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Interview Taner Yildiz, Minister of Energy and Natural Resources, Turkey

"The private sector can ensure security of supply through a transparent, competitive market"

Turkey, faced with strong demand growth and high import dependency, is undertaking ambitious projects in new nuclear power, coal power and renewables. In an exclusive interview with World Energy Focus, Taner Yildiz, Minister of Energy and Natural Resources, says the government is shaping the energy strategy, but the private sector will have to make the investments. "Having put in place a transparent, competitive market structure, I am confident we are able to ensure security of supply though the market."

Few countries face greater energy challenges than Turkey. Not only has the country had the second highest growth in gas and electricity demand in the world over the past decade, after China, it also has to import three-quarters of its energy resources. In addition, Turkey aspires to be an energy hub between East and West – and is serious about its climate commitments. The man who is responsible for balancing these competing concerns is Taner Yildiz, who has stood at the helm of the Turkish Ministry of Energy and Natural Resources since 2009. An electrical engineer by education and experience, Yildiz has a clear vision of Turkey's energy course: the State should direct the energy system, the market should do the work, guided by an independent regulator. Top priority for the government: security of supply. We interviewed the Minister as the World Energy Council's Turkish National Committee is preparing for next year's World Energy Congress, which Yildiz promises will be "the biggest ever".

Security of supply is regarded as the top priority of your Strategic Energy Plan (2015-2019). Do you believe a competitive energy market dominated by private players can guarantee security of supply?

As you know, energy investments are large, requiring long term finances and a great deal of market analysis in advance. I believe the private sector should invest in the energy sector. Governments should tend to channel their public funds to social programs and infrastructure projects. In the past, the State took care of energy infrastructure investments. In the 1980s and 1990s we started experimenting with public-private partnerships. Then, partly as an effort to align with the Acquis Communautaire of the EU, we adopted extensive reforms to achieve a transparent, competitive and fair playing ground for private sector actors. Since 2001, our laws actually dictate that the State will not make additional investment in the electricity generation sector as long as private sector investments are able to guarantee security of supply. It is an honour for me to underline that this strategy has been successful until now.

Rosatom's subsidiary Akkuyu NGS has recently been rewarded a preliminary license for building Turkey's first nuclear power plant at Akkuyu, in Büyükeceli, Mersin Province, which is to start operations in 2023. Do you believe nuclear power to be cost-effective over the long term, given the fact that the cost of renewables is coming down quickly?

I agree that renewable technologies are fast becoming more competitive. Yet we are not totally there. Furthermore, Turkey needs more baseload capacity and nuclear power is the most reliable option for this. So,

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going nuclear is not just a price-based decision, but part of a grand strategy taking supply security concerns into account. Still, these are long-term decisions and inherently involve some of the risks you hint at, but I believe the agreement we have reached with our partners in nuclear deals could be considered even-handed.

The Akkuyu nuclear power plant (NPP) is being financed by Rosatom, but how will it operate in the market? Will it get a fixed payment from the government?

For Akkuyu NPP, for the first two of a total of four units, the government has pledged to buy 75% of the electricity generated at a previously determined price. For the remaining two, when they come on-line, only 25% will be bought by the government. So, in sum, 50% is to be bought by the government. The rest will be sold in the market and will have to compete.

> going nuclear is not just a price-based decision, but part of a grand strategy

Do you intend to further expand nuclear power capacity to 10,000 MW as mentioned in your Strategic Energy Plan?

Akkuyu with Rosatom will have 4800 MW total capacity. We have also concluded a deal with our Japanese counterparts who formed a consortium with the French to build the second NPP of Turkey in Sinop. Its total capacity is expected to be 4400 MW. And we are considering additional opportunities, watching the markets, evaluating options under alternative scenarios and technologies.

How can you guarantee safety in view of the earthquakes that regularly occur in Turkey?

Well, geography still decides fate of the nations. Turkey has always been an earthquake prone land. We have suffered much in earthquakes, but we are learning from our bitter experiences. Much has been done in upgrading building codes. Even more attention is paid to the safety of energy infrastructure. Earthquake and environmental safety is our top-most priority in nuclear projects. We have demanded safety requirements well beyond international standards.

How far do you want renewables to expand in the next five years and how will you ensure that this happens?

Currently the share of renewable contribution to the electricity mix is on average around 28% (mainly hydroelectricity). According to our Strategic Plan for 2019, we are planning to increase hydroelectric capacity from 25 GW to 32 GW, wind capacity from 5 GW to 10 GW, geothermal capacity to 700 MW, solar capacity to 3 GW and biomass capacity to 700 MW. We will keep on supporting renewables in the form of feed-in tariffs and other support mechanisms. The Turkish renewable market is currently booming and there is huge investor interest. So I believe we will reach these targets, but we can provide additional support mechanisms if the necessity arises.

You want to reduce the share of natural gas in power generation. Doesn't this contradict Turkey's desire to be a major gas hub?

Energy import bills comprise the biggest share of our total imports and a considerable portion of our trade deficit. Natural gas constitutes almost half of the fuel mix of our electricity generation and 98% of that gas has to be imported. Numerous supply crises that we experienced in the past, some as a result of market conditions, others due to state-to state interactions, made us > see page 3

decide that we have to do something about it. Our target is to reduce the share of natural gas in electricity generation from 44% now to 38% by the end of 2019. This target does not contradict our plans to be a major gas hub. Even when the share of natural gas decreases, in absolute terms demand and the volumes consumed will still keep on rising!

ABOUT TANER YILDIZ

Taner Yildiz graduated from Istanbul Technical University as an electrical engineer and worked for Kayseri Electricity Generation Company. He was elected to the Parliament in 2002 and was appointed Minister of Energy And Natural Resources on 1 May 2009.

Yildiz says that being an electrical engineer "helps me a lot in not only running the daily affairs of the ministry, but also in developing future-oriented strategies. As I have educational background and work experience in the energy sector, it is easier to follow and understand new developments, be it in the field of energy related technologies or in energy markets. I can develop deeper understanding and form common grounds when in touch with representatives of the energy industry. As a matter of fact, my colleagues suggest they do not have to work so hard to brief me about my agenda."

> I think that Turkish Stream is a feasible project and can be achieved

When do you think you can reach agreement on Turkish Stream and how will this affect your relations with Russia?

We have mostly had good energy relations with Russia and this continues to be so. Additionally, energy trade between us is increasing. I think that Turkish Stream is a feasible project and can be achieved. As our energy partnership is improving, so do our relations in general.

What is your domestic shale gas policy?

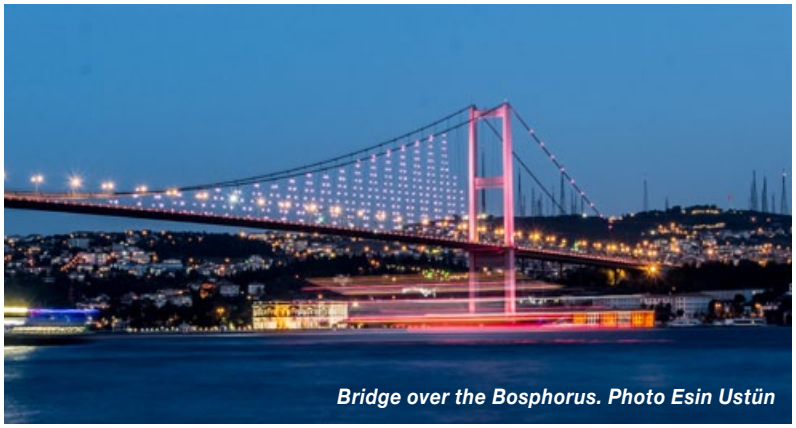
We are watching the shale gas revolution with great interest and keep in touch with sector actors. Some shale gas deposits are already identified. We would like to utilise them if possible, of course paying utmost attention to the environment.

The Strategic Plan mentions an intention to expand electricity generation from domestic coal-fired power. What does this mean in regard to your climate commitments?

Currently, the contribution of indigenous coal power plants to electricity generation is around 40 TWh but we are planning to increase it to 50 TWh by 2017 and 60 TWh by 2019. In order to realise these goals, we know that we have to accelerate investments in the coal sector and explore new coal fields. We are considering options such as awarding the coal fields in the form of royalties to possible investors. In addition, we will modernise existing plants to improve efficiency and limit negative environmental effects. I would like to underline that per capita emissions of Turkey are well below OECD averages and apart from renewables, lignite and hard coal resources are the only indigenous alternatives we have to cover ever increasing demand. Even after the realisation of these projects, our emissions will be considerably less than those of many developed countries.

The Plan pays a lot of attention to demand side management, energy efficiency and energy saving. However, it also notes that so far not much has been achieved on this front. How do you intend to change this?

There is a great potential for efficiency gains in Turkey, especially in buildings, industry and transport. In fact, we consider energy efficiency as an additional energy source and my ministry will continue to utilise it to the highest extent. We have reorganised our institution responsible for carrying out and coordinating energy efficiency activities in Turkey. We will improve inspection and training, increase public awareness, upgrade the regulatory framework. We are planning to complete our energy efficiency road map and communication plan by next year.



Bridge over the Bosphorus. Photo Esin Ustün

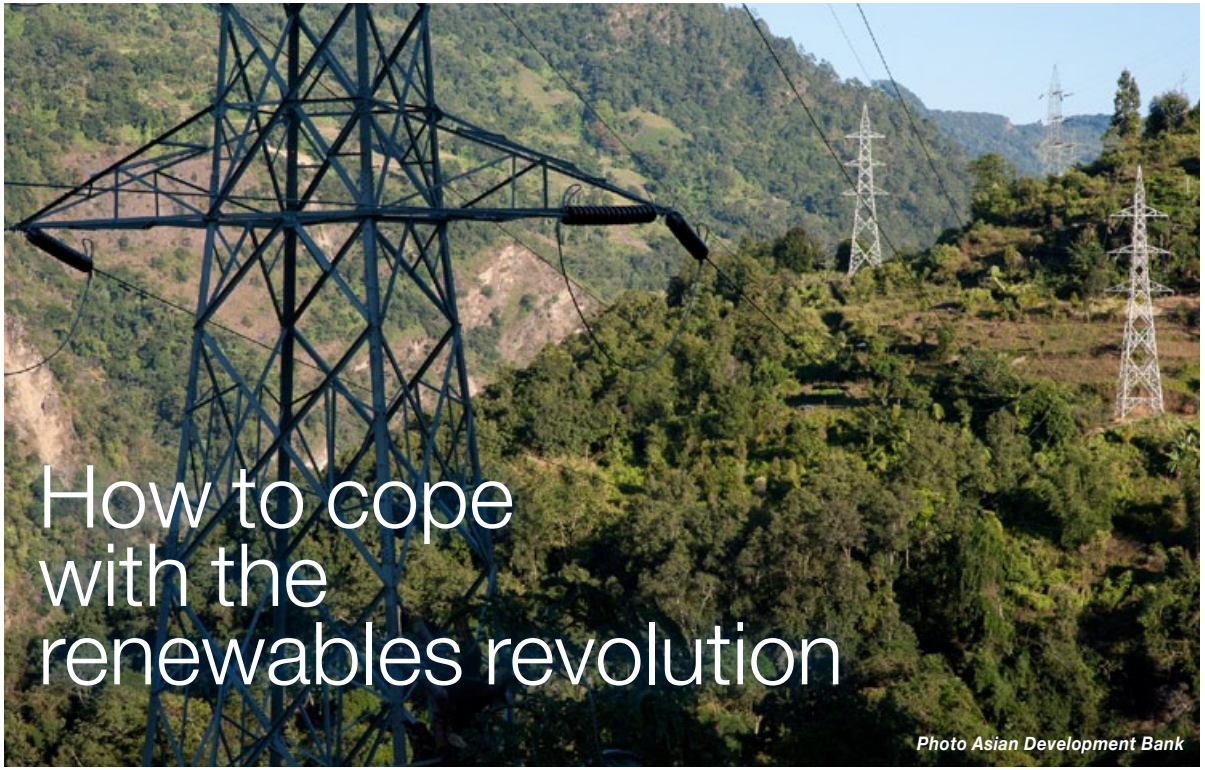
What do you expect to come out of the Paris Climate negotiations in December? What do you regard as a possible climate commitment for Turkey in Paris?

Turkey has some special circumstances which have also been recognised by the Convention Parties in Cancun, Mexico. In Doha in 2012 it was decided to provide support for Turkey in technology, capacity building and financial mechanisms. We do our best but it is a little bit early to be too specific about commitments. Yet I want to be optimistic about the outcomes of the Paris Climate Negotiations in December. This is a huge process and I believe as humanity we are making some progress although not as fast as hoped. ●

ABOUT THE WORLD ENERGY CONGRESS

Turkey is the host of the World Energy Council's 23rd World Energy Congress, which will be held 9-13 October 2016 in Istanbul. Yildiz says he believes "this congress will be the most successful one ever organised with record level participation and high level of interest. This will also be a perfect chance of publicity for investment opportunities in the Turkish energy sector. The successful completion of the Congress will provide further prestige to Turkey and accelerate its recognition as an important energy actor in the region. For all these reasons, my Ministry is providing all support to the Turkish National Committee and the World Energy Council and will continue to do so. I personally pay close attention to the ongoing preparations and my door is always wide open to the World Energy Council and the Turkish National Committee."

http://www.wec2016istanbul.org.tr



How to cope with the renewables revolution

Photo Asian Development Bank

Variable renewable energies are experiencing strong growth across the world. How far will this trend go? What will be its impacts? The World Energy Council last year launched a global Knowledge Network on Renewables Systems Integration that is examining these issues. We take stock of some of the preliminary findings. Main takeaways: the right policies will be crucial to limit costs and ensure smooth integration of renewables. And: there is no one-size-fits-all approach.

Views differ as to how 'big' renewable energy will become over the next few decades. The World Energy Council's Jazz and Symphony scenarios project that renewables will increase from around 15% in 2010 to almost 20% or 30% respectively in 2050.

The International Renewable Energy Agency (IRENA) is more optimistic: it projects in its Renewable Energy Roadmap 2030 that global renewable energy share could reach 36% by 2030 already.

Whatever the exact figure turns out to be, it is clear that renewables are set for a tremendous expansion. To study the implications of this development, late last year the World Energy Council established a dedicated Knowledge Network on Renewables Systems Integration. This project is supported by the World Energy Council's Global Partner CESI, an engineering consultancy from Italy. Knowledge Network Leader Dr Alessandro Clerici and Project Manager Daniele Daminelli are supported by other experts who have conducted a large number of renewable energy integration studies in countries around the world. The Knowledge Network, who will issue their first official report in October 2015 at the World Energy Council's Executive Assembly in Addis Ababa, already has over 50 members representing more than 40 different countries.

The main objective of the Knowledge Network is to increase awareness and understanding of the issues arising from the integration of intermittent and volatile renewables into electricity systems. Based on single country case studies, the Network will highlight impacts on systems operations to help ensure maximum deployment and smooth integration of renewables.

LESSONS LEARNED

What are the lessons learned so far? To begin with, notes Matteo Codazzi, the CEO of CESI, policymakers often underestimate the cost of renewable energy subsidies and the strain they place on national economies. As an example, the cumulative cost of Italy's FIT (Feed-in-Tariff) programme between 2000 and 2014 is estimated at €200 billion. In 2015 alone a further €14 billion is expected to be spent on subsidies for renewable energy, equivalent to almost one third of the Italian education budget.

This can lead to higher electricity prices for end users. Retail prices in Italy have increased significantly for many electricity consumers. In Spain, prices have doubled from €0.09 per kWh in 2004 to €0.18 per kWh in 2013. In comparison, household electricity prices in the United States have remained relatively stable over the last decade at around €0.13/kWh.

High energy prices can severely affect net exports. According to the IEA (International Energy Agency), the European Union is expected to lose one-third of its global market share of energy intensive exports over the next two decades, due to high energy prices and generous subsidies for renewable energy.

FOLLOW THE WEATHER

Paradoxically, the rapid growth of renewable energy has also reduced wholesale prices in Europe. The merit order switched as renewables, with their zero variable cost of production, get dispatching priority over thermal power plants. As a result, wholesale prices for baseload power in Germany, for example, have fallen dramatically from €90/MWh in 2008 to €32/MWh in 2014. This has had a number of consequences. For one thing, profit margins for utilities have been severely reduced. Many new gas-fired power plants have become economically uncompetitive, forcing owners to close or divest them.

Another consequence, as shown by the studies of the Knowledge Network, is that while in the past wholesale prices followed the demand curve, today they follow the weather; falling when the sun shines and the wind > see page 5

blows and going up when, in particular at times of high demand, the sun does not shine and the wind does not blow. Thus, price forecasts and energy trading now require more skill sets and different know-how, including weather forecasting abilities.

> it is important that solar and wind power generators are allowed to actively participate in system integration

So what can be done to make the expansion and integration of renewables as smooth as possible? The good news is that subsidies may be reduced, as costs of renewable energies are coming down quickly. Most impressively, the levelised cost of electricity (LCOE) of solar PV has halved between 2010 and 2014. "This technology is becoming competitive at the utility scale", notes Codazzi. "Last year, Dubai produced the world's cheapest solar energy ever with a tender placed at an unprecedented $0.0598/kWh."

ON AND OFF

But there are still challenges to be met. Measures have to be taken to integrate variable solar and wind power into the grid. Because of the variability of wind and solar, thermal power plants are required to provide backup capacity to ensure the reliability of the system. Studies from the Knowledge Network show that grid demands on generation have increased significantly, as thermal generators have to switch on and off or start up power plants that are not designed to run in variable mode as required by rapidly changing market-based dispatch. Discussions regarding the introduction of a capacity market are going on in several EU countries.

At the same time, large-scale investments in the grid are required to expand transmission grids so that they can accommodate the increasing share of variable renewable energies. For example, the total investment cost for the grid connection of new solar and wind capacity in Germany is estimated to be around €40 billion over the next 10 years.

In addition, higher penetration of variable renewable energies requires increased flexibility from the power system. This can be achieved by implementing sub-hourly scheduling and dispatch intervals and shorter gate closure periods as well as establishing capacity and other ancillary services in markets. Countries that make use of flexible storage and demand response systems can support the integration of variable renewable energies through load shifting, balancing and frequency regulation.

Findings from the Knowledge Network show that it is important that solar and wind power generators are allowed to actively participate in system integration as part of the entire renewables deployment strategy. Also important are grid codes to help ensure that renewable energy is compatible with, and can even help contribute to the stability of, the power grid.

CHEAPER

Ruud Kempener ,Technology Roadmap Analyst at IRENA, is confident that grid integration challenges for renewable energy can be solved. He notes that "a transformation towards variable renewables requires rethinking the concept of baseload power plants." In a recent working paper, "From Baseload to Peak: Renewables Provide a Reliable Solution", *(http://bit.ly/1DuzV3g)*, published in May 2015, researchers at IRENA argue that baseload is a demand characteristic rather than a supply technology characteristic. Traditional plants are operated in baseload mode, they note, simply because they are not technically capable of operating in a more variable mode and need to achieve high utilisation levels to recover their high investment costs. "We have to think of a new flexible system that works around the free available electricity that renewables provide. If you build a system in such a way then as a whole it can be cheaper than today", says Kempener.

For many the answer to grid integration lies in growing deployment of battery storage. Karl Rose, World Energy Council's Director of Scenarios, notes that "storage is key. Any new technology in mass storage would be extremely interesting." However, he adds, "there is nothing on the horizon in the next ten years that will solve this. There have been improvements, but nothing in the pipeline that will structurally change the picture or revolutionise it."

GOING OFF-GRID

And there is another solution as well: micro-grids – or even going off-grid altogether. This could be a preferred option particularly in rural regions in developing countries, notes Kempener. "The emergence of off-grid systems and mini-grids in developing countries in rural areas is very exciting." He adds that "many small developing island states have set very ambitious targets – some even at 100% of energy from renewable energy systems. Once these models are running they can be replicated."

Codazzi agrees that "countries that are still at the beginning of their electricity sector transformation can learn from best practices elsewhere", but he also stresses that, as case studies from the Knowledge Network have revealed, "there is no one-size-fits-all approach and each country has to craft its own combination of policies, market designs, and system operations to achieve the system reliability and flexibility needed to integrate variable renewable energy." ●

ABOUT
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Nuclear accord heralds opening of Iran's energy sector

Photo European External Action ServiceBank

The nuclear accord signed on 14 July will revive Iran's flagging oil exports once sanctions are lifted, although the Iranian government is more optimistic about the speed and size of the revival than outside analysts. New gas exports will take longer to develop. European oil companies and German equipment producers are already lining up to make deals, but the Iranian government has yet to announce the terms. US companies will most likely be left out for the time being.

Iran has the world's fourth-largest proven crude oil reserves and the world's second-largest natural gas reserves. Over a decade of international sanctions have slashed Iran's oil exports and impeded investment into upstream oil and gas projects. The tightening of sanctions in 2012 led oil exports to drop by half, from 2.6 million barrels per day (bpd) in 2011 to 1.4 million bpd in 2014, according to data from the US Energy Information Administration (EIA). Exports to Europe fell to a trickle while some remaining buyers reduced import volumes, with China, India, Japan, South Korea, and Turkey being the main customers.

Sanctions are not expected to be lifted until the end of the year at the earliest, when the International Atomic Energy Agency (IAEA) has verified that Iran's nuclear curbs are in line with the agreement.

Iran's Oil Minister Bijan Namdar Zanganeh has promised to revive the country's output quickly. He claimed in early June that as soon as sanctions are lifted output could be ramped up by 400,000 bpd and an additional 600,000 bpd after six months, i.e. 1 million bpd additional exports in total. In early August he was quoted in the

Iran deal reached in Vienna
14 July 2015

Iranian press as saying that production can increase by 500,000 barrels a day within a week after sanctions end and by 1 million barrels a day within a month following that.

But analysts believe it will take at least a year before Iran can ramp up production significantly as it will still have to find investment and technology. The EIA puts the figure at 700,000 bpd by the end of 2016, while Wood Mackenzie estimates 600,000 bpd by the end of 2017.

NEW CONTRACT

Meanwhile, Iran has been working on making conditions more attractive for foreign investment. The government is finalising a new type of contract that will allow foreign firms to set up joint ventures with its national oil companies or their subsidiaries. Hossein Zamaninia, Iran's Deputy Oil Minister for Commerce and International Affairs, said at a conference on 23 July the country is targeting up to 50 oil and gas projects worth $185 billion, which will be open to foreign firms via the new model. The full terms of the Iran Petroleum Contract are expected to be revealed in late August to September.

Foreign businesses have been quick to position themselves to capitalise on the new opportunities. In the weeks before the nuclear deal was signed European and Asian energy company executives, including from Shell and ENI, already visited Tehran. And days after inking the deal, Sigmar Gabriel, the German Vice Chancellor and Minister of Economy and Energy, led a delegation of 60 German industry and business executives on a visit to Tehran to renew trade ties. In a meeting on 21 July with the delegation, which included Linde, Siemens, and BASF, Oil Minister Zangeneh expressed hope that German companies would participate not only in Iran's oil and gas projects but more broadly in its energy sector.

"Iran will cooperate with German companies for funding projects in the petrochemical, refining, storage, energy optimisation and renewable energies sectors," he told the delegation.

Carsten Rolle, Secretary of the Weltenergierat, the World Energy Council's German member committee, believes that the German machinery industry will stand to gain from the modernisation of both Iran's economy and its entire energy system, including the phase-in of renewables. "Both will be a prerequisite to increase the export of gas and oil rather than consuming them in the country," he says.

The German example was followed by French Foreign Minister Laurent Fabius who visited Iran on 29 July. French oil company Total was one of the biggest customers of Iran, along with Shell, before the sanctions kicked in.

GAS EXPORTS

Shell is known to be interested in developing Iran's huge gas fields, but the company's financial chief Simon Henry has said it will take time before any deals can be concluded.

Much like the oil sector, the Iranian natural gas sector has been hampered by international sanctions, notes the EIA. Iran was expected to become one of world's leading natural gas producers and exporters, given the country's vast gas reserves, but the country currently accounts for less than 1% of global gas trade.

US firms will most likely take longer to capitalise on the energy opportunities that will open up in Iran. Barry Worthington, Executive Director of the United States Energy Association, the World Energy Council's US member committee, says that in all likelihood most of the oil field services contracts in the next few years will go to European or Asian companies due to the history between the US and Iran. "There is still going to be some deep feelings on both sides," he said.

However, he does not see the US energy sector being worried at all about losing out. "We have tremendous opportunity right here, not just in the United States, but in North America," he says, referring to US firms' success in Canada, potential opportunities with Mexico's energy reform, and the need to improve the oil infrastructure within the US. "I don't think that US companies are particularly concerned that we might be disadvantaged." ●

Innovative finance could raise sustainable energy investment by $120 billion per year

Innovative financial mechanisms in four areas have the potential to boost investment in sustainable energy by $120 billion a year by 2020, according to a new report from the UN Sustainable Energy for All (SE4ALL) initiative.

The work, 'Scaling up finance for sustainable energy investments', was released at the UN Third International Conference on Financing for Development in Addis Ababa, Ethiopia in July. It finds that investment from the public and private sectors will need to triple to more than $1 trillion per year to meet SE4ALL's goals of ensuring universal access, doubling the rate of improvement in energy efficiency, and doubling the share of renewables by 2030.

The report identifies four financial mechanisms that together could achieve $120 billion in new investment, if they are adopted widely:

- Expanding the Green Bond market to drive fresh capital into new sustainable energy investments, in particular into the more nascent project bond market and asset-backed Green Bonds: $35 billion
- Developing tailored structures for the private sector to co-lend with development finance institutions, while helping to refinance existing loan portfolios by attracting new investors: $30 billion
- Encouraging new construction-stage lending and enabling later-stage flows from institutional investors: $30 billion
- Developing structures to aggregate small-scale projects: $25 billion

"The report highlights some of the practical ways for reducing risk," says Joan MacNaughton, member of the Finance Committee of the SE4ALL Advisory Board, which prepared the work. She adds that it addresses the barriers stopping available capital from flowing to projects identified in the World Energy Council's Trilemma work.

"Unless developers see the risk equation is right, they're not going to bring forward projects," says MacNaughton, who chairs the Council's Trilemma work.

She points out several mechanisms identified in the SE4ALL report as likely to be particularly effective in reducing risk. For example, international financial institutions should expand their capacity for sovereign guarantees to detach country risk from project risk. Cutting down on the transaction cost of project development, streamlining negotiation approaches, and standardising environmental assessments could help increase the pipeline of projects.

In addition, bundling off-grid and micro-grid projects could help them secure the investment needed to get off the ground. "That's particularly important where capital markets are less well developed, where you don't have the breadth of individual financiers potentially interested in small projects," MacNaughton notes.

The World Bank, Bank of America Merrill Lynch, and the Brazilian Development Bank also contributed to the report, available on: *http://bit.ly/1JK2DKb*

New proposal for climate deal released

The UNFCCC, the UN's climate body, has released fresh proposals for a global climate deal. The new 83-page "consolidated" document (bit.ly/1MpAtJw), released in late July, "provides for the first time clarity on what could be contained within the emerging legal agreement in Paris," said a UNFCCC statement.

One of the proposals is for carbon reduction levels to become legally binding, while it will be up to countries to decide how they will meet their commitments. Governments will now use this text as basis for the next round of talks in Bonn late September.

As of this writing, 47 of 194 countries, accounting for 59% of global emissions, have submitted their national emissions reduction plans, formally known as Intended Nationally Determined Contribution (INDCs).

NEWS IN BRIEF

OMAN TO BUILD SOLAR THERMAL PLANT FOR ENHANCED OIL RECOVERY

Petroleum Development Oman, Oman's largest producer of oil and gas, has announced plans to build a 1021 MW solar thermal plant to be used for enhanced oil recovery (EOR) in the south of the country.

The steam generated will help extract heavy and viscous oil at the Amal oilfield, which currently burns natural gas for EOR. The project, to be developed with US company GlassPoint Solar, will break ground this year with steam generation from the first module expected in 2017. Once completed, the plant will save 5.6 trillion BTU of natural gas each year, an amount that could be used to provide electricity to 200,000 people.

AGENDA AGREED FOR FINANCING SUSTAINABLE DEVELOPMENT

The UN Third International Conference on Financing for Development in the Ethiopian capital Addis Ababa saw 193 UN member states agree on more than 100 measures to finance sustainable development. Among the action points is the setting up of a Global Infrastructure Forum to bridge the building gaps in transport, energy, and water. Countries also agreed to re-affirm the commitment to phase out inefficient fossil fuel subsidies. The event is widely seen as a stepping stone for countries to finance and adopt a set of new sustainable development goals in September.

China's State Grid to build transmission line from hydro plant Belo Monte in Brazil

Brazil has awarded China's State Grid the right to build and operate a second transmission line for Belo Monte, the world's third largest hydropower plant. The line will link the 11.2 GW dam in the north to the power consumption centres of Rio de Janeiro and São Paulo in the southeast.

At 2500 km and due to be completed in December 2019, the line will be Brazil's longest and requires an investment of 7 billion reais (US$2.25 billion).

State Grid is seeking a local partner for the project. This second line follows the first bid won last year by a consortium consisting State Grid (51%), Furnas, and Eletronorte.

The project is expected to help Brazil meet its soaring electricity needs more securely. Last year's severe drought brought reservoir levels in the centre and south of the country to historic lows, sparking a power crisis. About 80% of Brazil's electricity comes from hydropower. ●

World Bank invests $700 million in gas project in Ghana

The World Bank has approved a record investment of $700 million in guarantees for Ghana's Sankofa Gas Project, which it calls "a transformational project that will help address the country's serious energy shortages by developing new sources of clean and affordable natural gas for domestic power generation".

The guarantees ($500 million for gas purchases by Ghana National Petroleum Corporation and $200 million to secure financing from its private sponsors) are expected to mobilize $7.9 billion in new private investment for offshore natural gas, says the World Bank.

Ghana has suffered frequent power outages due to water shortages for hydropower, erratic gas supplies from external sources and delays in the development of domestic gas resources. The Government has spent more than $500 million on fuel subsidies in recent years. ●

Kenya breaks ground on Africa's largest wind farm

Construction has begun on the Lake Turkana Wind Power project in northeast Kenya. When completed, the 310 MW project – equivalent to about 20% of Kenya's current installed capacity – will overtake Morocco's Tarfaya Wind Farm as Africa's largest wind power project.

Kenyan President Uhuru Kenyatta lays the foundation stone of the Lake Turkana Wind Power project

At a cost of Ksh 70 billlion ($686 million), the project will also be the biggest single private investment in Kenya's history.

Developers said the wind farm will start supplying 50–90 MW in September and will be fully operational by mid-2017.

Last month Kenya pledged to reduce its greenhouse gas emissions by 30% by 2030, in its formal sub-mission to the UN ahead of the Paris climate talks.

The Kenyan government is working towards raising the country's wind capacity by 620 MW as part of plans over 2013–2016 to up generation capacity by 5000 MW. ●

Wind farm at Villonaco. Photo Franzpc

Ecuador is in the midst of an energy makeover. By the end of next year, 93% of the country's electricity will be derived from hydropower. But the country's energy transformation involves much more than that: it includes far-reaching energy efficiency programs, radical changes in the oil, gas and transport sectors and far-reaching integration of energy systems with its neighbouring countries. When the $7 billion program will be completed, by 2017, it will "constitute a huge competitive advantage for Ecuador", says Gabriel Arguello, Secretary-General of the Ecuador Member Committee of the World Energy Council and Executive Director of Ecuador's Independent System Operator (ESO) CENACE.

Currently eight new hydroelectric projects are being built in Ecuador under direct management of the State. Some of them will start operation this year, but most in 2016. When they are ready, 93% of electrical energy consumed in Ecuador will come from hydropower. Thermal generation will have been reduced from 44% in 2007 to a few percentage points.

This is a pretty radical change, but Ecuador's energy transition involves a lot more. It includes promotion of electric cars, reduction of losses in the generation and distribution of electricity, and more efficient use of energy in industry and households, including a large-scale changeover from gas-based (LPG) cooking to induction-based cooking appliances as well as a complete replacement of incandescent lamps with compact fluorescent lamps.

The country is also investing in other forms of renewable energy, including wind power – the 16.5 MW wind farm in Villonaco in the south is one of the few in high hills in the world – and in solar, e.g. in the Galapagos Islands.

And Ecuador is making some radical changes to its fossil fuel sector: it is constructing new efficient combined-cycle gas plants and a big oil refinery that will allow the country to export higher-value oil products.

For all these reasons, Ecuadorian energy policy is very relevant to other countries, says Gabriel Arguello. "We take a long-term perspective towards sustainable development. Changing our energy matrix to a more efficient one will allow us not only to reduce our emissions of greenhouse gases, but also to improve our production matrix, offering a better and more competitive framework for industry as well as reducing the money that goes into energy subsidies."

Another key element of Ecuador's energy strategy concerns regional energy integration. The governments of Colombia, Ecuador, Peru, Chile and Bolivia are working on a great interconnection project, Sistema de Interconexión Eléctrica Andina (SINEA), which will allow electricity exchanges and transactions across the Andean region by 2020. Arguello, who served as President of the Comisión de Integración Energética Regional (CIER), responsible for the project, says that this will be an important step to ensure sustainable development in the region.

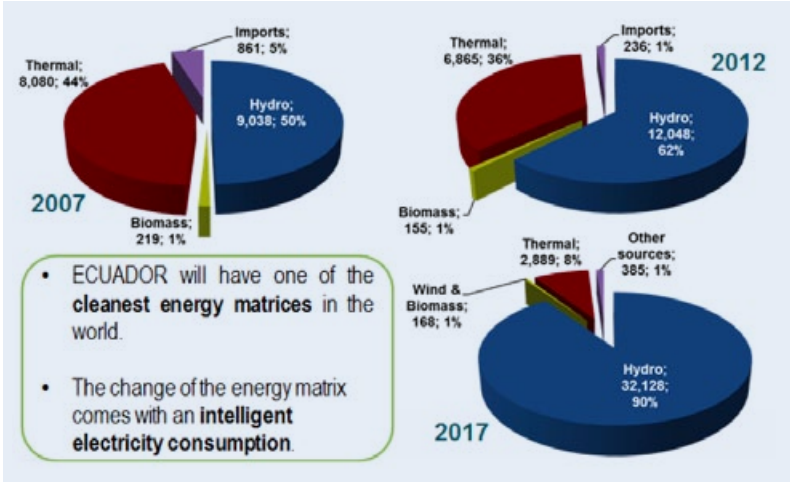
Regional integration will be at the centre of discussion during the World Energy Council Latin American regional meeting in Quito on 10 and 11 September. At the headquarters of the Union of South American Nations (UNASUR), who will be co-hosts, representatives from public and private sector will discuss priority integration projects and the future energy landscape.

"The challenge of regional integration is huge", says Arguello. "Especially to create a strong regulatory framework that will provide legal certainty, equity and efficiency for all participants." But the benefits will be many. "It will allow us to utilise the comparative advantages of local energy resources, to exploit economies of scale for new generation capacity, reduce supply risks and costs of reliability, and help integrate intermittent renewables such as wind and solar. In addition, for Ecuador the integration will allow the strengthening of bilateral relations with its neighbours Colombia and Peru."

None of this means the Ecuador energy transition is easy. "The biggest challenge is the natural resistance to change", says Arguello. This must be countered "with an adequate incentives policy and a communication campaign."

The government is considering regulatory changes such as the introduction of hourly rates for electricity and reducing taxes on electric water heating systems and electric cars. In addition, investments need to be made to strengthen the country's distribution grids, but also in metering systems and indoor electric installations.

With over $7 billion to spend in the period 2009-2017, the Ecuadorian state is the main investor in the energy transition. The money will be well spent, says Arguello. "The future availability of clean, renewable and cheap energy will constitute a huge competitive advantage for Ecuador." ●



EVENTS

Executive Assembly
Addis Ababa, Ethiopia
26–30 October 2015
The World Energy Council's annual meeting, welcoming the Council's community and representatives from the African and global energy sectors, will discuss sustainable energy systems on national, regional and global levels. Together with more than 20 Energy ministers that have already confirmed their attendance, leaders from business, finance and academia will share best practice and identify solutions to the energy trilemma during dedicated sessions including the **Trilemma Summit, Future Energy Leaders' Summit**, and the private invitation-only **World Energy Leaders' Summit**. The event is hosted by the Prime Minister of Ethiopia under the theme of "Unleashing the power of regional market creation".
http://bit.ly/1SopMvr

REGIONAL EVENT
South American Energy Forum
10-11 September
Quito, Ecuador
The World Energy Council will be hosting its 2015 Latin American regional meeting in Quito, Ecuador on 10 and 11 September. The meeting will be held at the headquarters of the Union of South American Nations (UNASUR) who will co-host the event. It will include top-level participants from both the public and private sector. It is expected that UNASUR ministers will approve the principles of the relaunched Latin American energy strategy during the meeting which will be opened by the President of Ecuador. The event will include discussions on energy scenarios and the role of regional integration.

Contact: Cristina Morales
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2016 World Energy Congress
Istanbul, Turkey
9–13 October 2016
As the triennial flagship event of the World Energy Council, the World Energy Congress enables dialogue among Energy Ministers and leaders from business, finance and academia from around the world. At the 23rd edition in Istanbul, energy leaders will seek options for delivering sustainable energy systems on the national, regional and global level.

Under the theme "Embracing New Frontiers", the Congress is expected to bring together up to ten thousand participants, including 100 energy Ministers.

You can register at the official congress website
http://www.wec2016istanbul.org.tr

The first 100 to register get a discount and a free Istanbul city tour.

ISTANBUL 2016
23rd WORLD ENERGY CONGRESS

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MEMBER COMMITTEE EVENTS

International Beirut Energy Forum
Beirut, Lebanon
9–11 September 2015
With continuous oil price fluctuations, how is the world's sustainable energy sector being affected? What are the dynamics of fuel-based economy and sustainable energy development? Energy ministers and leaders from around the world will look at these and other issues at this platform for discussion of topics related to renewable energy sources, energy efficiency, and green buildings in the Middle East and North Africa (MENA) region.

Catch up on last year's event at:
http://bit.ly/15InlgB
Contact: Pierre El Khoury
pierre.khoury@lcecp.org.lb

Alternatives for social and environmental viability of large energetic projects
Bogotá, Colombia
27 August 2015
The event will identify practices and policy guidelines to promote efficient management of social and environmental impacts to ensure the energy sustainability in Colombia.

http://www.cocme.org/
Contact: Daniel Diaz
a.tecnico@cocme.org

Annual Joint Energy Congress
Acapulco, Mexico
9–11 September 2015
The Council´s Mexican Member Committee will host its 2015 Congress: *Progress in the Implementation of the Energy Reforms in Mexico*. The Committee is organising the session *Energy Trilemma and Competitive Energy Markets*. It will discuss the situation in Mexico as regards the three dimensions of the energy trilemma: equity, security and sustainability.

http://www.wecmex.org.mx/
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SEE MORE COUNCIL EVENTS AT www.worldenergy.org/events/future

ABOUT THE COUNCIL

The World Energy Council 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 Council'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 World Energy Council 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

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