

Overcoming obstacles

Blockchain surges forward

Good neighbours
Russia's interconnector
plans

2018 outlook
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revolution

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the status quo



Changing times

As another calendar year ends and the publication of the *World Energy Focus* draws to a close in its current format, the *World Energy Council's* Secretary General Christoph Frei reflects on the trends we've seen in 2017 and some predictions for next year

The pace of change in the energy sector may be fast, but there are three areas in particular which Christoph Frei, World Energy Council's Secretary General, highlights as critical as 2018 approaches.

"E-mobility is the hardest area for transition," he tells *World Energy Focus*. While countries such as the UK, France, India and Norway have made commitments to move from diesel and gasoline to cleaner fuels in the next 20-25 years, challenges remain.

The difficulty of charging electric vehicles on a large scale has not yet been solved, batteries remain costly, and not all nations are making similar pledges to switch from fossil fuels to electric.

Yet Frei believes that if China enacts a policy to transition to electric vehicles in 2018 as many predict, the world's most populous nation could change the global picture.

Another trend for Frei is the exponential decrease in the cost of renewables, and solar in particular.

"Everyone is preparing for \$20 per megawatt hour in 2018 for solar," he says. "That is just massive progress."

Thirdly, the Secretary General highlights the rise of new companies in the digital space which are transforming the way energy is bought and sold.

"There are so many start-ups in this area," he says. "Electrical systems are now being built so that supply could follow demand instead of the other way around."

More progress is needed in adapting regulatory frameworks to this new reality, Frei says. Innovations changing the face of electricity systems include mini-grids, where small-scale electricity generators connected to a distribution network supply electricity to a small, localised group of customers independently from the national transmission grid.

While these new technologies are transforming access to power in some rural, poor locations in the world, some regional disparity remains.

"There are some totally new models emerging in rural areas, such as micro-financing through smartphones, at least in countries which don't have regulations which hold back entrepreneurship.

"But policy is needed. It's not going to fall from the sky," he says.

For that reason, the *World Energy Council* has engaged in a strategic partnership with the Start Up Energy Transition initiative led by DENA, the German Energy Agency, to build the "platform of platforms" for energy innovators globally.

"The Award process and collaboration with the innovators' network will allow for the systematic identification of the most promising innovation ventures around the world and ensure that the scope, time frame and success factors to deliver key innovation areas are understood and part of the global energy dialogue," Frei adds.

As this edition will be the last *World Energy Focus* for the foreseeable future, Frei highlighted that he would like to thank all those members who have contributed their experiences, knowledge and views.

"*World Energy Focus* has been a highlight of our way of reaching out," he says.

"To celebrate the work of the energy sector through new platforms is just one example of how we hope we can bring a greater wave of innovation stories to our energy leaders' audience." ■



Petroleum Economist awards honours the best in energy

On 21 November, a ceremony was held to announce the winners of 19 categories in the *Petroleum Economist* Awards.

Winners included Libya's Mustafa Sanallah, in the category Chief Executive of the Year. As chief executive and chairman of the country's National Oil Corporation, Sanallah has helped to revive Libya's oil industry despite the civil war, political chaos and the ever-present risk of supply disruptions.

Total won the Energy Company of the Year-large cap category, following its multi-billion-dollar acquisition of Danish firm Maersk Oil. The deal showed Total remains committed to building economies of scale and that oil and gas M&A was back with a vengeance.

Saudi Arabia's Khalid A. Al-Falih was awarded Minister of the Year. ■

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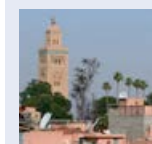
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Reshaping the global energy system

Four major forces will transform the sector over the next two decades, according to the International Energy Agency's *World Energy Outlook 2017*

The annual IEA report finds that renewables are being rapidly deployed due to falling costs and the share of electricity in the energy mix is growing. China's new economic strategy will have implications for global energy markets with its focus on clean energy; and the United States is set to become the undisputed global oil and gas leader.

The shale oil and gas revolution in the US continues to soar

According to the IEA, solar PV is set to lead growth in renewables' capacity, driven by China and India. In the European Union, wind will become the leading source of electricity soon after 2030. The report predicts that, based on existing policies, renewables could make up two-fifths of power generation by 2040.

This year, *WEO 2017* has a special focus on China, where ongoing economic and energy policy changes will have a significant impact on the country's energy mix, and continue to shape global trends. A new phase in China's development should result in an economy less reliant on heavy industry and coal.

A strong emphasis on cleaner energy technologies, partly to address poor air



Changing face: The IEA report predicts new trends in energy

quality, is catapulting China to a position as a world leader in wind, solar, nuclear and electric vehicles and the source of more than a quarter of projected growth in natural gas consumption in the next 20 years. As demand growth in China slows, other countries continue to push overall global demand higher — with India accounting for almost one-third of global growth to 2040, according to the *Outlook*.

Meanwhile, US shale oil and gas production shows no signs of slowing down due to the ability of producers to

cost-effectively unlock new resources. By the mid-2020s, the country is projected to become the world's largest liquefied natural gas exporter and a net oil exporter by the end of that decade.

This is having a major impact on oil and gas markets, challenging incumbent suppliers and provoking a major reorientation of global trade flows, with consumers in Asia accounting for more than 70% of global oil and gas imports by 2040. LNG from the US is also accelerating a major

structural shift towards a more flexible and globalised gas market.

These themes — as well as the future role of oil and gas in the energy mix, how clean-energy technologies are being deployed, and the need for more investment in carbon capture utilisation and storage (CCUS) — were among the key topics discussed by the world's energy leaders at the IEA's 2017 Ministerial Meeting in Paris last month.

The theme of the two-day meeting was *Bolstering energy security for sustainable energy growth*. It was an opportunity for governments and industry to discuss how to create the right conditions for energy investments and building a framework for 21st-century energy markets, stimulating energy and technology innovation, and examining the transformative potential of digital technologies on energy systems in the coming decades.

The IEA also hosted a carbon capture and storage summit, co-chaired by Rick Perry, the United States Secretary of Energy, and IEA director Dr Birol. The event brought together energy ministers, government officials and chief executives of major energy companies to support a renewed push for investment in CCUS, a critical technology to tackle greenhouse gas emissions and meet global climate targets. ■

Change in the air at COP 23

Energy was a central theme at the UN Climate Change Conference in Bonn, Germany, this month. The event included four days focused on advancing the global energy transition and several announcements of initiatives and publications on the challenges and opportunities on the road towards low-carbon energy systems. Overall, discussions held during the two weeks underlined the accelerating global shift towards cleaner and renewable energy sources.

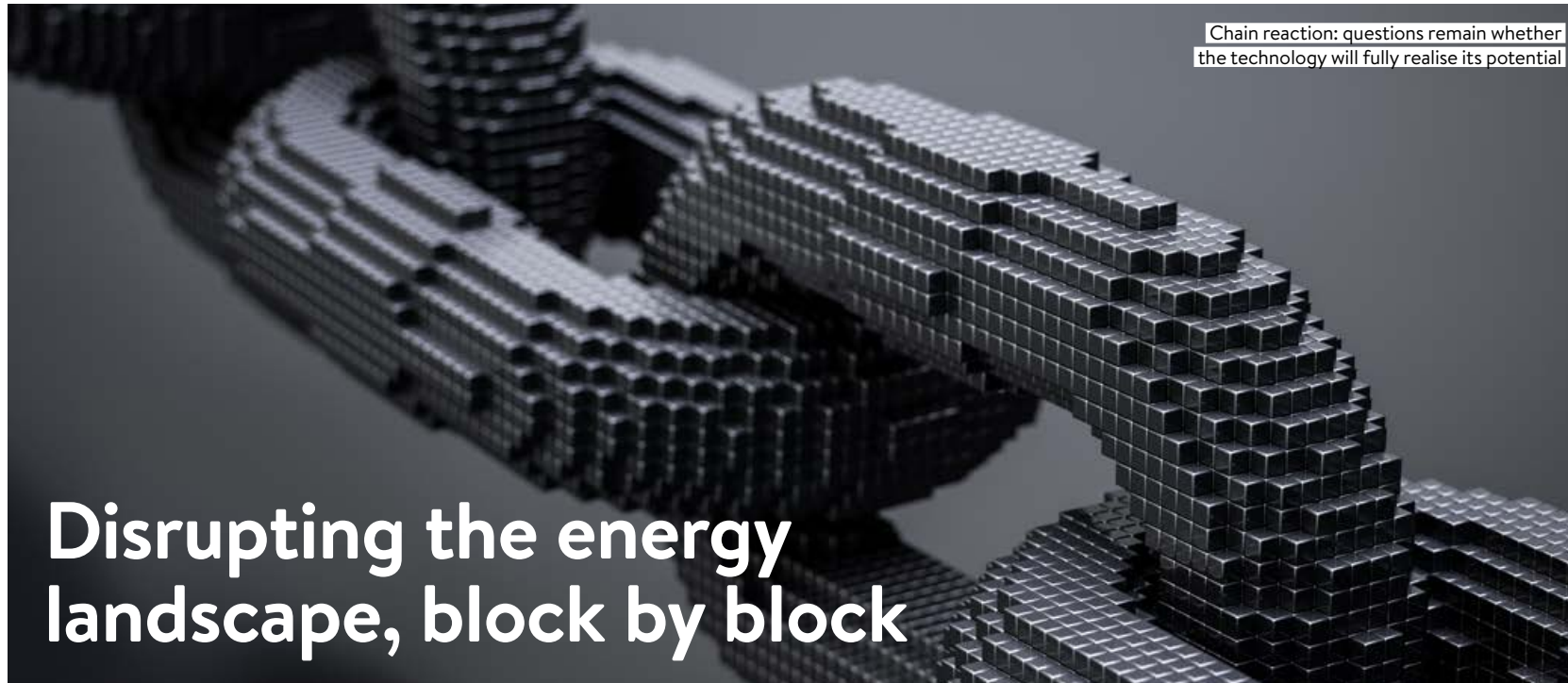
"There was a glass half full or glass half empty discussion," World Energy Council Secretary General Christoph Frei says. "It is easy to focus on the negatives, but the Paris Agreement really was a tipping point. Countries, regions and cities have started adopting mitigating strategies and that progress cannot be stopped. ■

WHO ARE THE TOP INNOVATORS IN THE ENERGY TRANSITION?

Opening of the 'Start Up Energy Transition' (SET) Award 2018: Who are the top innovators in the energy transition? On 14 November 2017, the second round of the international award 'Start Up Energy Transition' (SET) was launched during the COP 23 in Bonn, Germany. Young companies and innovation projects around the world are invited to apply with projects in six different categories, all with the aim of identifying solutions towards a sustainable energy transition and climate protection.

1/3

of global energy growth up to 2040 will be down to India



Chain reaction: questions remain whether the technology will fully realise its potential

Disrupting the energy landscape, block by block

Will blockchain overcome the hurdles in its way to transform the industry?

There has been a tremendous buzz around the potential for blockchain to transform the energy sector. But there are still a number of uncertainties surrounding the technology and a combination of technological,

Blockchain has the potential to change the way the energy sector arranges, records and verifies transactions

regulatory and other practical challenges could stall its growth.

In the latest *World Energy Issues Monitor*, produced by the *World Energy Council*, blockchain is identified as one of the most critical uncertainties within the digitalisation sphere, and is perceived by energy leaders globally to be an issue of both relatively high impact and doubt.

Blockchain technology reduces transaction costs by keeping a single logical copy of transaction records—avoiding the need for reconciliation and settlement. Blockchain has the

potential to change the way the energy sector arranges, records and verifies transactions, with the underlying model shifting away from a centralised structure (exchanges, trading platforms, energy companies) towards decentralised systems (end customers, energy consumers interacting directly).

Yet numerous questions remain. Will its early potential translate into robust and reliable practical applications? Will industry-wide protocols and standards be needed before blockchain can become universally adopted and

transformative, rather than niche and fragmented? How far away is widespread deployment of blockchain in the energy sector?

These key questions were addressed in a recent whitepaper: *The Developing Role of Blockchain*, produced by the *World Energy Council* in collaboration with PricewaterhouseCoopers (PwC) and with the support of our Future Energy Leaders (FELS).

The paper draws from interviews with a number of companies and organisations actively involved in blockchain projects in the energy

industry from the US, Europe, China, Japan and New Zealand. It is designed to start a dialogue on potential obstacles to the uptake of blockchain and where the technology might be headed.

A disrupting force

Blockchain is a new technology developed to enable peer-to-peer transactions without an intermediary. Many see it as a catalyst for decentralised business models. “It will help companies adapt to a decentralised and digital market,” says Dr. Norbert Schwieters, PwC’s Global Energy, Utilities & Resources Leader. “At the same time, it helps the democratisation of the energy system, so small communities can perform power transactions without an intermediary [such as a utility company].”

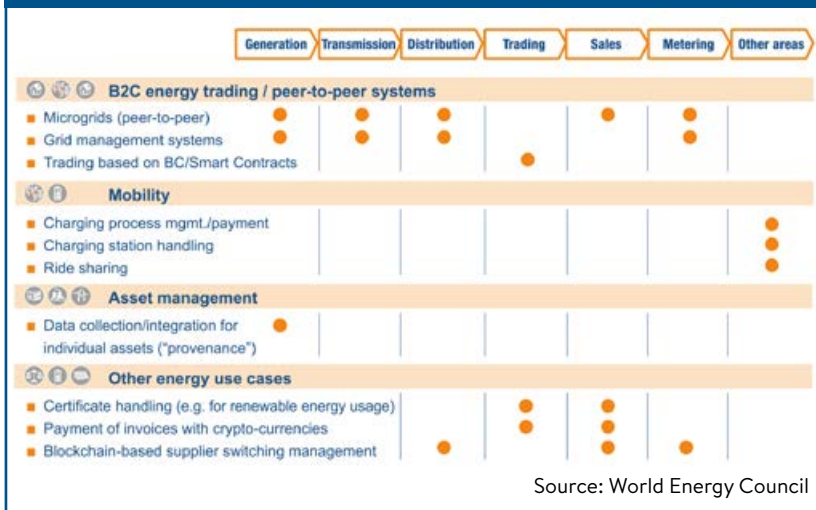
Having seen its early application in the financial sector, executives are convinced it will have a significant impact on energy.

In the survey, which forms the basis of the whitepaper, all but one of the interviewees agreed that blockchain will disrupt the functioning of the industry and contribute toward accelerating the speed of changes already taking place such as decarbonisation and the move to more decentralised energy sources. Notably, 87% of those surveyed anticipate that the most disruptive impact is less than five years away.

Still early days

Christoph Frei, who is a board member of blockchain organisation Energy Web Foundation, as well as Secretary General of the *World Energy Council*, says: “There

Several blockchain use cases along the energy value chain are currently being investigated



are some areas of blockchain that are doable as of now but other things that require upgrading of the whole energy system are further out."

Dr. Schwieters adds that the early excitement, which typically surrounds a new technology, should be treated with caution. "Many are realising that there are still a lot of issues around it, and the initial buzz is calming down," he said. "I think it will take some time for it to really become a leading-edge technology. It's still at a very early stage and many people say it will be five to 10 years before blockchain has a big impact."

Regulation is seen as one of the key barriers to its uptake, according to two-thirds of the senior executives interviewed. "Regulation in many ways still prevents companies from doing peer-to-peer transactions," says Dr. Schwieters. "There are a lot of

regulatory rules around trading data and trading energy. So energy laws will have to change."

This was echoed by Frei. He noted that three-quarters of the respondents in a separate survey undertaken for the *World Energy Council's* upcoming 2018 Issues Monitor said that the lack of robust regulations is an enormous obstacle which must be overcome if the technology is to succeed.

"If, for example, you need a trade from one household to another, there's no regulatory framework today that allows for that," he said.

Other problems include the lack of understanding of what a complex technology is, as well as the privacy and security issues that go hand-in-hand with data transfer. Blockchain will also have to prove it can work in practice and overcome scale, speed and other

constraints that currently hinder its applicability in many situations.

"Speed is an issue right now because blockchain requires a lot of computing capacity—the more transactions you want to do, the more capacity you need," Dr. Schwieters said. "Also, the amount of energy needed just to run it is huge. So, at the moment it is still quite slow; and its energy intensity makes it a very expensive technology."

While this will no doubt change over time, other technologies will also develop that may challenge blockchain.

These technologies include IOTA and Hashgraph, which is quite similar to blockchain. There are also internal and external blockchains which could develop. "We cannot foresee which technology will prevail in the end" Dr. Schwieters said.

At this very early stage of development, the range of blockchain application cases under investigation is very broad

Key applications

At this very early stage of development, the range of blockchain application cases under investigation is very broad.

The most promising identified in discussions with senior executives were architecture for managing grids, energy trading, peer to peer trading platforms and payment systems (particularly those associated with renewable energy and electric vehicle charging).

"We see three main use cases that are very close to realisation. The

first is enabling peer-to-peer, as well as device-to-device transactions," Frei said. "The second is in the area of certificate of origins: allowing individuals or organisations to trace the origins of emissions or renewable energy production. The third area is in billing and accounting."

Finding a business model

A more overarching question for the energy sector at the moment is which business model will be most suitable. "You see many start-ups but what we haven't seen yet is a valid large-scale business model," Dr. Schwieters said.

Utilities have historically generated most of their revenues from power generation based on healthy wholesale electricity prices and could earn money from depreciated plants that were run longer than originally estimated. But deregulation and decentralisation in many countries has seen the erosion of this main revenue stream, leading utilities to seek out new business models.

"Blockchain could be part of an answer." "It will play a big role but perhaps in different ways than is perceived right now," says Dr. Schwieters.

PwC and the *World Energy Council* plan to continue to keep tabs on developments. "This whitepaper gives the early thinking," said Frei. "We are systematically identifying the best innovators in the game and will work with them to understand their perspective on critical success factors."

Frei says their progress will be updated regularly, with blockchain featuring in the programme at *World Energy Council* events. ■

What is blockchain?

Blockchain is the technology underpinning the digital currency, Bitcoin, enabling transactions involving the cryptocurrency to be recorded, traced and made publicly available. But since the release of Bitcoin in 2009, developers have come to realise the potential for the use of blockchain in other industries.

Blockchains create a digital ledger that records and continually reconciles transactions—and other types of information—across a distributed network. These records are available to, and can be updated by, anyone with access to that network. Blockchains therefore eliminate the need for central oversight of a ledger, and enable information flows to be managed quickly and efficiently.

Crucially, blockchain allows ledgers to be shared transparently and are immutable—meaning that they cannot be altered—which serves as a basis for trust between partners in a transaction. Anything of value to a business—tangible or intangible—can be tracked and traded securely, without the need for third parties.

The white paper and related graphics are available to download here: <https://www.worldenergy.org/publications/2017/the-developing-role-of-blockchain>



Solar boost: Morocco plans to increase the share of renewables in its energy mix

Morocco's renewables revolution

The kingdom is expanding its use of solar and wind power rapidly through research and innovation, say Badr Ikken General Director of the Research Institute for Solar Energy and New Energies of Morocco (IRESEN) and Zakaria Naimi, its Director of Photovoltaic and Electric Systems

Today, most of Morocco's energy supply comes from imported fossil fuels.

But by 2030, the kingdom expects its primary energy demand to triple from 2008 levels. Electricity demand alone will quadruple. To meet this increasing demand, Morocco implemented a new energy strategy

in 2009, aiming to secure its supply, to ensure power was priced competitively and to protect the environment by using local energy resources, including renewables. Morocco, under the leadership of His Majesty the King, Mohammed VI, has committed to increasing the share of renewables in its energy mix to 42% by 2020, then rising to 52% by 2030.

For the first time in its history, Morocco will have a share of electricity produced from renewable sources that outweighs the share produced from fossil energy sources. This will be largely achieved by using its wind and

solar resources. Between 2016–2030, Morocco aims to create an additional 10,100 MW at least of electricity from renewables. Around 4,560 MW will come from solar power while 4,200 MW will come from wind and another 1,330 MW from hydropower.

Alongside other key institutions to lead the national energy strategy, the Research Institute for Solar Energy and New Energies, IRESEN, was created in 2011, by the Ministry of Energy, Mining, and Sustainable Development, and other key players in the energy sector in Morocco. Research and innovation is fostering

the energy transition by addressing optimally the energy needs in Morocco while including economic development through local manufacturing of new products and offering specific new services.

IRESEN, as a leading research organisation in the field of renewable energy, is facilitating and coordinating the setting up of adapted research and development infrastructure projects, as well as national and international partnerships focused on knowledge acquisition and innovation. To reinforce innovation across Morocco in the field of renewable energy and to promote human resources development, IRESEN developed and set up the first innovation network in the African continent, called the FARABI Network. It is built around regional platforms for testing, research and training in the field of renewables. It addresses strategic needs and challenges in relation to energy and sustainable development. In addition to the medium and long-term scientific vision, the network will enable the local industry, in close collaboration with academia, to seize market opportunities to expand renewable energy use.

The genesis of this network was marked by the creation of the Green Energy Park (GEP), the international platform for testing, researching and training in solar energy. The GEP, which is a unique platform in Africa, covers the entire research and development value chain, from basic research until proof of concept is reached. Built on an area of eight hectares, the GEP has an internal research platform of more than 3,000 square metres,

which includes several labs with cutting-edge technologies in the field of solar photovoltaic and thermal energies. Topics such as treatment and desalination of water using solar energy, development of desert modules, design of innovative thermal and electrical storage solutions and development of industrial applications of solar thermal energy are major focuses of the GEP.

The investigation and understanding of solar technologies and how they fare in desert conditions will allow manufacturers to develop new products which are suitable for these conditions, to enter a market which is difficult to penetrate. IRESEN is offering through workshops and training courses at the GEP a know-how transfer programme for local communities on various levels. It is hoped that partners from both academia and industry will gain enough knowledge to create the big next innovation in renewable technologies.

Meanwhile, plans to build a 5bn cubic metres a day liquefied natural gas terminal in the Atlantic deep-water port of Jorf Lasfar have not yet got off the ground, despite the efforts in recent years of key energy ministry and other government figures to attract international investors.

Morocco wants to give natural gas a bigger role in its energy mix in order to address intermittency issues currently associated with renewables and reduce both the share of imported oil in power generation and the country's exposure to external shocks in oil markets. Such a strategy makes sense given the growth of global LNG supplies and their weakening effect on prices. ■

52%

The share of renewables which will be in Morocco's energy mix by 2030



Cooperating to innovate: World Energy Council Vice Chairman Oleg Budargin

Energy security from east to west

Oleg Budargin, Vice Chairman of the World Energy Council and former CEO of Rosseti, the biggest energy networks operator in Russia, tells World Energy Focus why it is important for countries to work together in the field of energy integration

Why, in your opinion, is regional integration of energy networks important?

Today, global technological changes are happening rapidly.

Twenty years ago, it was difficult to imagine how soon the financial sector, communication technologies,

transport and logistic services would be integrated, and today, thanks to the development of the internet, it is not just a reality, but in some ways yesterday already. We are moving into a new technological cycle: the digital economy.

A reliable, effective and accessible electrical power supply is a strategic

priority for any modern economy. Electrification has become the basis of industrial growth for most countries, including Russia. And today, I see a lot of economic advantages in the implementation of international projects to integrate electrical grids, based on intelligent networks. Teamwork on the technologies of electric

power transmission is important. This is the logical step for the next round of development of our civilisation. It is necessary, and it is important to take into account that each technological cycle erases old boundaries and creates new opportunities for integration.

What does Russia hope to get from working with other states in this direction?

One of Russia's priorities is to actively create modern infrastructure. Not just by upgrading the last century's infrastructure but also by using innovative, new approaches. It is difficult to talk about widespread adoption of innovations in the absence of available infrastructure. Transport networks and the electrical energy industry should work at a great pace with minimal losses and be available at a good price. This is already a given, perceived as an integral feature of the quality of modern life.

It is extremely important to establish effective and mutually beneficial exchanges of experience and scientific competencies collected throughout years of investigation into technological electric energy transmission. This is exactly the kind of project which is difficult to develop alone. The maximum effect can only be achieved when several partner countries are involved in the project. We need to work together on the formation of a strategy for the future of the electric energy industry. At the heart of its first stage should be the maximum use of existing national energy systems to their full potential.

When we take into account the considerable volume of power plants, hydro and even solar and wind stations already existing in the world, many countries could significantly save on construction of their own capacities.

Can you give examples?

Take our country. Today, Russia has a generating capacity in excess of 30 gigawatts. In many ways, this has been the result of greater efficiency, the emergence of new energy consumers, and technology modernisation. We have an opportunity to direct this unclaimed capacity to other neighbour

Integration is more important than the national interests of any specific country

states, at least on the Eurasian continent. As you know, electric power remains one of the most perishable of all goods, which has to be consumed at the time of its generation. The advantage for our partners is being able to save money. Electric energy comes at a very low price in Russia. On average, it is about 6–7 cents per kilowatt hour. Creating integrated energy systems is much cheaper than the construction of your own generation, not to speak of additional environmental costs.

Integration, therefore, makes electric energy more accessible for consumers. Additionally, creating

integrated electric network grids should allow the transfer not only of electricity, but also of information. There is a lot of potential in this.

What other advantages are there in integration?

The country which imports electric energy receives a clean product which does not pollute the environment. Today, in many regions of the world, production of clean electric energy is developed from renewable sources – from wind and sun. There are significant volumes of generation from water resources and massive solar and wind energy projects in Russia.

A single electric network grid will allow the transfer of this clean electric energy to those regions where its production is impossible, for various reasons.

The Russian energy system is already an accumulator of large capacity because it covers several different time zones.

In general, Russia's single energy system is a successful example of interregional integration, which has long proved its effectiveness. Decades of successful work have confirmed that this approach provides reliability and availability, allowing the transfer of large volumes of electric energy at long ranges.

Today, our experience in creating a single energy system, in my view, can be used to help joint efforts of national energy systems at least in the Eurasian space and potentially globally, and we are already in discussion with colleagues in China, Japan, and Europe.



Sharing power: a geothermal power station in the Kamchatka province

The new technological cycle requires joining forces, knowledge, and resources to submit energy safely from each individual system. Joining forces to effectively use new atom energy, solar emission, biomass, and tidal power, creating effective multi-dimensional storage of electric energy. And this is all alongside joint practice in questions of energy conservation and efficiency.

Are there barriers for teamwork in different countries?

The modern energy system of any country is a rather complex and well protected mechanism which works in accordance with national standards, regulations and protocols. Its development, depending on how it was historically created, can be based on various elements such as hydropower, renewable energy sources or thermal

electric power stations. At the same time, the problem of balancing consumption and production, are solved by automated control systems which are the basis of the electricity system of each country. Each of them usually has its own specific aspects. Of course, energy bridges connecting nation networks shall comply with state standards, taking part in the relevant integrated process. They need to be consistent with existing equipment and software and ensure the required quality of electric energy (for example, within an acceptable range of deviations of voltage and frequency).

What is the best way to meet these challenges?

One solution could be the large-scale integration of electric energy infrastructure, national systems, and

continents' energy systems, under similar standards and rules. We have successful examples in Russia. The first DC link was built in 1980 for the export of electric energy from USSR to Finland.

What steps is Russia taking in this direction?

Today, Russia is carrying out ongoing consultations and negotiations on projects for both bilateral and multi-country energy interconnections. For example, the Large Asian Energy Ring of Russia, China, South Korea and Japan.

The “North-South” project on the integration of energy systems of Russia, Georgia, Armenia, Azerbaijan and Iran with a transit to 1.5 GW of capacity is another.

Another project is with Mongolia where there are five isolated energy systems and the country needs 1 GW of installed generating capacity. There are several solutions proposed including: an electricity transmission line using Siberia's generating capacity and a hydropower plant. Russia has also suggested creating an energy bridge to minimise the environmental risks for the Baikal region.

Strategic partnerships are also actively being developed with the state electricity supply network corporation of China (SGC).

It should be noted that Russian energy policy has always focused on energy security both for its own territory and for its neighbours. We have already become a reliable supplier of hydrocarbons, and a responsible and predictable trading partner. We need to move on. Russia can extend

30+ gigawatts
Russia's generating capacity

its presence in global electric energy markets but these should be done as joint projects with our partners.

As I said, we stand on the verge of big technological changes. By 2025, global energy consumption is expected to increase by almost 30%, of which two-thirds will be accounted for the Asia-Pacific Region countries. At the same time, according to evaluations, the increase of electricity consumption will exceed the increase of primary energy resources consumption so the need for electric energy will be higher. Russia's energy system has great potential: there is a reliable power grid which serves as a natural energy bridge between Europe and Asia.

Therefore, it is extremely important to continue an active dialogue with other countries on energy integration.

Integration is more important than the national interests of any specific country. Not least because many global issues such as ecology, energy efficiency, safety, fighting poverty (one in seven people on the planet live without electricity) can be solved by integrating energy systems. Many developed countries already have the experience and knowledge to support developing countries and will see a significant increase in their electrical energy consumption. Their task is to produce more. Our task is to provide affordable, clean electric energy. ■

World Energy Congress 2019

8-12 September 2019

Abu Dhabi, United Arab Emirates

Held every three years, this flagship event of the World Energy Council is the longest-running and one of the most influential energy gatherings in the world. Under the theme Energy for Prosperity, the 24th World Energy Congress aims to lead over 10,000 international energy stakeholders. These include governments, private and state corporations, academia and media, with a programme focused on the critical issues facing the energy sector and topics such as: innovation; generation technologies; the role of energy regulators; and the nexus between the energy industry and sectors such as transportation, water, agriculture etc. Providing a unique platform for partnership and collaboration, the exhibition covers 40,000 sq metres and will showcase a wide variety of innovations and opportunities in energy business, policy and technology.

Save the date and follow updates: <https://www.wec24.org/home>



World Energy Week 2018

8-11 October 2018

Milan, Italy

The World Energy Week is the World Energy Council's annual general gathering of global energy leaders to promote the sustainable supply and use of energy for the greatest benefit of all. Hosted by WEC Italia, the 2018 edition will feature a week-long programme offering the global energy leadership community the opportunity to network and gather unique insights. There will be a series of open and private discussion sessions on delivering sustainable energy systems at national, regional and global levels.

More information will be available soon:

<https://www.worldenergy.org/events/63402387-27b6-e611-80c3-00155d0511bf/>

ABOUT THE WORLD ENERGY 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: www.worldenergy.org/wec-network

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MEMBER COMMITTEE EVENTS

Balanced energy policy in an era of innovation

14 December 2017

Wellington, New Zealand

New technologies and business models are set to revolutionise the way we produce and consume energy. These innovations will lead to unprecedented levels of efficiency and require new ways of thinking. What is needed to achieve this transformation? What new skills are required across the energy sector to support the change? BusinessNZ welcomes New Zealand's World Energy Council Future Energy Leaders – Daniel Gnoth (Powerco), Bennet Tucker (Transpower) and Tina Frew (Z Energy) – to bring their understanding from the 2017 World Energy Council Summit to a local conversation with fresh insights on the global energy system.

For more information, visit the website:

<https://www.eventbrite.co.nz/e/balanced-energy-policy-in-an-era-of-innovation-tickets-38859441636>

North Sea Conference 2018

18 January 2018

Rotterdam, Netherlands

Offshore wind capacity is increasing rapidly while costs continue to decrease, but the success of that and other renewables in the North Sea depends on efficient ways of bringing the power generated to shore. A new study, Bringing North Sea Energy Ashore Efficiently, led in collaboration with the North Sea countries' member committees, will analyse the effective routes to transport the energy to shore and distribute it. The event, organised by the World Energy Council Netherlands, will offer the opportunity to share key findings from the report and provide a forum to gather market actors' thinking and collaboration on opportunities offered by the North Sea's potential.

For more information, visit the website:

<https://evenement.pwc.nl/en-us/WEC-North-Sea-Seminar>

India Energy Congress (IEC) 2018

1-2 February 2018

New Delhi, India

The IEC is the annual flagship event of the World Energy Council India, organised in conjunction with the Indian Ministries of Power, Coal, New & Renewable Energy, Petroleum & Natural Gas, External Affairs and Department of Atomic Energy. Under the theme Energy 4.0- Energy Transition towards 2030, this 7th edition of the IEC will take place in the context of a grand transition in the global energy scene and will include discussions around the topics of: Political and Energy Environment 2030; Energy Investments in an Uncertain World; Sustainable Mobility; Variable Renewable Energy Sources Integration and Reaching the Last Mile.

For more information, visit the website:

<http://wecindia.in/webportal/>

Africa Energy Indaba 2018

20-21 February 2018

Johannesburg, South Africa

The Africa Energy Indaba Conference is the World Energy Council's annual African regional event. The 10th edition will focus on key issues that impact the African energy sector. Delegates, drawn from all continents, represent an unrivalled combination of industry experts, project developers, financiers, energy users, government officials and manufacturers. Based on the outcomes of the 2018 Africa Energy Ministerial Roundtable, the conference will help shape energy policy for Africa. Sessions under preparation are looking at topics such as resilience, the impact of digitalisation, innovative funding, the role of the mini grid to improve rural access and regional projects.

For more information, visit the website:

<http://www.africaenergyindaba.com/>