challenge in Africa, says Lepercq, is grid connection and strength of the grid. "Grid connection is fundamental. If it's an off-grid situation, you don't have to worry but we are much more comfortable with a grid-connected project. If you are serving a mine and it runs out of minerals after five years, you are in trouble if it's not connected to the grid. A grid-connected project is the best security a developer or investor can have. Africa also faces grid stability issues that need to be addressed."

Another equally important consideration is the bankability of the off-taker and the entire business model. Interesting work is being carried out by some multi-lateral institutions, which is helping to draft the right bankable power purchase agreements. Yet challenges still remain.

Lepercq said: "The general rule is that African government-owned utilities are usually not bankable, so then it's a question of can you get sovereign guarantees, which is always a touchy issue. How you structure guarantees is important if you are dealing with public sector players."

In every project, whether in Africa or other promising markets, developers have to solve several issues together.

Lepercq explained that firstly, it is a case of finding the right site and developing it. Secondly, the plant has to be operated correctly, both technically and financially in a way that addresses the needs of investors. Thirdly, he notes that solar projects are "hugely capital intensive".

He said: "It takes $10 of investment to generate $1 of power revenues. This is versus $3 for wind and $2 for gas… generating steady, predictable and safe cash flows is absolutely essential. Matching that with what can be sometimes like a wild-west environment in Africa is an interesting challenge."

Raising finance for ambitious solar programmes will be a challenge, not just for African nations but for other countries too. In India, Prime Minister Modi now wants companies from China, Japan, Germany and the United States to lead investments of $100 billion over seven years to reach India's new target.

In the meantime, however, the country remains locked in a dispute with the US over the domestic content requirement under the country's Jawaharlal Nehru National Solar Mission. Trade disputes such as this, anti-dumping duties imposed on China and Taiwan by the US, and difficult financial markets all add a level of uncertainty to the market.

All in all the future for solar is bright but is it bright enough to wear shades? The Irena report shows the sun is shining but as those of us living in colder climates than the Middle East, Africa and India know, that doesn't mean it's warm outside.