WORLD ENERGY COUNCIL

WORLD ENERGY FOCUS

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World Energy Congress will map out the Grand Transition

Less than a year after COP21, the movers and shakers of the energy world, including Khalid Al-Falih, Energy Minister of Saudi Arabia, Alexey Miller, Chairman of Gazprom and Bob Dudley, CEO of BP, as well as dozens of other Ministers and business leaders will gather in Istanbul for the 23rd World Energy Congress (9-13 October). It is at this triennial event, the largest energy gathering in the world, that the future of the energy sector will be mapped out. Hasan Murat Mercan, Chair of the organising committee for the 23rd World Energy Congress, outlines some of the issues facing the global energy industry and how they will be addressed.

COP21 in December 2015 has identified an ambitious set of goals which were agreed by nearly 200 countries. The headline target to put the brakes on global warming so the earth does not heat up by more than two degrees requires business and government to work hand in hand.

Policy makers must enshrine this targets in law and ensure that the appropriate incentives and funding are available to help businesses adapt.

As it currently stands, 41% of global CO_2 emissions are produced by the energy sector, followed by transport with 23%. Many countries are working towards decarbonising energy supply with more environmentally friendly means of energy production. To mention just two examples, in 2015, President Obama announced a target of 20% non-hydro renewables for the US by 2030; the United Arab Emirates (UAE) has pledged to drop fossil fuel subsidies and increase the low-carbon energy contribution of renewable energy and nuclear power to 24% of the overall energy mix by 2021.

It is critical for the global economy that energy businesses are able to adapt. Such is the importance of the energy sector that if companies don't innovate and adapt, the future of the planet is at risk.

At the World Energy Congress, this crucial issue will be addressed in a number of sessions including 'Scenarios 2016: the Grand Transition' which will explore the latest scenarios and modelling developed by the World Energy Council. Led by Isabelle Kocher, CEO of Engie, Guler Sabanci, Chairman of Sabanci Holding, and Steve Bolze, President and CEO of GE Power, this session will explore three new scenarios developed by the Council and explore questions such as What are the major challenges that the world and its energy sector will face on the pathways to 2060? Which will be the most critical innovation areas? What does the future energy industry look like? Who wins and who loses?

It is on the issue of energy transition that we have received the majority of our award-winning academic papers. Academic papers are a bastion of the World Energy Congress, enabling industry leaders and innovative thinkers to present their findings and proposals to a high-level global audience. Awarded papers include Yousef M. Alshammari and Mani Sarathy's 'Achieving 80% Greenhouse Gas Reduction Target in Saudi Arabia under Low and Medium Oil Prices' and Sergey Paltsev's 'Projecting Energy and Climate for the 21st Century: Energy Scenarios, Energy Geopolitics, and Impacts of the Paris Agreement (COP-21)'.

ENSURING ACCESS AND AFFORDABILITY

Whilst more people than ever have access to energy, the question of long-term affordability remains less certain. Access to, and

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the affordability of energy are key development issues, and were recently incorporated into the UN Sustainable Development Goals. At the Congress we will look at real solutions to address these issues on day one, in the 'Scenarios for the Future' sessions and also on day three in the 'Embracing the Trilemma' sessions. The session on Latin America and its energy transition, for instance, will call on regional leaders such as Olga Otegui (National Energy Director, Government of Uruguay) to discuss how countries balance access with affordability.

Access and affordability problems are not only concerns for developing countries. In developed nations consumers often feel the pinch of rising energy costs. In many countries ambitious renewable energy programmes are financed by increased consumer prices, with some policy makers claiming that higher energy bill prices will be balanced by lower consumption.

Affordability is also a key concern with regard to the rise of renewable energy. In the 2015 Energy Trilemma Index, the flagship energy metric from the World Energy Council, the US, Canada and Saudi Arabia respectively ranked 1st, 2nd and 51st for energy equity, and yet ranked 95th, 71st and 120th for environmental sustainability.

Countries need to stay true to their commitment of transitioning to a low-carbon energy supply without succumbing to a knee-jerk reliance on energy subsidies, which can be a pretty blunt instrument, too often meaning that costs fall upon both governments and consumers.

On these issues, we have Shruti Sehgal's awarded paper on 'Innovative Pricing Models for Sustained Growth of the Solar Power Sector,' which will be presented at the Congress.

AFRICA: EMBRACING THE NEW FRONTIER

Africa is the chief example of a developing continent impacted by the way in which energy intersects the poverty and climate change debate. As such, Africa will be a special focus for the 23rd World Energy Congress with a whole day at the event dedicated to questions surrounding the continent's energy future. The fourth day of the Congress will see an impressive gathering of African energy leaders, discussing methods to secure a sustainable energy future for Africa.

Africa represents a phenomenal investment opportunity but also many risks. It is vital that this continent, so rich in potential, is given the opportunity to rewrite its energy plan to ensure that its countries tackle the challenges associated with climate change. Africa's energy challenge is acute; 600 million people do not have access to modern energy, and in South Africa alone, blackouts cost businesses in excess of $7.2 billion every month in lost production, revenue, and wastage.

This additional focus on Africa is something I personally pushed for in planning the Congress. I firmly believe that it is vital for global energy leaders to now give due attention to the world's largest investment and development opportunity.

This is only a short overview of the topics, papers and speakers who will be appearing at the Congress. The calibre of speakers and diversity of academic submissions, together with the insight which our Future Energy Leaders will bring, all make for a fantastic event. Mindful of the security concerns, the World Energy Congress has appointed the Soufan Group to manage the event security. We look forward to you joining us in Istanbul on 9th October. ●

Interview Francesco Venturini, CEO Enel Green Power:

"Growth of renewable energy does not depend on the Paris Climate Agreement"

"I don't think the Climate Paris Agreement will change things hugely", says Francesco Venturini, the head of Enel Green Power, one of the largest (if not the largest) green energy producers in the world. According to Venturini, the Paris Climate Agreement the business case for renewables primarily rests on their low fixed costs, scalability and speed to market. He increasingly sees companies from other sectors moving into the energy space. "Until recently I could not have imagined that I would have meetings with people in the automotive industry once a week."

Enel Green Power, one of the largest green energy producers in the world with €3 billion in revenue and 700 power generation plants in 15 countries, started in Europe, in Italy, but that continent is last on its investment list today. Just 14 % of total investments are still allocated in Europe, says Fransesco Venturini, an economist by training who joined Enel in 1997 and became CEO of Enel Green Power in May 2014.

For Venturini, the main problem is that he sees no long-term EU energy strategy that successfully unites conflicting national interests. "The difference between Europe and the other big economies around the world is that in one way or another all those economies have a pretty solid energy strategy," he says. He likes the idea of a carbon market – the EU Emission Trading System – in theory, but doesn't believe it can work because it is artificial and provides only short-term price signals. "What you get in the end is a market that is very difficult to control... instead of paying a tax, companies are making money."
The bottom line for Enel Green Power is that, as Venturini notes, it has been losing "tonnes of revenue" in Europe but making "tonnes of revenue" elsewhere.

Surprisingly, in Venturini's view, the Paris climate agreement doesn't dramatically change the outlook for renewable energy, because the business case for renewables primarily comes from their fixed costs, scalability and speed to market. He doesn't expect massive technological disruption over the coming years, but rather a steady stream of improvements to existing technologies. Gas has already been relegated to second place, he says, after the hype around it two years ago. He looks to digitalisation, end-to-end energy services and new partnerships.

Enel is often talked about as a good example of a company that got it right on renewables. What's your strategy? What do you do differently to others?
Enel tried to get into renewables in the late 1990s, early 2000s. The first version of "Enel Green Power" was created in 1999 and the first acquisition that Enel ever made abroad was in 2000, when it bought a renewable energy company in the US. The difference between us and the rest was that Enel really believed renewables could compete with conventional generation. The gas era was probably going to be much shorter than forecast and there was going to be a big replacement with renewables. We started to invest heavily because we believed that costs would go down much faster than predicted. As indeed they did.

The strategy in Enel was to diversify risk as much as possible: play with all the different technologies you can master and then diversify as much as you can geographically. We're probably the only player in the world that did this from the beginning.

Where do you see the biggest opportunities for growth and investment today?
In the beginning it was Europe. Then we moved to the Americas, from there to Africa, and now we're moving faster and faster into Asia. Asia is going to be the big market over the next 5-10 years. Africa will also be in need because there is little power generation there. But the amount of investment we will deploy there is probably going to be smaller. America is still important. Europe is probably last of the pack.

How much of your business is still in Europe?
Around 14% of our total investments are allocated in Europe. We see not so much a market for new investments, but a market where we can do some aggregation. It's a very fragmented market so you can create efficiency by consolidating what you have.

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ABOUT
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What specifically are you looking for from policymakers here? How could investment start flowing again?
The most difficult thing is to find a common vision of what the energy strategy for Europe should be. Europe is blessed with fantastic natural resources, past investments, networks and minds, but the personal interest of the different countries is so tough to overcome that very often things get stuck, they don't move forward.

The difference between Europe and the other big economies around the world is that in one way or another all those economies have a pretty solid energy strategy. If you look at Europe, it's a combination of many different energy strategies that usually don't talk to each other.

In the US, they've decided that coal is dirty and needs to be phased out. They have tonnes of gas. They know renewables are important. So gas and renewables are the main technologies they want to invest in. That doesn't mean they're not going to build one or two more nuclear plants, or that coal is going to disappear in the next 2-3 years. But they know where they want to go. The same is true for China, Brazil and India.

What about the role of the EU Emission Trading Scheme (ETS)?
The EU ETS is extremely important. On the other hand, I never believed that it can work. It's an artificial market that tries to combine buyers and vendors on something that doesn't really exist. So what you get at the end is a market that is very difficult to control, with big price swings, and big lobbyists fighting to get more and more emission allowances for free so that in the end, instead of paying a tax, companies are making money.

We built the whole [energy] market in Europe on short term price signals and the ETS is exactly the same. It's short term. The combination of being an artificial market and providing only short term price signals means it doesn't work. It's a great idea but if you look worldwide it never really worked anywhere. If you need to deal with CO_2, slap a tax on CO_2 producers. They are going to transfer the cost to the final customer anyway.

Does the Paris climate agreement make a big difference in terms of creating new opportunities abroad?
I don't think it changes things hugely. There are many reasons why renewables are being implemented all over the place. It's a completely different way of investing. You're not investing in something that needs fuel so the level of uncertainty related to fuel is gone. It's all about capex. You have a fixed cost for your energy for the next 20-30 years. It's small and it's scalable. You can build a 1MW wind plant and you can build – like we are doing right now in the US – a 400MW wind plant. And you can build it in less than 18 months! To build a 400 MW gas-fired power plant it takes at least seven years just to get the permits.

From a policymaker's perspective, you are independent of the big swings in fossil fuel prices, you are not generating inflation because of the fixed costs and you can create jobs, also through local content requirements.

We read a lot about the energy company of the future. Do you also see a qualitative shift in what you do?
Yes, that shift is extremely important. As a generator we are increasingly selling energy directly to big industrial consumers. They don't want to be bothered with energy issues. So you need to give them the full package. You need to be ready to take care of problems with transmission, interconnections and intermittency.

This is just one aspect of it. Digital is pervasive. We invest millions and millions of Euros every year into more digital and efficient systems. Essentially we are investing in technologies that allow us to control our power plants from Rome when they are in Zambia, for example. Or into systems that help us do preventive maintenance so downtime is less. Data analytics is becoming an essential part of what we do.

Competition is coming from other industries and at the same time, we are becoming the competition for other industries. Industries that never talked to each other are teaming up to build the energy sector of the future. I would never have imagined until two years ago that I would have meetings with people in the automotive industry once a week.

Which technologies are you most excited about?
I don't think you're going to see anything that's totally disruptive in the way of for example a small nuclear plant in your basement. Instead, you're going to see tonnes of incremental improvements and more and more software to support them. For example wind turbines will be cheaper, taller and more efficient. You'll see new types of solar PV modules, but not a different technology. It's going to be the same but more competitive and efficient.

And what about energy storage?
We're investing a lot of money in this. We have several pilot projects. Let's assume electric vehicles start to be sold in decent numbers. At that point you essentially have batteries on wheels. You can use them to move the car but when it's parked in a garage, also to manage the intermittency of renewables. It's already doable. Aggregation of what's out there in a smart way, that's what's really going to make the difference.

And on the conventional generation side? What about gas?
Gas is here to stay. What really astonishes me is that two years ago, everybody was talking about the Renaissance of gas. Gas was going to be the fuel of the future. Now, two years later, with gas prices that have never been so low, that wave is already gone. Our investors say it doesn't matter what the price is. The reason they're investing in renewables is because they want certainty in the price in the years to come.

Where do you see the world of energy going and why?
I believe Enel Green Power will make another shift in the next 2-3 years. We will move more and more into aggregation, the digital world and providing end-to-end solutions to the final customer. When people wonder why we're getting into Zambia and Uganda, it's because that's the first step to something much bigger – electrifying the continent that doesn't have power. We really want to change the world. ●

WHO IS FRANCESCO VENTURINI?

Born in New York (USA) in 1968, Francesco Venturini graduated cum laude in Economics from the University "La Sapienza" of Rome, Italy. He studied at the London Business School alumnus and received an MBA from the MIT Sloan Business School. He joined Enel Group in 1997. In 2009, he was appointed Head of Finance in Enel Green Power. In May 2014, he became CEO of Enel Green Power and in April 2016, he has also been appointed as Head of North and Central America area and Sub-Saharan Africa and Asia area of Enel Group.

"Insurers lag behind pension funds on tackling climate risk, threatening financial shock"

The global insurance industry is failing to rise to the challenge of climate change, putting trillions of dollars of investments at risk and threatening financial stability, according to a new study from the Asset Owners Disclosure Project (AODP), a London-based non-profit global organisation whose objective is to protect retirement savings and other long term investments from the risks posed by climate change by improving disclosure and industry best practice.

AODP's study, "Global Climate 500 Index 2016: Insurance Sector Analysis", which looked at the world's 500 biggest asset owners, concludes that whereas institutional investors are starting to take action to protect their portfolios from climate risk, insurers are lagging way behind.

Photo Peter Kelly

The study finds that insurers, which manage a third of the world's investment capital with around $30 trillion in assets perform worst on what should be their core competency, managing risks from high-carbon assets. They also lag on low carbon investment and engaging with companies they invest in to reduce climate risk.

- Just 1% of insurers are assessing the risk of stranded assets in their investments compared with 6% of pension funds, and 45% of global "leaders," those asset owners doing most to protect their portfolios.
- Only 5% of insurers are measuring portfolio carbon emissions, compared with 13% of pension funds and 74% of leaders.
- Only 8% have staff dedicated to integrating climate risk into the investment process compared with 16% of pension funds and 97% of leaders.
- Only 3% have a policy setting out how they engage with companies they invest in on climate risk compared with 15% of pension funds.
- On average just 0.2% of insurers' assets are invested in low-carbon, compared with 0.6% of pension assets.

Insurers invest predominantly in fixed income assets but the report warns they are relying too heavily on ratings agencies' assessment of bond risks, without doing their own due diligence. Julian Poulter, CEO of AODP, said: "Climate change poses a double threat to the insurance industry. Insurers faces mounting costs from claims relating to the impacts of climate change, and the investment portfolios that enable them to meet those claims are exposed to climate risks as the transition to a low-carbon economy accelerates."

"Insurers are specialists in risk management, but while they may understand the implications of climate change in their underwriting they are failing to join the dots on the investment side. It is extraordinary that the left hand doesn't seem to know what the right hand is doing. By failing to protect their portfolios they are threatening their long-term capacity to cover future claims, putting clients' policies in jeopardy, and risking a systemic failure that could have catastrophic effects on the wider economy. When pension funds are starting to act there can be no excuse for insurers to lag behind."

AODP's Global Climate 500 Index, which rates the world's 500 largest asset owners on how they manage climate risk, identifies a group of 31 "global leaders", rated A to AAA. This includes 26 pension funds but just one insurer, Aviva (UK). The Index also reveals that European asset owners are way ahead of the US and other markets when it comes to taking action on climate risk. ●

World Energy Council: tackling non-tariff measures vital to low-carbon economy

A new report from the World Energy Council's Rules of Trade Knowledge Network explores how an open global trade and investment regime focussing on energy and environmental goods and services, can foster the transition to a low carbon economy.

The report, World Energy Perspectives 2016: 'Non-tariff measures: next steps for catalysing the low-carbon economy' *[http://bit.ly/2bYBNst]*, written by experts from 28 countries, finds that while a number of international efforts have been progressing in the elimination of tariff barriers, a comprehensive initiative to phase out non-tariff barriers on products covered in the current multi-national environmental goods tariff negotiations should be undertaken.

These topics are only just starting to be addressed within the World Trade Organisation (WTO) rules and appear to be limited, states the report, launched at the APEC Market Access Group meeting in Lima, Peru, on 18 August. ●

NEWS IN BRIEF

NIGERIA

Nigeria signed a $1.75 billion deal with 14 solar companies to supply more than 1GW of electricity to the nation's power grid as it seeks to diversify away from fossil fuel generation, reports Bloomberg New Energy Finance (BNEF). Oil and gas pipelines are increasingly susceptible to attacks by militant groups in the country's Niger River delta, with gas generation running at less than half of its 6GW installed capacity as a result.

SCALING SOLAR PROGRAM

Zambia, Senegal and Madagascar are participating in the World Bank's "Scaling Solar" program, which aims to develop 1 GW of solar power in Africa in three years. In Zambia, First Solar, Enel and Neoen won tenders to develop 73 MW of solar power under the program for as little as 6.02 dollar-cents/kWh, the lowest prices so far recorded in Africa. 48 companies participated in the tender.

2GW SOLAR PARK IN INDA

In India, the Solar Energy Corporation of India (SECI) won a contract to deliver 1 GW of solar power to five utilities in the southern state of Karnataka for 6.7 dollar-cents/kWh for a period of 25 years. The power will be produced at a 2GW solar park. Part of the capacity will be auctioned off by NTPC, a state-owned power generating company, and SECI.

US government promotes EV charging

The Obama administration has announced a collaboration with 50 federal and state agencies, electric utility companies, vehicle manufacturers, electric charging station companies, and others in the private sector to promote faster development of charging infrastructure for electric vehicles and increased numbers of electric cars on the roads, reports the website Breaking Energy. *[http://bit.ly/2aWtehW]*

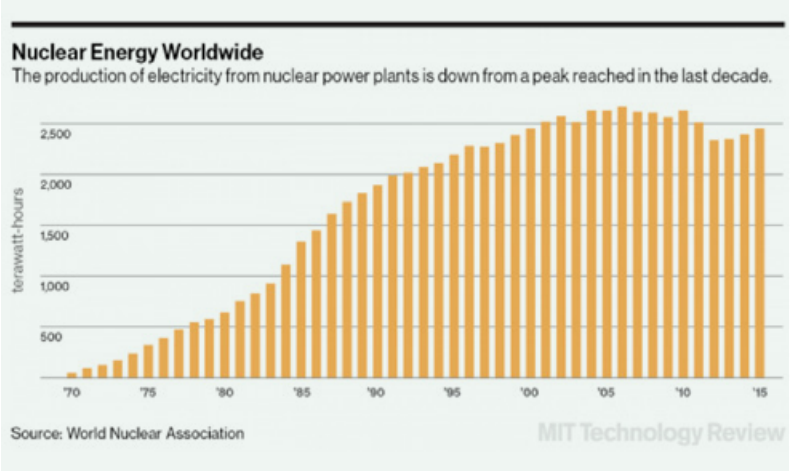
This collaboration *[http://bit.ly/2bYL4jZ]*, in partnership with the Department of Energy (DOE), Department of Transportation (DOT), Environmental Protection Agency (EPA), Air Force and Army, aims "to promote consumer adoption of electric vehicles and increase the accessibility of charging infrastructure across the country".

Major goals include:

- Guaranteeing $4.5 billion in loans to finance a national network of electric vehicle charging infrastructure to increase consumer access;
- Utilizing funds from the Fixing America's Surface Transportation (FAST) Act *[http://bit.ly/2b09OEp]*, signed into law by Obama in December 2015, to identify zero emission and alternative fuel corridors and developing a 2020 vision for the optimal placement of fast charging infrastructure. ●

Russia builds new nuclear power stations

The Russian government has published a decree on 9 August, indicating that the country intends to construct 11 new nuclear power reactors by 2030, according to World Nuclear News. These do not include four reactors already under construction (one of them, Rosatom's Novovoronezh, was connected to the grid on 5 August) nor the floating reactor Academician Lomonosov.



Two of the 11 new reactors will be highly advanced BN-1200 sodium-cooled fast neutron reactors. This indicates that Russia does not just want to build quantity but wants to be in the forefront of new nuclear technology as well.

According to WNN, the decree also "approves building a facility to produce high-density U-Pu nitride fuel and the construction by 2025 of the BREST-OD-300 fast neutron reactor. BREST-OD-300 is part of Russian state nuclear corporation's 'Proryv', or Breakthrough, project to enable a closed nuclear fuel cycle. The ultimate aim is to eliminate production of radioactive waste from nuclear power generation."

The decree also identifies six points for radioactive waste disposal. Worldwide nuclear power generation has grown moderately in the last four years, but is still below its peak level in the last decade. ●

China's energy transformation continues full steam

China's coal production declined 10.1% in the seven months to July 2016, reported the Institute for Energy Economics and Financial Analysis (IEEFA) on 16 August, based on figures from the China's National Bureau of Statistics. This is triple the rate of decline experienced in 2014 and 2015.

"The rate of transformation in China's electricity sector continues to accelerate. Electricity demand has largely decoupled from economic activity, and China continues to diversify away from coal faster than anyone expected. China is well past peak coal," said Tim Buckley, Director of Energy Finance Studies at IEEFA. "This has global industry and climate change ramifications, given China produces and consumes half the world's coal."

The figures from the National Bureau of Statistics show the ongoing transformation of the Chinese energy system. They report industrial production up 6% in January-July 2016, but electricity demand up just 2%. According to the IEEFA, this "decoupling" started in 2014, so we are now in the third year of this trend.

While overall electricity demand was up 2.0%, thermal power generation was down 1.9%. "Coal fired power generation is rapidly losing market share to hydro electricity (+13.2%), gas (+3.1%), nuclear (+24.5%), wind (+14.8%) and solar generation (+27.5% yoy YTD)."

"While solar's contribution remains small in absolute terms, it was reported that more than 20 gigawatts (GW) of solar were installed in the first half of 2016 alone, well above the 15GW installed in the whole of 2015 (which was itself a world record at the time)."

Policy moves are accentuating the trend, notes IEEFA, "with the Chinese government last month moving to ban the construction of new coal fired power plants countrywide, as the average Chinese thermal power plant utilisation rate hit a record low of 47.8% in the seven months to July 2016." ●

China's electritity Consumption by fuel source [Jan-July 2016]

China Fuel	Jan-July 2016, TWh	yoy %
Thermal	2,448.7	-1.9%
Hydro	604.9	13.2%
Nuclear	116.3	24.5%
Wind	121.0	14.8%
Solar	21.1	27.5%
Total electricity	3,312.0	2.0%
	Mt	%
All Coal	1,900.8	-10.1%

Source: China's National Bureau of Statistics, 12 August 2016

Clean energy "a new beginning" for Lebanon

Beirut River Solar Snake project - solar farm with a total production capacity of 10 MW.

Lebanon's second National Renewable Energy Action Plan is published by the Lebanese Center for Energy Conservation this September, setting out priorities for renewables development, with an overall target of reaching 12% by 2020, from 5% in 2015. Enabled by flexible finance, renewables are growing, with rapid take-up of decentralised solutions. "We want to be a model for the Arab world", says Pierre El Khoury, head of the Lebanese Center for Energy Conservation and Secretary of World Energy Council Lebanon member committee.

Lebanon has a long history of renewable energy. The first hydropower plant was built in 1924, and is still operating today. As recently as 1976, around 70% of total electricity production in the country came from hydroelectricity. But the civil war, which lasted from 1975-1991, caused severe damage to infrastructure. As a result, today, hydropower accounts for just 2-4% of electricity generation.

In the aftermath of the civil war, traditional hydrocarbon power plants fired by fuel oil and gas oil were built to meet rising demand. Further infrastructural damage was caused by the 2006 Lebanon war, during which the bombing of the Jiyeh power station resulted in the largest ever oil spill into the Mediterranean sea.

In this challenging context, the Lebanese Center for Energy Conservation (LCEC) was initiated at the Ministry of Energy in 2005. Sustainable energy began to be taken more seriously, in order to curb energy demand, supply clean energy, reduce pollution and reduce imports. In 2010, imported energy accounted for 96.8% of total consumption and consisted of liquid gas, gasoline, gas oil, fuel oil, kerosene, and asphalt. The LCEC estimates demand for both heating and electricity in 2010-2015 increased by 7% annually and is expecting a 5.8% increase between 2020 and 2030.

Pierre El Khoury, President of the Board and Director General at LCEC, says: "Our oil imports are mostly from Algeria and the Gulf. The current level of dependency is set to continue until such time as indigenous oil and gas exploration begins – probably in about 5-7 years."

Meanwhile, Lebanon's second National Renewable Energy Action Plan (NREAP) is published this September, setting out priorities for renewables development. The national target is for energy produced by renewable energy sources to reach 12% of total electricity and heating demand in the country by 2020 from 5.1% in 2015. "We will strive to reach these targets," says El Khoury. "There is real support for sustainable energy – it's becoming popular because it's clean and represents a new beginning."

GREEN SHOOTS

The take-up of decentralised renewable technologies has been rapid; in particular, Lebanon is currently witnessing a remarkable increase in the installation of solar PV distributed generation. A recent study by LCEC and the United Nations Development Programme (UNDP) identifies over 600 small scale PV projects accounting for more than 20 MW.

El Khoury: "Power outages in Lebanon are extremely frequent – usually about 6-8 hours every day. During these times, there are neighbourhood or private generators that supply power." These outages act as a stimulus to market growth in solar PV, which offers an economically attractive alternative to the diesel generators used during blackout periods.

In the wider solar PV market, solar public lighting is also on the increase. Furthermore, seven commercial PV projects with sizes ranging from a minimum of 130 kWp to over 300 kWp per site are currently under construction, led by two government programmes. The new NREAP describes a target of 150 MW of solar PV installations by 2020 as very "realistic".

> "There is real support for sustainable energy – it's becoming popular because it's clean and represents a new beginning."

A key support to the growing market for renewable technologies is the National Energy Efficiency and Renewable Energy Action (NEEREA) financing mechanism which was set up by the Central Bank of Lebanon and the LCEC in 2012 > see page 8

El Khoury: "For the first two years of NEEREA, the main aim was to create momentum in the market and this has been achieved. Most companies are depending on NEEREA, and this private sector involvement is supported through loans and subsidies. Going forward, there will be about € 1 billion per year of soft loans on offer with a leverage factor [of public to private funding] of about 1:6 to 1:7."

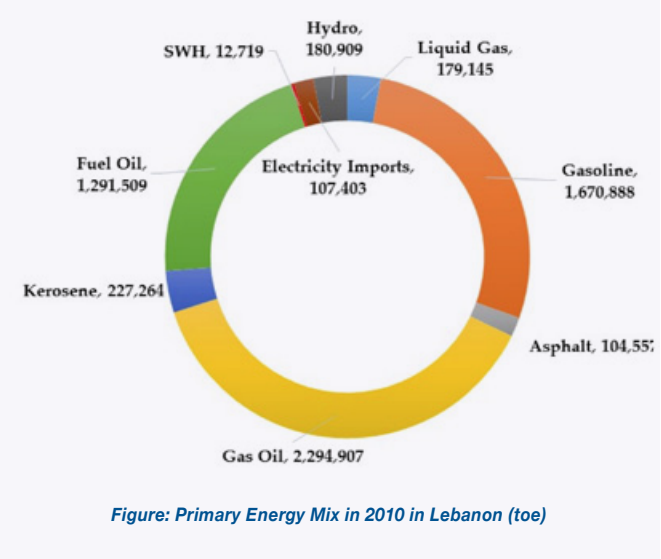


Figure: Primary Energy Mix in 2010 in Lebanon (toe)

Loan sizes range from $2000 to $20 million. The interest rate is typically 1.075%, and can be as low as 0.3%. Repayment periods range from 10-14 years. Along with flexibility, accessibility is key "another extremely important characteristic of NEEREA is that greens loans are provided through any of the Lebanese commercial banks to directly reach the end user," says El Khoury.

CHALLENGES AHEAD

For the development of centralised renewable power – hydro, solar and wind farms – "the most challenging issue is the legal framework for the grid. I believe that if we can solve this, it will not be difficult to raise the finance," says El Khoury. "The electricity sector has an extremely bad reputation, with allegations of corruption and incompetence leading to poor strategic development. The civil war ended in 1990, but the problems [of governance] are still there," he adds.

In Lebanon, there is no law that specifies the exact requirements of connection of renewable energies to the grid, although Electricité de Liban (EDL) is currently working with Electricité de France (EDF) on developing a new master plan for the transmission network. The master plan will include all the planned renewable energy projects expected between 2016 and 2020.

A tender for the first wind farms in Lebanon (each with a capacity of 50 to 100 MW) is underway from the Ministry of Energy and Water, where out of 26 companies that expressed their interest at the beginning of the bid, 3 offers were selected.

Despite the significant challenges, the mood at LCEC is upbeat. "Lebanon will reach its 2020 renewable energy target through the NEEREA national financing mechanism, highly skilled human resources, and the solid public framework set by the Ministry of Energy and Water through LCEC. We want to be able to present our development of renewable energy as a model for the Arab world," says El Khoury. ●

2016 World Energy Congress

Istanbul, Turkey, 9–13 October 2016

ISTANBUL 2016 23rd WORLD ENERGY CONGRESS

The energy world in 2060? Listen to Khalid Al-Falih and 240 more top-level speakers at the Congress

10 Oct 2016 (Mon)	11 Oct 2016 (Tues)	12 Oct 2016 (Weds)	13 Oct 2016 (Thurs)
Vision and Scenarios for the Future	Identifying the Business Opportunities: Resources and Technologies	Policy Solutions to Secure Prosperity: Embracing the Trilemma	Africa: Securing a Sustainable Energy Future

With fewer than 50 days to go until the 2016 World Energy Congress, Khalid Al-Falih, Saudi Arabia's Minister of Energy, Industry and Mineral Resources, and Amin Nasser, CEO of Saudi Aramco have been confirmed as speakers. Al-Falih joins the industry's elite at the Congress, including BP's Bob Dudley, Gazprom's Alexey Miller and EDF's Jean-Bernard Lévy. Additionally, top executives from Royal Dutch Shell, GE, Total, ENGIE, VNG, DESFA, and China National Nuclear will be speaking at the Congress on major issues facing the energy industry.

Other speakers include representatives from intergovernmental and international organisations, including the EU, the IEA and the WWF, as well as ministers from Iran, Iraq, UAE, Jordan, Germany, Switzerland, Algeria, Nigeria and Uruguay, among others. In total 255 speakers from84 countries and 48 heads of state and Ministers have confirmed to feature at the event.

Christoph Frei, Secretary General, World Energy Council said "Preparations for the Congress are progressing well, with heightened security arrangements, to welcome over 200 energy leaders from across the globe.

Over four days, the programme for the Congress will explore the critical priorities facing the energy industry today including of resilience, new business models, governance, climate, financing and market dynamics. The details of many more sessions have now been publicised on the website *[http://bit.ly/2bQsMzK]* including 'The road to resilience: Managing and mitigating extreme weather risks', Global renewables update: The reality of scaling up, The commodity price storm: Signal of a new normal? And 'Redefining the African resources frontier'.

For more information on the Congress and registration, visit **the official congress website** *http://www.wec2016istanbul.org.tr*
Follow the Congress on **Twitter**: *https://twitter.com/WECongress*

Energy Panel Breakfast

Toronto, Canada
13 September 2016

Attendees at this breakfast event will be able to preview the new World Energy Council report "The Road to Resilience: Financing resilient energy infrastructure," presented by Christoph Frei, Secretary General of the World Energy Council. The following interactive discussion is moderated by Colin Andersen, Chair, Energy Council of Canada, and will highlight current energy issues and the implications for Canada. The breakfast is held in conjunction with the Toronto Global Forum of the International Economic Forum of the Americas (IEFA) on 12 – 14 September. Last minute registration for the breakfast is possible by contacting Krystal Underhill.

Contact: Krystal Underhill
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International Oil Shale Symposium 2016

Tallinn, Estonia
20-23 September 2016

Celebrating 100 years of oil shale mining in Estonia, attendees at this event will hear about the latest innovations and technology updates, increases in efficiency and applications to reduce environmental impacts of shale. They include professionals in all spheres of oil shale energetics – connecting resource holders, technology developers, researchers, government representatives and business leaders from across the world. World Energy Council Estonia co-organises this conference, which will be held in English and simultaneous in Estonian and also features field trips to industrial scale facilities.

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Energy Day 2016

Berlin, Germany
29 September 2016

Discussion at this major annual World Energy Council Germany event will focus on the role of Turkey as an energy hub and innovation in the digital energy world. It brings together leading German and international experts from politics, business and academiaThe World Energy Council will be launching the report "Managing Cyber Risks", which is the third part of the Council's resilience series after energy water food and extreme weather. The conference is free of charge and will be held in German and English with simultaneous translation available.

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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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