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INSIDE THIS ISSUE

Back to a nuclear future

What Prime Minister Shinzo Abe's renewed mandate means for energy in Japan

The two nuclear reactors at Kyushu Electric's Sendai power station are expected to be the first of Japan's fleet of 48 to re-start, probably in the first half of 2015.

Shinzo Abe's decision to call a snap election in December paid off with a decisive victory – renewing the mandate of the ruling coalition. High on the list of policy priorities will be energy, given its crucial role in the economy. Japan will benefit from low oil prices as they reduce the burdens of heavy dependence on fossil fuel imports. However – as there is no knowing how long the low oil price will last – Abe's government will be focusing on two energy issues with big economic impacts: re-starting still-dormant nuclear power stations, and scaling back renewables subsidies.

The election result was all that Abe could have wished for – except for the record low turnout. Having framed the poll as a referendum on his economic revitalisation programme – dubbed "Abenomics" – Abe saw his Liberal Democratic Party (LDP) win 291 of 475 seats in the lower house, while the junior coalition party, Komeito, won 35. Crucially, this meant that the coalition held onto the two-thirds majority needed for the lower house to pass laws without recourse to the upper house. This renewed mandate leaves Abe in a strong position for the coming four years, with big implications for the energy industry. The most important is that Abe strongly supports re-starting closed nuclear reactors.

Until the events at Fukushima in March 2011, it was inconceivable that Japan would today have no nuclear power generation capacity online. The nation's 54 reactors were then providing 30% of the nation's power – a vital contribution, in terms of cost, self-sufficiency and greenhouse gas (GHG) emissions, in a nation now more than 90% dependent on energy imports. After Fukushima, concerns over safety meant that as reactors closed for obligatory periodic maintenance they were not allowed to re-start, pending safety reviews and approvals from the new Nuclear Regulatory Authority (NRA) and local government. By September 2013, all were offline.

Despite impressive energy conservation efforts on the part of Japan's people and businesses, imports of fossil fuels rose to offset the loss. With oil at over $100/barrel and liquefied natural gas (LNG) priced on the basis of linkage to oil, the nation's energy bill rocketed. In December 2014 Japan recorded a 30th straight monthly trade deficit, despite a plummeting yen. Energy imports, generally priced in US dollars, have been a big factor.

NUCLEAR RE-STARTS

It now looks likely that two reactors at the Sendai nuclear power station, owned by Kyushu Electric Power Company, could re-start in the first half of this year. The NRA concluded in September that the reactors conformed to new safety standards. In November, the local government of the region that hosts the power station and the Kagoshima Prefecture governor agreed to re-starts. Final NRA approval is expected within a few months.

How many more reactors will follow and over what > see page 2

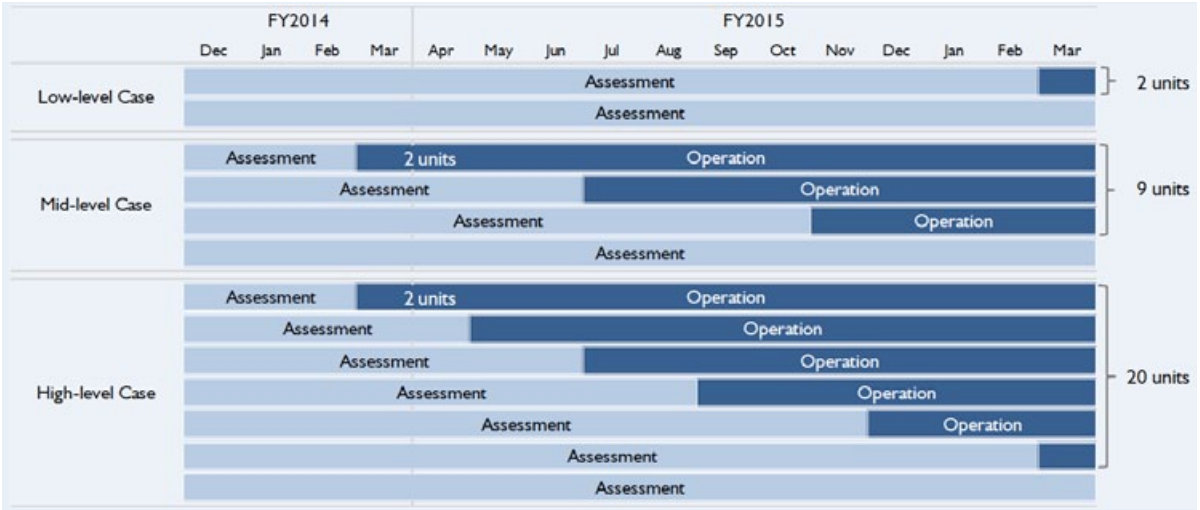
timescale is a question addressed in a report recently published by the Institute of Energy Economics, Japan (IEEJ) – entitled *Economic and Energy Outlook of Japan for Fiscal Year 2015* (FY2015, which begins at the start of April). The authors – Yanagisawa Akira, R. Ikarii, S. Iwata, I. H. Hwang, K. Tomokawa, Y. Shibata and K. Ito – have formulated four scenarios that project what the future might hold.

- In the "Nuclear Mid-Level Case", the two Sendai reactors and another seven re-start by the end of FY2015. These nine reactors operate for an average period of six months, generating 44.4 TWh during the year. This compares with the 288.2 TWh that the nuclear industry generated in FY2010. A key bottleneck in getting reactors re-started is the level of expertise and the number of staff that the NRA is able to deploy to conduct the complex and time-consuming engineering studies required for safety reviews and approvals.

- In the "Nuclear High-Level Case", the authors assume that the NRA expands its staff and rationalises plant examination procedures, based on its experience to date, reducing the impact of the regulatory bottleneck. A total of 20 reactors start up by the end of FY2015, operating for an average of seven months and generating 95.8 TWh during the year.

- The "Nuclear Low-Level Case" illustrates just how much uncertainty surrounds the question of nuclear re-starts. In this scenario only the two Sendai reactors start up towards the end of 2015, generating a negligible 1.0 TWh during the year.

- The authors also include what they describe as a "hypothetical reference case". This scenario assumes that all of the reactors in Japan's remaining fleet of 48 that still have reasonably long operating lives – 32 in total – come on stream during the year and operate at a load factor of 80%, generating 233 TWh – establishing a theoretical ceiling (effectively not far off what the situation would be now had the events at Fukushima not happened).



Three scenarios for the re-start of Japan's nuclear reactor fleet. (Source: IEEJ)

ECONOMIC AND ENVIRONMENTAL IMPACTS

The economic impacts of these scenarios are tempered by the oil price plunge and by the relatively low average load factors that the reactors would achieve in their first year of operation. The authors assume an average CIF (cost, insurance and freight) oil price for FY2015 of $67/barrel. Japan is already feeling the benefits of lower oil prices but has yet to feel the full benefit of lower gas prices because LNG prices are linked to oil prices with a three-month lag.

In the mid-level scenario, power generation costs are up JPY3.0/kWh (US¢2.5/kWh) on the 2010 figure of JPY8.2/kWh (US¢7.0/kWh). In the hypothetical case the increment is a much lower JPY1.3/kWh. Oil consumption is down 16.5 Gigalitres (Gl) on 2010's 232.3 Gl, because demand in the transport sector has been falling and because nuclear electricity would tend to push oil-fired generation out of the mix first. In the hypothetical case, oil consumption is down by 25.1Gl. LNG imports are 14.5 million tonnes (Mt) higher than the 70.6 Mt imported in 2010. In the hypothetical case, they would be 1.5 Mt lower.

Environmental impacts are significant, highlighting the role that nuclear power can play in reducing the overall GHG emissions of electricity generation. In the mid-level case, energy-related CO_2 emissions are up 45 Mt on 2010's 1,123 Mt, while in the hypothetical case they are down 52 Mt. To look at it another way, in the mid-level case, emissions are 2.9% lower than in FY2005, while in the hypothetical case they are 10.9%

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ABOUT
WORLD ENERGY FOCUS

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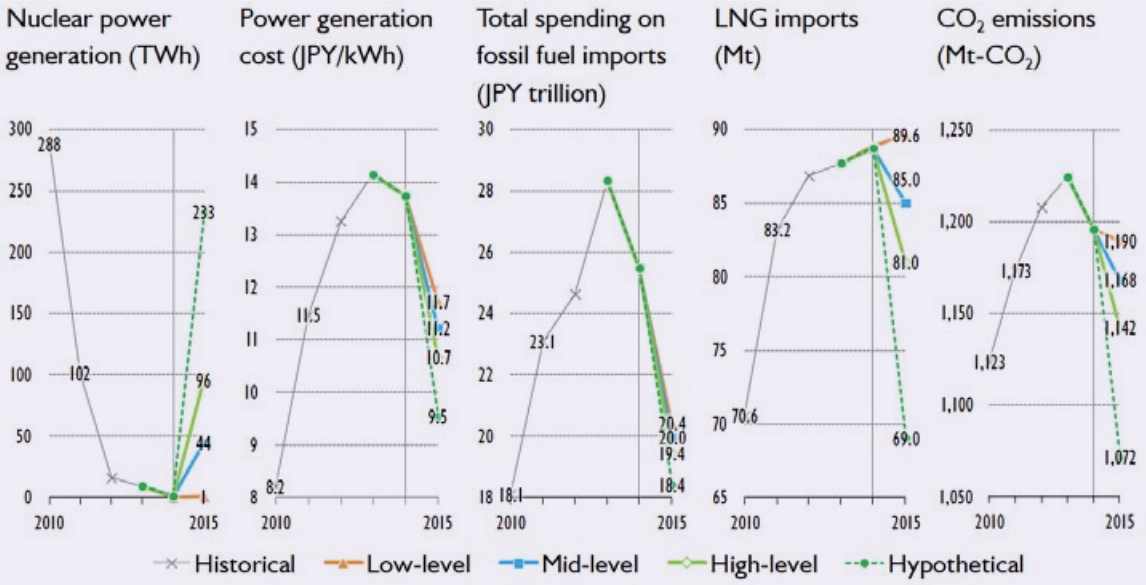
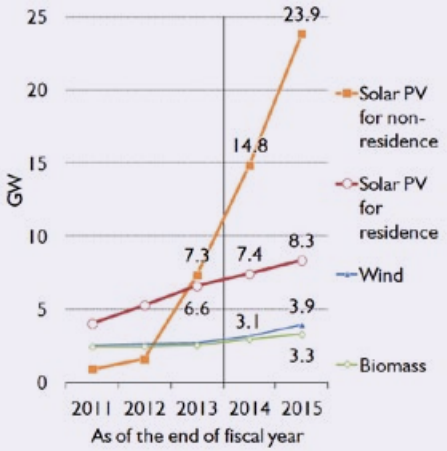


The impacts of re-starting nuclear plants on generation costs, fossil fuel imports and CO_2 emissions. (Source: IEEJ)



Installed capacity of renewable power generation (Source: IEEJ)

down. This is particularly significant given that Japan needs to submit its plans for mitigating GHG emissions to the UN Framework Convention on Climate Change by the end of the first quarter of this year, as part of the run-up to the December climate change talks in Paris. Assumptions over nuclear re-starts will make a big difference to what is feasible.

The high level of uncertainty in the IEEJ scenarios is largely a reflection of public opinion in Japan over the role that nuclear power should play in the energy mix of a country prone to earthquakes. Surveys tend to show that more people are against nuclear re-starts than for them. For example, a survey conducted in November by broadcaster NHK, found 57% of those asked against nuclear re-starts and only 32% in favour. However, attitudes have been shifting over time. They are affected by a range of factors, one of which is that electricity bills are significantly higher than they were – and not just because of the nuclear shut-downs. Also significant are the perceived prospects for alternatives to nuclear power. A case in point, from both perspectives, is renewable energy.

OVER-GENEROUS SUBSIDIES

One of the policy responses to the nuclear power crisis has been a push to promote renewable energy sources, especially solar power. In mid-2012, the previous government introduced feed-in tariffs (FITs) that with hindsight look over-generous – and expensive. The result has been a stampede to develop new projects that has had two significant impacts. One is the cost of the subsidies; the other is the effect on the stability of electricity grids of a sudden surge of intermittent renewable energy sources.

In the IEEJ report, the authors have calculated that: "Cumulative burdens for authorised renewable power generation capacity would be JPY46 trillion (US$390 billion) [over 20 years], equivalent to 11% of electricity rates for households and 21% of those for large industrial users. At the end of FY2015, renewable power generation capacity in operation will reach 50GW." (However, most of this will consist of non-residential photovoltaics, so-called "mega-solar".)

The attractions to Japan of boosting renewable energy are clear: they constitute a domestic energy source in a country heavily dependent on energy imports and emit no carbon dioxide, thus potentially providing two solutions as a replacement for nuclear power. But, says the IEEJ report: "Renewables power generation capacity has increased too rapidly, resulting in a fast burden expansion and turmoil." Not surprisingly, the government has already been taking action to reduce subsidies and curb the rate of expansion.

The issue of grid network stability should not be underestimated either. "FIT contract applications have increased too rapidly in some regions, threatening to destabilise electricity supply," says the IEEJ report. "Five electric utilities have frozen response to grid connection applications."

In the very first issue of *World Energy Focus* (published in July 2014), we ran a Country Focus in which Teruaki Masumoto – Chair of the Japan Energy Association and the nation's WEC Member Committee – described Japanese energy policy as a "muddle" caused by "a lack of understanding of energy issues". With his renewed mandate, Abe and his administration have the opportunity to re-start not just some of Japan's nuclear reactors but the nation's energy policy. ●

Low oil prices will bolster faltering global economy, say IMF and World Bank

Low oil prices are likely to persist through 2015 and into 2016, making a significant contribution to global economic growth, according to the International Monetary Fund (IMF) and the World Bank. Nevertheless, in economic forecasts released last month, both organisations downgraded their growth expectations for this year and next – citing downside factors that are expected to outweigh the contribution to growth from cheaper energy.

An important message for the energy industry is the growing consensus that the 60% fall in oil prices between June 2014 and January 2015 marks a new phase in global energy markets, with major implications for everyone. The International Energy Agency, due to publish its medium-term oil market report looking ahead to 2020 on 10 February, says: "The recent oil market sell-off, brought on by deep imbalances after years of record-high prices, will likely prove a milestone in the history of oil. However prices eventually evolve, markets may never be the same."

In its twice-yearly *Global Economic Prospects report,* the World Bank forecasts global economic growth of 3.0% for this year, 3.3% for 2016 and 3.2% for 2017, after what it describes as "a disappointing year in 2014". The previous forecast, in June last year, envisaged growth of 3.4% for this year and 3.5% for 2016.

"Risks to the outlook remain tilted to the downside, due to four factors," says the report. "First is persistently weak global trade. Second is the possibility of financial market volatility as interest rates in major economies rise on varying timelines. Third is the extent to which low oil prices strain balance sheets in oil-producing countries. Fourth is the risk of a prolonged period of stagnation or deflation in the Euro Area or Japan."

The World Bank believes that lower oil prices, if sustained, will contribute to global growth and lead to "sizeable real income shifts" from oil importers to oil exporters. "Estimates suggest that a 30% oil price decline could increase global GDP by up to 0.5%," it says. However, it cautions that "both cyclical and structural factors might affect the impact of oil price drop on growth in 2015-2016".

The IMF, in an update to its twice-yearly World Economic Outlook (WEO), projects global economic growth of 3.5% for this year and 3.7% for 2016, a downgrade of 0.3% for both years since the October 2014 edition of the outlook. "The revisions," it says, "reflect a re-assessment of prospects in China, Russia, the Euro area, and Japan, as well as weaker activity in some major oil exporters because of the sharp drop in oil prices. The United States is the only major economy for which growth projections have been raised."

The IMF says four key developments have shaped the global outlook since the release of the October 2014 WEO:

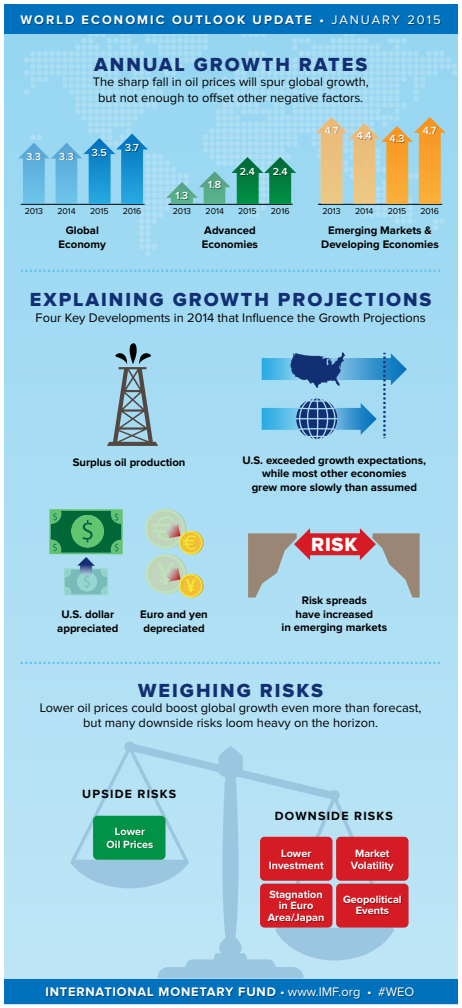
- Top of the list is the decline in oil prices, which it says, is partly due to unexpected demand weakness in some major economies, in particular emerging market economies, also reflected in declines in the prices of industrial metals. "But the much larger decline in oil prices," it adds, "suggests an important contribution of oil supply factors, including the decision of the Organisation of Petroleum Exporting Countries (OPEC) to maintain current production levels despite the steady rise in production from non-OPEC producers, especially the United States."

- Second, while global growth increased as expected in the third quarter of 2014, the overall figure masked "marked growth divergences in the major economies", with economic performance in all the major economies, except for the US, falling short of expectations. The IMF sees this as "reflecting ongoing, protracted adjustment to diminished expectations regarding medium-term growth prospects".

- Third, currency movements have played a big role, with the US dollar appreciating significantly since October but currencies in Europe, Japan and commodity-exporting countries weakening.

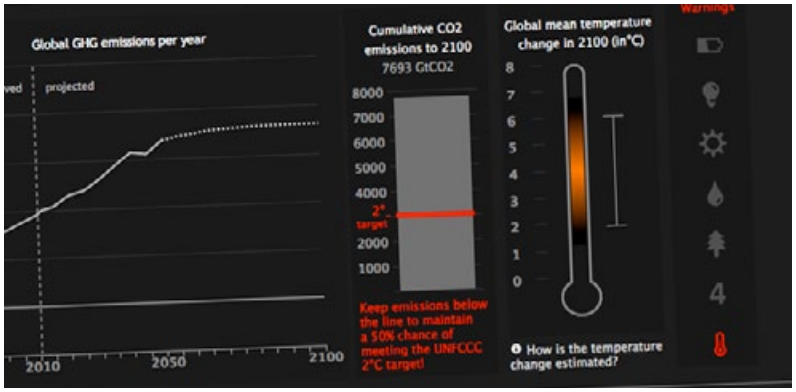
- Fourth, "interest rates and risk spreads have risen in many emerging market economies, notably commodity exporters, and risk spreads on high-yield bonds and other products exposed to energy prices have also widened".

A country causing particular concern to both the IMF and the World Bank is Russia, whose economy is expected to contract by 2.9% in 2015 instead of growing by 1.5%, says the World Bank. The IMF comments: "The much weaker outlook in Russia reflects the economic impact of sharply lower oil prices and increased geopolitical tensions, both through direct and confidence effects. Russia's sharp slowdown and rouble depreciation have also severely weakened the outlook for other economies in the Commonwealth of Independent States (CIS) group."



Source: IMF

Both the IMF and the World Bank have called on world leaders to take the opportunity presented by the oil price plunge to cut energy subsidies and to increase energy taxes *(see separate story on page 6)*.



Climate 'calculator' shows we 'can curb carbon and live well'

An innovative, simple-to-use, yet highly sophisticated modelling tool that allows anyone – from policymakers to consumers – to evaluate the impact of policy changes on climate change was launched last month in London and Beijing. In London, the UK's energy and climate minister, Ed Davey, claimed the online free-to-access Global Calculator "shows that everyone in the world can prosper while limiting global temperature rises to 2°C".

The calculator has been designed as an interactive tool for businesses, NGOs and governments to explore and evaluate the wide range of policy options for cutting carbon emissions, and the trade-offs for energy and land use to 2050. According to the UK government's chief scientist, Mark Walport: "The hard part of climate is the science; the harder part is the communication. That's why the Global Calculator is so key."

Its development was led by the UK's Department of Energy and Climate Change (DECC), in collaboration with organisations from around the world, among them Climate-KIC, the European Union's main climate innovation initiative, the International Energy Agency (IEA) and the Energy Research Institute (China).

The Global Calculator allows users to design their own vision of the future energy, land and food system to 2050 by combining their choices of 40 policy levers. The combination chosen is called a "pathway". Users can either design their own pathways or explore pathways based on models developed by other organisations, such as the IEA and the World Energy Council. For example, the calculator allows users to explore the WEC's *Jazz and Symphony World Energy Scenarios to 2050* that were launched in 2013 at the World Energy Congress in South Korea.

Users can pre-load an example scenario and then make adjustments to it to see what the results are – in terms of emissions trajectories and global warming. The target is to come up with feasible pathways that result in emissions below the levels needed to keep warming to within 2°C.

Stefan Hirschberg at the Paul Scherrer Institute, said: "The Global Calculator is a very useful tool for comparing the different pathways and their implications and exploring the sensitivities to variation of some key parameters."

The model is based on work conducted by DECC to develop a similar calculator for the UK, which was successfully used by the UK government to develop its 2011 strategy, *The Carbon Plan*. Around 20 other governments have since developed similar calculators for their own countries, some with help from the DECC. "However," said Davey, "the country-level calculators cannot tell us what actions add up to at a global level . . . That is why DECC, with joint funding from Climate-KIC, has led a range of global partners to build a global version." ●

To access the Global Calculator, go to: *http://www.globalcalculator.org*

Projects cancelled and delayed as low oil price hits cash flow

As the annual financial results reporting got under way last month, the scale of the impact of the oil price plunge on investment intentions became clear. Company after company in the oil and gas sector signalled intentions to scale back capital expenditure, which will delay not just oil development projects but other energy projects too. Two badly hit sectors are liquefied natural gas (LNG) and gas-to-liquids (GTL) because of the crucial role that oil price generally plays in their economics.

The first major oil and gas company to report 2014 results was Shell, which said it planned to cut back capital investment by US$15 billion over 2015-2017.

CEO Ben van Beurden said: "A year ago, when I updated you on fourth quarter 2013, oil prices were around $108/barrel. They are quite a bit lower than that today … In the medium term, supply and demand fundamentals tend to reassert themselves around the marginal cost of supply. We have not changed our long-term planning assumptions of $70-$90-$110 Brent … However, we have to think carefully about the implications of today's prices, which are below our planning range, and we don't have much visibility on how long this downturn will last – months or years."

BP said it planned to reduce capital expenditure by 20% in 2015, cutting back on exploration spending, postponing "marginal" upstream projects, and halting some down-stream projects.

Several LNG project developers announced they were putting projects on hold and in the US the South African fuels and chemicals company Sasol said it was postponing a major GTL project planned for Louisiana. ●

Clamour grows for energy subsidy cuts and higher taxes

The plunge in oil prices since June 2014 is a golden, once-in-a-generation opportunity for world leaders to cut costly and poorly targeted subsidies for fossil fuels and to raise energy taxes to curb wasteful consumption. That is the message coming from a growing number of influential organisations – including the International Energy Agency (IEA), the International Monetary Fund (IMF) and the World Bank – and numerous editorials in a wide variety of publications, among them *The Economist* magazine.

In its January 2015 *Global Economic Prospects* report, the World Bank notes that several developing countries provide large fuel subsidies to consumers, "in some cases exceeding 5% of GDP". These subsidies, it argues, tend to benefit middle-income households disproportionately, and "tilt consumption and production towards energy-intensive activities".

"Falling oil prices reduce the need for fuel subsidies," it says, "and provide an opportunity for subsidy reform with limited impact on the prices paid by consumers . . . Fiscal resources released by lower fuel subsidies could either be saved to rebuild fiscal space lost after the global financial crisis or re-allocated towards better-targeted programmes to assist poor households, and critical infrastructure and human capital investments."

Even before the oil price plunge a number of countries had implemented subsidy cuts in 2013 and 2014 – among them Egypt *(see p5 of our August 2014 issue)*, India, Indonesia, Iran and Malaysia. However, political leaders have been wary of removing or lowering energy subsidies because of the risk of public unrest.

The World Bank also stresses that sustained low oil prices over the medium term "may encourage a move towards production which is more intensive in fossil fuels or energy generally. This runs counter to broader environmental goals in many countries." It is therefore urging policymakers to reform tax policies on the use of energy, especially in countries where fuel taxes are low, as a way of offsetting incentives to increase oil consumption, "while at the same time building fiscal space".

In a recent front-page leader headlined "Seize the day", *The Economist* magazine writes: "The plunging price of oil, coupled with advances in clean energy and conservation, offers politicians around the world the chance to rationalise energy policy. They can get rid of billions of dollars of distorting subsidies, especially for dirty fuels, whilst shifting taxes towards carbon use. A cheaper, greener and more reliable energy future could be within reach."

Christoph Frei, Secretary General of the World Energy Council, says: "Urgent action is needed to address the issue of energy subsidies, as was recognised in our recent survey of over 1,000 energy leaders worldwide. Subsidies often distort markets, create political risk, produce inadequate energy solutions, encourage wasteful behaviours and shy investors away from the energy projects that countries really need. Governments should take the opportunity of low oil prices to reduce subsidies now." ●

The first liquefied natural gas (LNG) plant to be supplied with coal-seam gas (CSG, also known as coal-bed methane) has begun loading cargoes in Australia.

The Queensland Curtis LNG (QCLNG) facility, developed by BG Group, is the first of seven new LNG projects under construction in Australia. Together they will make Australia a larger LNG producer than Qatar before the end of the decade. Qatar is currently the largest producer by far, with capacity of 77 million tonnes/year (Mt/year). Australia's new projects will boost its production capacity from 24 Mt/year in 2014 to more than 86 Mt/year by the early 2020s. Three of the seven projects, all located on Curtis Island in Queensland, will be supplied with CSG. At plateau, expected in 2016, QCLNG will have an output of 8 Mt/year of LNG. Its first cargo was loaded onto the Methane Rita Andrea LNG tanker (pictured above) at the end of December. ●

NEWS IN BRIEF

UK NUCLEAR POWER PLANT DEAL EXPECTED NEXT MONTH

The partners developing the UK's first new nuclear plant in 20 years expect to sign an investment agreement next month, taking the project a big step closer to fruition. France's EDF and its Chinese partners, which include China General Nuclear Power Corporation, are planning a 3.3 GW plant at Hinkley Point in Somerset. The EU approved state support for the Hinkley Point C project towards the end of last year *(see p8 of our November 2014 issue)*.

WEC PROPOSES LIST OF GOODS FOR LOW-CARBON TRADE

To support the World Trade Organisation negotiations under way to eliminate tariffs on environmental goods, the World Energy Council last month published a report listing the goods that it recommends should be included in the final Environmental Goods Agreement. The report, *Catalysing the low-carbon economy*, can be downloaded from: *http://bit.ly/1IXKr1i*

INDIA TO GET US$4 BILLION SOLAR POWER FACTORY

SunEdison, a US-based solar power developer, and Indian industrialist Gautam Adani plan to invest US$4 billion in constructing a solar power factory in India, according to a report in the *Financial Times*. What is claimed will be "the largest solar photovoltaic manufacturing facility in India" is due to start up in 2018, said SunEdison's CEO, Ahmad Chatila. Narendra Modi's government has big plans to install new solar power facilities in the country.

Worst drought on record threatens Brazil's power

The ONS electricity grid control room for the south-eastern region of Brazil, the part of the country worst affected by the current drought. (Photo: ONS)

Hydroelectricity has been a boon to Brazil, providing more than two-thirds of the nation's power, relatively cheaply and with low greenhouse gas emissions. Today, however, as the nation faces its worst drought since records began in 1930, its overwhelming dependence on hydropower threatens the security of electricity supplies.

In 2001 Brazil faced an energy crisis when drought led to a sharp fall in the generation of hydroelectricity. With the nation dependent on hydro for most of its power, the government implemented energy rationing that lasted from July into early 2002. Consumers who exceeded their quotas faced heavy fines or temporary disconnection.

Today, once again, Brazil is struggling to meet demand for power because of drought and coming months will be a worrying time for consumers, producers and the new government, with President Dilma Rousseff starting her second term on 1 January.

This time around the challenge could be all the greater – firstly, because demand for electricity rose by 55% between 2002 and 2012 as Brazil went through what the International Monetary Fund (IMF) describes as a period of "remarkable growth" that lifted living standards and reduced poverty; and secondly, because this drought, says environment minister Izabella Teixeira, is the worst since records began in 1930.

'DELICATE AND WORRYING'

The states worst affected – São Paulo, Rio de Janeiro and Minas Gerais, all in the south-eastern part of the country – are the most populous and also home to much of Brazil's industry. Teixeira says: "Since records for Brazil's southern-eastern region began 84 years ago, we have never seen such a delicate and worrying situation."

Brazil is in the middle of what is usually its rainy season but there has been little rainfall in recent weeks. In São Paulo there have been frequent cuts in water supplies and the city's Cantareira reservoir system is reported to be only 5% full. The Paraibuna reservoir that serves Rio de Janeiro has a similar problem. Generation from hydroelectric plants has already fallen but the big worry is how bad the crisis may get if the drought persists. In an interview with *World Energy Focus* last year *(see the October 2014 issue)*, José da Costa Carvalho Neto, the CEO of Eletrobras, Brazil's largest electricity company, said: "This has been one of the driest periods in Brazil since we started measuring rain levels . . . But we managed to maintain supply, thanks to recently built thermal plants and the interconnections between the different watersheds."

Since then the situation appears to have worsened. Last month, there were reports in Latin American media that Brazil's electricity grid operator, Operador Nacional do Sistema Elétrico (ONS), had been forced to implement power cuts that led to rolling blackouts across parts of the country as temperatures rose and air-conditioning and other loads surged. Brazil also called on Argentina to supply it with some power. Electricity companies have been ramping up generation at thermal plants, but at greater cost than hydropower and higher greenhouse gas emissions.

MORE HYDROPOWER COMING

Brazil's power companies have been diversifying their sources of electricity, with two nuclear plants in operation and a third under construction, new natural gas-fired power stations, and various programmes to develop non-hydro renewables, especially wind power. But even so the nation remains overwhelmingly dependent on hydropower, as the table shows.

Despite these diversifications, Brazilian power companies are planning several very-large-scale new hydropower plants. Eletrobras, for example, is working on the Belo Monte project, which will add 11,233 MW of capacity, and is also involved in studies for hydropower projects on the Tapajós river, and at Garabí and Panambí on the Uruguay River. (This hydro facilities are typically "run-of-the-river" because of the environmental problem with large lakes in the Amazon Basin.)

ECONOMIC IMPACTS

The potential electricity crisis comes at a difficult time. Following a period of rapid GDP growth during the presidency of Luiz Inácio Lula da Silva – who held office from 2003 until 2010 – Brazil's economy faced an economic slowdown from mid-2011 onwards. GDP has risen by just 6.7% during the four years since President Rousseff took office and while there has been some recovery, according to the IMF Brazil entered a "technical recession" in early 2014.The future continues to look challenging. In its October 2014 *Regional Economic Outlook Update for the Western Hemisphere* the IMF projected real GDP growth for Brazil of just 0.3% for 2014 and 1.4% for this year, significant downwards revisions from previous forecasts and well below the 2.2% projected for the Latin America and the Caribbean (LAC) region as a whole. There were further downwards revisions in last month's economic update.

The last thing Brazil needs right now is for its industries to be suffering from electricity rationing and power cuts. ●

Brazil's electricity supply, 2013 (GWh)

Hydropower	390,992	64.1%
Gas	69,003	11.3%
Biofuels	39,679	6.5%
Oil	22,090	3.6%
Nuclear	14,640	2.4%
Coal	14,801	2.4%
Wind	6,576	1.1%
Other	12,244	2.0%
Imports	39,733	6.5%
Exports	-	-
Total	**609,758**	100.0%

Source: EPE

WEC EVENTS

Africa Energy Indaba
Johannesburg, South Africa
17–18 February 2015

Africa Energy Indaba (AEI) is the foremost African energy event for energy professionals from across the globe. The event gathers international and African experts to share insights and solutions to Africa's energy crisis, while exploring Africa's vast energy development opportunities. It includes a conference and an exhibition. Designated the WEC's African regional event, the AEI is presented by the South African National Energy Association (SANEA), the WEC national committee. It is supported by the African Union Commission and the NEPAD Planning and Coordinating Agency.
http://www.africaenergyindaba.com

4th European Energy Forum
Paris, France
12–13 March 2015

This event – with the theme "On the way to COP 21" – will assess national and regional climate initiatives in the EU, aiming to identify practical solutions. It will include a special workshop on the energy trilemma which seeks to understand the opportunities and challenges for policymakers, business, finance, and civil society in determining post-2015 sustainable development goals for energy. Organised by WEC France.
Contact: Einari Kisel
kisel@worldenergy.org

World Energy Leaders' Summit
Manila, Philippines
17–18 June 2015

A high-level, invitation-only event held within the Asia Clean Energy Forum. The summit provides a platform for the global energy leaders' community to facilitate dialogue on energy issues.

Executive Assembly
Addis Ababa, Ethiopia
26–30 October 2015

The WEC's annual meeting, welcoming the WEC community and representatives from the African and global energy sectors. It will also host the WEC's governance meetings.

2016 World Energy Congress
Istanbul, Turkey
10–13 October 2016

The World Energy Congress is the triennial flagship event of the World Energy Council. It has gained recognition since the first event in 1924 as the premier global forum for leaders and thinkers to debate solutions to energy issues. The event also provides an opportunity for executives to display their technologies and explore business opportunities. With the upcoming congress in Istanbul – to be held under the theme "Embracing new frontiers" – the event will have taken place in 21 cities around the world.
Catch up on the 2013 Congress at:
http://bit.ly/1n1IWVW

WEC MEMBER COMMITTEE EVENTS

World Energy Trilemma: sustainability, economics, energy security
Graz, Austria
10 February 2015

WEC Austria will be presenting the Trilemma report in an event co-organised with the Institute of Electricity Economics and Energy Innovation at Graz University of Technology.
Contact: Dr Robert Kobau
office@wec-austria.at

3rd Seminar on the Ecuadorian Electric Sector
Riobamba, Ecuador
15–17 April 2015

This event will gather the most important representatives from Ecuador's energy sector to discuss the country's energy development.

For the first time, to celebrate Ecuador joining as a member of the WEC, the seminar will have dedicated sessions looking at the sector from the lens of the council's studies.

Co-hosted by ECUACIER, Ecuador's committee for the region's energy integration commission.
http://ecuacier.org/seminario/
Contact: Marisol Álvarez
aalvarez@ecuacier.org

Energy and Geostrategy
Madrid, Spain
13 May 2015

WEC Spain will present its latest publication "Energy and Geostrategy 2015" at this event, co-organised with the Spanish Ministry of Defence. Speakers will discuss current energy issues from a global geopolitical perspective.
Contact: Javier Jiménez Pérez
jjimenezp@repsol.com

3rd International LNG Conference (ConferenzaGNL)
Rome, Italy
11–12 June 2015

Focusing on LNG-as-fuel applications in marine and road transport in the Mediterranean region, the conference will gather national and international experts from business, research, and civil society. Organised by WEC Italy in partnership with Symposia.
Contact: Agata Carone
agata.carone@wec-italia.org

SEE MORE WEC EVENTS ON
www.worldenergy.org/events/future

ABOUT THE WEC

The World Energy Council (WEC) has been at the forefront of the energy debate for nearly a century, guiding thinking and driving action around the world to achieve sustainable and affordable energy for all. It is the UN-accredited energy body and principal impartial network, representing more than 3,000 organisations – public and private – in almost 100 countries.

Independent and inclusive, the WEC's work covers all nations and the complete energy spectrum – from fossil fuels to renewable energy sources.

JOIN OUR NETWORK

Join the debate and help influence the energy agenda to promote affordable, stable and environmentally sensitive energy for all.
As the world's most influential energy network, the WEC offers you and your organisation the opportunity to participate in the global energy leaders' dialogue.

Find out how you can:

- join a Member Committee;
- become a Project Partner, Patron or Global Partner;
- take part in annual industry surveys, study groups and knowledge networks;

by visiting our website and contacting our team on: http://www.worldenergy.org/wec-network

CONTACT US

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