

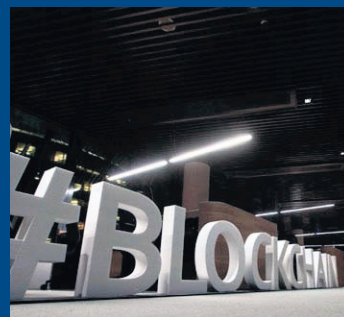
# WORLD ENERGY COUNCIL



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Thursday, 12 September 2019



## AT THE SHOW

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Iraqi Oil Minister Thamer Ghadhban  
Photo: AP/SCANPIX

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# World Energy Insights Brief — Blockchain: Anthology of Interviews

The World Energy Council in partnership with PwC interviewed 39 companies/organisations to understand the maturity of blockchain technology in energy and also to understand its potential and its impediments.

We interviewed companies pushing new business models, traditional oil and gas companies, regulators and utilities to find out what is going on with all the blockchain hype. We found the following:

**1:** Technological feasibility and scalability are hurdles to be sure, but the market, or rather those interviewed for this study, are confident that with time, testing and refining of the technology these will be crossed. Energy Web Foundation has assembled an ecosystem of more than 80 energy companies' affiliates and start-ups interested in blockchain applications in the energy sector. EWF builds open-source, foundational blockchain tools and technology for use in the energy sector. The EWF collaboration is working to speed up the number of transactions that a blockchain platform can handle as well as the cost effectiveness of the transactions. Additionally, EWF has implemented a proof of authority consensus mechanism that requires the known companies to validate transactions, increasing the potential for regulatory integration

**2:** Blockchain in energy is in its infancy. 85% of those interviewed who had use cases said that they were in early stages and their pilots not mature yet

**3:** There are alternatives out there; one in particular that we have featured in our work is the alternative from Faraday Grid

**4:** Like many new initiatives in the



The Blockchain Centre in the Lithuanian capital Vilnius

Photo: AFP/SCANPIX

energy world the success of blockchain is very much dependent on a reframing of regulation and large scale customer engagement, but that doesn't mean blockchain cannot bring immediate optimisation for the existing system. The transformative nature of blockchain, which is P2P is dependent on regulation and customer engagement.

"Blockchain in energy has the potential

to upend the energy system that was created over a century ago, but it has a long way to go. In the meantime it is certainly pushing the envelop and forcing market players to innovate and create new business models to bring a cleaner, reliable and equitable energy system for everyone," said Marzia Zafar, World Energy Council Director of Issues Monitor and Innovation.

We invite you to review this work and give us your feedback. We will organise a regulatory roundtable in Brussels to continue the dialogue and understand if there are new ways to think about regulation.

• If you have any comment or questions, please contact Marzia Zafar at [zafar@worldenergy.org](mailto:zafar@worldenergy.org)

## Congress Programme

### Thursday 12 September

09:00 — 09:15	<b>Keynote address</b> <b>Leveraging 5G to drive sustainability and enable innovation in the energy sector</b> <i>Speaker:</i> Khalifa Hassan Alforah Alshamsi, Group Chief Corporate Strategy & Governance Officer, Etisalat	Hall 4 Block 1
09:15 — 09:30	<b>Keynote address</b> <i>Speaker:</i> Jesse Moore, Chief Executive Officer, M-Kopa Solar	Hall 4 Block 1
10:00 — 11:15	<b>Opening plenary</b> <b>Start-up Energy Transition: The power of the bold</b>	Hall 4 Block 1
11:15 — 11:45	<b>Break</b>	
11:45 — 13:15	<b>Interactive Sessions</b> <b>Pitch perfect: Best of the Start-up Energy Transition (SET)</b>	ICC Fishbowl
	<b>Faster, better, cheaper: Cross sector collaboration to deliver successful energy transitions</b>	Conference Room A, Block 4
	<b>Be a CEO for the day: a live simulation game</b>	Hall 4, Block 3
11:45 — 13:00	<b>Parallel Sessions</b> <b>Agile giants: Scaling up the entrepreneurial approach</b>	Hall 4, Block 2
	<b>Innovation in grids: Future-proofing the power network</b>	Hall 4, Block 1
	<b>Rethinking innovation ecosystems beyond technology</b>	Conference Room A, Block 5
13:00 — 14:15	<b>Lunch break</b>	Halls 2&3
14:30 — 15:30	<b>Closing plenary</b> <b>Reflections on the week: Energy for prosperity</b> <i>Moderator:</i> Dr. Christoph Frei, Secretary General & Chief Executive Officer, World Energy Council <i>Speakers:</i> H.E. Alexander Novak, Minister of Energy, Russian Federation H.E. Suhail Mohamed Al Mazrouei, Minister of Energy and Industry, United Arab Emirates	ICC Plenary
15:30 — 16:30	<b>Congress closing ceremony</b>	ICC Plenary





A conveyor belt with objects is used to demonstrate blockchain technology

Photo: AFP/SCANPIX

# Perceive, Promote and Protect: Three Ways Energy Policymakers can fast track Blockchain Innovation and Implementation

**E**nergy systems are undergoing significant transformational change, driven by the climate change agenda and triggered by the advancement of renewable energy technologies.

One of the main challenges of today is the decentralisation of the energy system, which has to happen quickly and reliably, if we want to accomplish our 2030 or 2050 energy aspirations.

Decentralisation of energy system requires decentralised technologies and ownership, along with novel paradigms and innovative business models.

Due to the inbuilt characteristics of blockchain technology, it has the potential to provide a promising solution for a decentralised energy marketplace when considered with other digital innovations such as Information and Communication Technologies (ICTs) and Internet of Things (IoT).

At present, somewhere around 200 companies are working on blockchain in the energy space and more than US\$450 million has been invested, now is the time for deeper government intervention with in depth analysis to understand the technology, stimulate focused innovation, and explore issues and barriers to its deployment.

## **Perceive — Developing an understanding within the government itself**

The scale of digital innovations and the pace of digitalisation in the energy sector have been radically increasing recently.

Technologies like blockchain have been booming in the energy sector, with the participation of giant multinationals to burgeoning start-ups, with more than 70 different projects in operation, some of which are being scaled quite rapidly.

Policies and regulations have to come into this equation, with now being the critical time for the policymakers and regulators to develop in-house expertise,

to gain an understanding of blockchain application opportunities and challenges of the technology.

It is of vital importance to understand how the adoption of blockchain technology in different energy sector applications can affect existing market structures and regulations.

This knowledge will also assist in prioritising the applications where policymakers want to focus and set blockchain in energy directives and recommendations at the national level.

Blockchain technology also involves an entirely new vocabulary for which internal expertise need to be developed by the policymakers to foster productive discussions among governments, businesses and other stakeholders.

Apart from developing the required knowledge and skills, policymakers also need to cultivate technology awareness policies and technical training through conferences, workshops and dialogues to ensure an adequate pool of relevant expertise are being developed.

## **Promote — Stimulating directed innovation to support aspiration**

A balance must be struck between the market and the regulations.

While innovation is virtuous, a focused innovation is imperative if we want to accomplish our ambitious aspirations.

The market is moving rapidly and regulation introduction needs to improve significantly to catch-up.

We need to bridge the considerable gap between technology innovation and regulatory innovation if we want to leverage the full potential of innovative technologies.

It is imperative that regulations do not act as an obstacle to innovation, but rather as a navigation opportunity, directing innovation through priority setting, and duly disclosing flexibilities will help meet our aspirations.

In terms of setting those aspirations,

we have moved remarkably beyond business as usual, but in terms of execution we are still business as usual.

Blockchain may still have some way to go to prove its capabilities to operate in a national market for different applications and there is no way to predict how blockchain will interact with the larger energy systems when there will be several minor players included in the grid.

There are costs associated at each step of the process with a need for the government to assess these costs from a deployment verses customers benefit and also from a broader policy perspective.

This will help improve the process and the time in developing relevant policies and guidelines in the near future.

## **Protect — Having flexible regulations while protecting consumers, prosumers and others**

Blockchain has the potential to play a key role in the decentralised energy system, with it being viewed as a key solution rather than a problem, empowering consumers to provide their own energy security and to assist those in their vicinity with their energy needs.

The current regulatory business model is focused around regulated utilities, and not the consumers, and therefore, supportive regulation is required to enable decentralisation of the energy market in different countries.

Countries like Germany and Spain have already successfully applied some mechanisms to encourage the prosumers uptake in particular.

When it comes to blockchain technology, there is another level of regulation that may be needed to ensure that privacy of consumers or prosumers is not breached, given that there may be considerable participation levels in the decentralised energy system.

With parallel centralised and decentralised energy operations in the energy market in coming years being

predicted and with blockchain being employed by both (whole energy market trading and peer-to-peer energy market trading), the rights of the multiple stakeholders involved needs to be taken into account.

Regulators need to provide legal certainty for blockchain in energy applications, addressing technology standardisation and the standardisation of new citizen-centric business models, in addition to defining the roles of different stakeholders as part of new business models will be critical.

International harmonisation of blockchain regulations for different applications in the energy sector should be a central focus.

Furthermore, from an IoT perspective, all the devices and technologies that will produce enormous amounts of data on blockchain based smart contracts, cyber security guidelines and regulations will also have to be considered from the energy sector perspective.

While regulations are required to ensure that the market functions effectively and impartially, the market does not need to be subject to unnecessary regulations.

Blockchain is a very practical technology with wide-ranging application opportunities, with the potential to provide a more secure, smart and sustainable decentralised energy market.

The time for the greater involvement of the government is now, with a need to explore how policies and programs need to be altered or be introduced in the near future to leverage the potential of the technology — not only Blockchain, but the integration of other digital innovations, such as ICT and IoT to facilitate a flexible, transparent, and citizen-centric energy market.

• Piyush Verma, PhD, Energy Market Analyst at the International Energy Research Centre, Ireland



# Cyber security and the energy transition

The Grand Transition is reshaping the energy sector via the three interacting trends of decarbonisation, decentralisation and digitalisation.

These trends are creating new opportunities that enable the transition while also presenting evolving challenges to be addressed.

The opportunities and risks arising from the digitisation trend are particularly stark enabling the rapid adoption of intelligent systems and innovation through the better use of data while also increasing the energy sector's digital vulnerability with the potential for cascade effects that could cause wider societal and economic harm.

Further structural changes that fragment the market and divide responsibility complicate energy system operations and mean that the potential financial and societal impact of a cyber or digital related loss of energy supply is only growing.

The energy sector needs to improve its dynamic resilience to address the evolving risks and the World Energy Council has been exploring how to support this.

As reliance on digitalised systems increases, new possible cyber vulnerabilities arise that need to be identified, assessed and managed.

The growth of intermittent renewable generators such as solar and wind require the distribution system to become more dynamic, with a greater co-ordination role for system operators using digital systems and significantly increases the number of entry points for malintents.

Moreover, other parts of the energy sector that had historically relied upon legacy operational systems with low levels of internet connectivity are moving to dynamic control systems reliant on digital communication that also increase the number of potential entry points.

Risks for the increasing digitalised and decentralised systems of the energy sector can have multiple stressors and origins that vary between from business as usual accidents to malicious attacks from within the systems or beyond with varying degrees of severity, duration and scale.

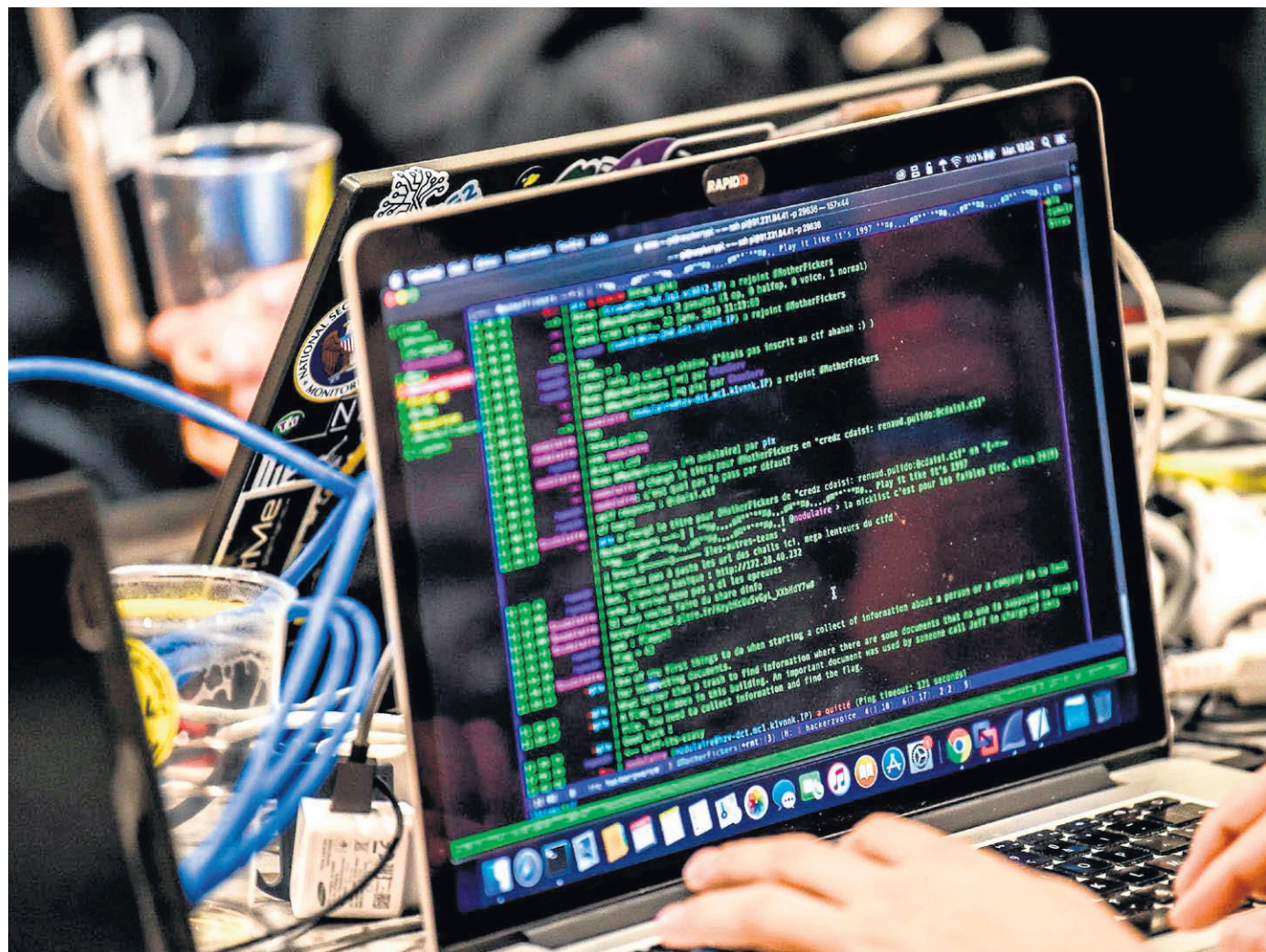
There are already numerous examples of cyber-attacks to the energy sector, with energy listed as one of the top three sectors targeted for attack in the United States.

The malicious hack in Ukraine in December 2015 was the first publicly known successful cyber-attack on a power grid, where hackers attacked the IT systems of three energy distribution companies to temporarily disrupt electricity supply to end customers.

Digital disruption to the energy sector does not only arise from malicious cyber-attacks or accidental issues but can also stem from natural phenomena such as solar storms.

In 1989, the Quebec region of Canada experienced a geomagnetic storm that only lasted 90 seconds but took nine hours for 83% of power to be restored while a further 1 million customers remained without power for a longer period.

With the increasing proliferation of digital systems, the impact today would be even greater, for example with outages to satellites affecting



A person works on a laptop during a recent International Cybersecurity Forum

Photo: AFP/SCANPIX

GPS, payments systems and aviation. While the causes and outcomes of cyber disruption maybe different, there are many common steps regarding assessment, reporting, communication and containment.

The role of governments in increasing dynamic resilience is crucial at both national and international level. While good response plans and preparations can be made, it is impossible to plan for all eventualities with the scale of impacts also dependent on timing and context.

Plans therefore need to be adaptive and agile to be able to respond to broader market and societal changes covering increasing electrification in transport, digital communication, electronic payments and just-in-time supply chains.

In the event of a serious incident, with wider societal impacts, maintaining communication will need to be prioritised, but could be particularly problematic with loss of power.

Therefore, non-electronic forms of communications should be explored.

Dynamic resilience planning will need to consider various cyber crisis scenarios (deliberate, accidental and natural events) and potential durations, but should also consider the scope for cascading impacts into other sectors and geographies.

Governments and companies therefore need to be able to assess the potential consequences of an incident swiftly, implement agile recovery plans and engage relevant stakeholders appropriately.

This is particularly important given the pervasive coupling of differing sectors due to digitisation and decentralisation for blurring sector boundaries that

increase the risk of cascade effects.

For example, restarting power systems in a black start event will need to consider financial payments, telecommunications and increasingly also transport systems, with the rise of EVs.

There may also issues with the prioritisation of data centres given their wider societal role while critical data systems themselves may be compromised following a black start.

For national governments, international preparedness and collaboration is also key to be able to respond to issues arising from beyond its own jurisdiction, which may not include the source of the problem nor have regulatory oversight of the manufacturer of affected equipment.

As societies increasingly electrify, digitalise and decarbonise, disruption to the power sector could have devastating implications, cascading across sectors with ever more entry-points for cyber-attacks and vulnerability to extreme weather events (a topic for another paper).

Recognising this, governments around the world are putting counter measures in place.

Yet in an area which is constantly evolving, the power system's integrity remains vulnerable.

Governments, industry sectors and non-convention actors in the energy system must work together to introduce and continually review policies to minimise the impact of digital disruption and enable rapid recovery from incidents when they do occur.

This will require better understanding of how disruption can occur and strengthening of the most vulnerable systems, with a comprehensive

assessment of potential cascading risks and public communication strategies.

Finally, there should be more international and regional co-operation to improve digital resilience against universal natural hazards such as space weather, establish and share best practice.

Where companies and countries are reluctant to admit their cyber incidents, establishing and sharing best practice behaviour can be challenging.

A hypothetical gaming exercise offers a potential solution to these sensitivities.

The World Energy Council and Chatham House recently ran a pilot workshop using carefully curated crisis simulations and role-playing breakout groups to explore best practice in a safe environment.

The inter-active approach allowed safe discussion under the Chatham House rules without the need for participants to reveal any potentially sensitive direct experience of cyber-attacks.

In conjunction with Marsh & McLennan Companies (MMC), its Dynamic Resilience Cyber Security partner, the Council is exploring how to develop the hypothetical gaming concept into a programme for roll-out across its global community of energy industry and policymakers.

A series of cybersecurity webinars will be hosted by the Council and MMC to start sharing knowledge across the Council's global membership community.

We look forward to work together to address this evolving challenge.

• Antony Froggatt, Senior Research Fellow, Chatham House & Martin Young, Director of POLICY and Risk, World Energy Council.





IRENA's stand at the World Energy Congress 2019

Photo: IRENA

# Speeding up the energy sector's decarbonisation through renewables

**R**enewable energy delivers on jobs, sustainable economic development and will deliver climate solutions.

To tackle climate change and its direct and related impacts on air pollution within the Intergovernmental Panel on Climate Change's 11-years window, renewables are the only ready and available instrument to achieve the goal.

The energy transition is already under way and a renewable-powered future is unfolding. Today, renewables account for one third of global power capacity and they remain the fastest growing source of new capacity.

However, urgent action is needed to accelerate the pace of the transformation.

Science has warned us that we only have 11 years left to avoid the point of no return towards rising global temperatures with catastrophic consequences.

In a few days, world leaders will gather in New York at the Climate Action Summit convened by the UN secretary general.

Our message is clear. Only an energy transformation driven by renewables will enable us to meet Sustainable Development Goals and fight climate change in line with the Paris Agreement.

Today, renewables and energy efficiency are the only ready instrument we have. Combined, they can cut 90% of the energy-related carbon dioxide reductions required.

The business case is strong. In many parts of the world today, renewables have become the lowest-cost source of new power generation.

Renewable power technologies now commonly undercut new fossil fuel-fired power generation, producing cheaper electricity than any coal, oil or natural gas option. Crucially, they are set to do so without financial assistance.

But investment in renewables must scale up.

Additional investments of US\$110 trillion are required by 2050.

Due to falling costs, this amount is 40% lower than in our previous analysis.

Every dollar spent on energy transition could pay off up to seven times.

These savings stem from avoided health costs, energy subsidies and climate externalities that can lead to socio-economies losses.

Renewables also deliver jobs and economic benefits. Last year, the number of renewable energy jobs grew by 700,000, bringing it to 11 million worldwide.

Affordable, secure and climate-safe energy will be crucial to underpin the world's development over the coming decades.

We have to ensure a just transition and the right energy mix, also looking at the potential of green hydrogen in the next future.

Policymakers, business leaders and global finance must work together to harvest benefits through renewables.

IRENA will work closer to the ground, with an increased focus on facilitating projects and driving renewable investment to scale.

The Agency will strengthen partnerships with those who can help us realise renewable energy potential.

This includes a close relationship with the private sector to stimulate investments in renewables.

We will also enhance our cooperation with international financial institutions, multilateral development banks and regional organisations.

IRENA will continue to be the global platform for international cooperation on renewable energy and ensure closer collaboration among multilateral institutions.

• *Francesco La Camera, Director General of the International Renewable Energy Agency (IRENA).*



**International Renewable Energy Agency Director General  
Francesco La Camera**

Photo: IRENA





**H.E. Dr Matar  
Hamed Al Neyadi**  
 Photo: WORLD  
 ENERGY CONGRESS

# Staging of Congress in Abu Dhabi will brighten the industry

**W**hen the 24th World Energy Congress comes to a close today, we can all reflect back knowing that another major step has been taken in reshaping not just the present but the future of the energy industry as well.

That is what we wanted to achieve and I believe we have made significant progress that will benefit all sectors of the global industry going forward.

Even before the Congress was officially opened, the signs were already there that the 24th World Energy Congress would make history. More than 15,000 people registered for this prestigious event, making it one of the largest Congress ever.

But it was not all about numbers, it was important to establish a platform to engage in regular dialogue. The 24th World Energy Congress did exactly that with 80 sessions over the course of the week.

The past three days have seen the most respected global experts, business leaders and pioneers from leading companies from around the world share their knowledge through a series of sessions, panel discussions and side events.

More importantly, there was significant presence

from governments with more than 72 ministers from the United Arab Emirates and around the globe attending.

With such key figures assembling here in Abu Dhabi, it reaffirms how important the countries view the need to work together.

We are extremely proud to be chosen as the first city in the Middle East to stage the World Energy Congress. It has also showcased the vision of the UAE's energy industry.

Yesterday I had the pleasure of being part of the side event organised by the Clean Energy Ministerial titled 'Long-term Energy Scenarios for the Clean Energy Transition'.

I also enjoyed moderating the insightful session — 'Progressing the vision for regional integration' which addressed the importance of how regional collaboration and integration can be the key to unlocking enormous untapped potential.

Anyone who has visited the exhibitions will have been fascinated by what is in store ahead.

The UAE is undergoing an ambitious energy transformation with significant projects set to be under

construction including plans for two of the largest solar generation projects in the world.

So, what impact will the 24th World Energy Congress have for the future? Only time will tell but having seen the positive engagement and discussions that has taken place at the Congress around collaborating to solve today's energy and climate challenges, I'm optimistic as to what the future will hold.

Today, we will be handing over to Russia for the next staging of the 25th World Energy Congress in 2022.

Just like the UAE, Russia has become a key country in the energy market and I look forward to hearing their plans later today in the afternoon at the closing plenary.

The industry will continue to evolve and this will present its own challenges but with all companies and nations willing to work together with the support of the World Energy Congress, big steps will be taken for the benefit of all.

• *H.E. Dr Matar Hamed Al Neyadi, Chairman of the UAE Organizing Committee for the 24th World Energy Congress and Undersecretary, UAE Ministry of Energy and Industry*

## Emirates Water & Electricity Company represents UAE efforts in diversifying the energy industry

**E**mirates Water & Electricity Company (EWEC) presents significant advances being made to deliver sustainable sources of energy, to the international energy community through its participation at the 24th World Energy Congress this week.

Standing alongside other major international energy suppliers and distributors at the four-day event held at ADNEC, EWEC highlights the great strides being made in developing and implementing sustainable sources of water and electricity to support the United Arab Emirates' goal of diversifying its energy industry.

Officially established in 2018, EWEC succeeded the former Abu Dhabi Water & Electricity Company as the sole procurer of power and water within the emirate of Abu Dhabi.

EWEC currently operates 11 power plants nationwide and leads the development of the emirate's water and electricity production projects, with a dedicated focus on technologies that promote renewable and sustainable sources of energy.

This focus is reflected in EWEC's commitment to minimise the environmental impact of water and electricity production through a range of innovative measures, placing

it among the most progressive energy companies in the region.

These measures include increasing the efficiency of its thermal power generation fleet, investing in renewable technologies such as zero carbon emitting solar capacity and utilising low carbon electricity to power its Reverse Osmosis desalination plants, effectively replacing the much older and less efficient gas-fired technology.

EWEC plays an important role in the UAE's ambitions to reduce its overall carbon footprint by increasing the contribution of clean energy to the national power grid by 50%, by year

2050, in line with the UAE Energy Strategy.

Othman Al Ali, EWEC's Chief Executive, said: "The 24th World Energy Congress is a great platform that has brought together some of the most important business leaders, thinkers and innovators in the global energy industry for four days of inspirational debates and high-level discussions."

"EWEC, is perfectly placed to shine the spotlight on the achievements being made across the UAE to reach the sustainability and diversification goals laid out in the UAE Energy Strategy."



**Othman Al Ali, EWEC's Chief  
Executive**  
 Photo: EWEC



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## Train 7 boost for NLNG

NIGERIA LNG (NLNG) has taken a significant step forward towards sanctioning its proposed Train 7 liquefied natural gas expansion project after selecting its preferred bidder for the engineering, procurement and construction work.

Italy's Saipem, Japan's Chiyoda and Daewoo E&C of South Korea — together known as the SCD consortium — on Wednesday signed a letter of intent with NLNG covering the planned 8 million tonnes per annum expansion project at Bonny Island in Rivers State.

The SCD grouping beat competition from the B7 consortium comprising KBR of the US, UK-based TechnipFMC and Japan's JGC to land the provisional EPC contract, which is thought to be worth about \$6 billion.

Each of the consortia in June submitted EPC bids following a dual front-end engineering and design competition, which ended the previous month.

NLNG chief executive Tony Attah said signing of the LoI is a “bold” and “very clear statement that we are forging ahead with Train 7”, which is set to increase capacity at NLNG from 22 million to 30 million tpa with the addition of two similar-sized small trains.

“With the signing of the LoI, we hope that by the end of October a final investment decision will be signed for Train 7. This will ensure we attain our ambition of increasing our production by 35%,” the company added.

Local content had been expected to play a key role in NLNG's decision-making process on the EPC contract, with one source previously saying that meeting this requirement would be “quite expensive”.

In March, the Nigerian Content Development & Monitoring Board and NLNG agreed a Nigerian Content Plan for Train 7.

A representative of the SCD consortium said: “SDC is committed to deliver the project to Nigeria, with Nigerians in Nigeria.”

NLNG added: “The project will form part of the investment of over \$10 billion, including the upstream scope of the LNG value chain, thereby boosting the much-needed foreign direct investment profile of Nigeria.”

“The project is anticipated to create about 10,000 new jobs during the construction stage and, on completion, help to further diversify the revenue portfolio of the federal government and increase its tax base.”

Assuming project sanction is taken this year, the new train could be up and running in 2023.

The NLNG facility is owned by state-owned Nigerian National Petroleum Corporation with a 49% stake, while Anglo-Dutch supermajor Shell holds 25.6%, France's Total has 15% and Italy's Eni holds 10.4%.

## MIDDLE EAST



Plans: Iraqi Oil Minister Thamer Ghadhban

# Iraq set to clinch deal with

**Minister expects EPC agreement** to be in place by end of the year for facility to handle **output from southern fields**

**NASSIR SHIRKHANI**  
Abu Dhabi

IRAQ is aiming to finalise a \$1 billion-plus deal with a consortium of US companies Bechtel, Honeywell and Turkey's Enka to build a new gas plant capable of processing 300 million cubic feet of associated gas per day from its southern fields as the Middle East producer continues with efforts to reduce flaring.

Oil Minister Thamer Ghadhban expects the engineering, procurement and construction agreement to be signed before the end of the year, boosting efforts to harness more associated gas from Iraq's fields.

“We have signed a memorandum of understanding (valid) for

three months. We hope by the end of the year (that we will) finalise and sign the contract. It's an EPC plus finance (deal). We're negotiating, it will be in excess of \$1 billion, no doubt,” Ghadhban said on the sidelines of the World Energy Congress in Abu Dhabi.

The Honeywell group sealed a memorandum of understanding with the South Gas Company in July to build the plant in the Al-Ratawi area of southern Iraq. It will capture associated gas from the West Qurna 2, Majnoon, Luhais and Tuba oilfields as part of gas expansion plans to provide more fuel for power generation.

The Honeywell-led consortium

had been competing against an alliance of Russia's Lukoil and France's Total to build the processing facilities to boost supplies to the domestic grid.

Lukoil is developing West Qurna 2, which is producing 400,000 barrels per day of oil.

Meanwhile, the Shell-led Basra Gas Company (BGC) is also expected to sanction a new gas processing train, the fifth such facility, to capture more gas from the giant Basra oilfields awarded under the country's first licensing round in 2009.

The expansion will push BGC's combined production to 1.5 billion cubic feet per day from around 900

MMcfd currently. Shell embarked on the current expansion phase in January, involving the addition of two new trains, each capable of delivering 200 MMcfd, and has now decided to add a new replica processing facility.

A final investment decision on the additional train is expected later this year.

The two new trains, under construction in Sharjah, in the United Arab Emirates, by US company Exterran, are in the process of being shipped to Al-Ratawi near Basra for installation by China Petroleum Engineering & Construction Corporation (CPECC).

They will be operational by





Photo: REUTERS/SCANPIX

## Ministers to review market

KEY oil ministers from Opec states and their allies in the so-called Opec+ group of producers were expected to meet in Abu Dhabi today to review the market.

Oil prices, while strong this week, have weakened overall this year despite big output cuts by the Opec+ group and geopolitical factors such as the US sanctions on Iran.

The meeting of the Joint Ministerial Monitoring Committee (JMMC), a body set up by Opec+ to oversee its production-cutting strategy, is not expected to lead to any immediate action.

United Arab Emirates' Oil Minister Suhail al-Mazrouei acknowledged late last week that the US-China trade dispute was having a negative effect on oil prices.

"All markets are suffering from this trade tension between the US and China. We are hopeful that there will be some good news later on this year around that tension, [and] hopefully it will be resolved," Mazrouei said.

He added that the Opec+ countries would be open to taking further action in the form of output curbs if needed, but added that it would be premature to expect any such decision to come out of the JMMC meeting.

"It's premature to say that we will have a recommendation. We don't take decisions like that just on feelings, we take decisions based on data and based on analysis.

The JMMC will study a report from the Joint Technical Committee team, which met in Abu Dhabi on Tuesday.

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## Abu Dhabi teams up

THE Abu Dhabi Department of Energy (DoE) has signed a memorandum of understanding with the State Grid Corporation of China for a strategic partnership that seeks to support Abu Dhabi's efforts to transition towards more efficient consumption practices.

The MoU lays the groundwork for future partnerships where the DoE acts as a catalyst for the emirate's energy sector in co-operation with companies owned by the Chinese state-owned company.

The agreement calls for collaboration in carrying out feasibility studies to render the energy system more efficient; develop facilities for producing and storing clean energy that complement the existing power grid; and connect the power grid with those of other emirates and countries around the region.

# th trio to build gas plant

2022, according to BGC officials. Despite Shell's success to date at harnessing associated gas, Iraq continues to flare more than half of its combined production. It sends more than 1.5 Bcfd up in smoke since it lacks enough capacity to handle associated gas.

Shell is a partner in BGC with the state-run South Gas Company, which has a 51% stake in the joint venture, and Japan's Mitsubishi, which owns 5%. BGC has dramatically reduced gas flaring at the Rumaila, West Qurna 1 and Zubair oilfields, operated respectively by BP, ExxonMobil and Italy's Eni.

As part of its flaring-reduction campaign and efforts to boost

power generation, Iraq has also awarded contracts to other companies, including CPECC, to capture associated gas from southern Iraqi fields.

CPECC was recently selected to build and operate facilities to process 300 MMcfd from Halfayah, operated by PetroChina.

Elsewhere, GE-controlled Baker Hughes is building facilities to produce at least 200 MMcfd by capturing gas from the Nassiriya and Gharraf fields.

Apart from the environmental benefits, the gas expansion schemes will help Iraq save money by reducing costly gas imports from Iran.



On site: Rumaila oilfield facilities in Basra  
Photo: REUTERS/SCANPIX



## CORPORATE OUTLOOK

# NPCC sees strong year ahead

**Rise in spending** by state-owned companies across contractor's key markets gives **big boost to order book**

**NISHANT UGAL**

Abu Dhabi

UNITED Arab Emirates-based National Petroleum Construction Company (NPCC) is optimistic that Abu Dhabi's offshore fabrication market will remain resilient this year, leading to record revenues for the company.

NPCC chief executive Ahmed Al Dhaheri told Upstream that the company's order book is strong and likely to lead to growth in revenues in 2019.

"We are looking forward to record revenues this year — over 30% more than in 2018," Al Dhaheri said.

NPCC operates in multiple markets in the Middle East and South Asia, which have witnessed a strong uptick in bidding activity led by increased spending by state-owned companies.

Al Dhaheri said most of the company's key markets have shown robust activity.

"We have a strong footprint in the UAE and Saudi Arabia, in addition to markets such as India, Kuwait and Bahrain where we see robust EPC activity," he said.

NPCC's Abu Dhabi facility is one of the largest fabrication yards targeting offshore work in the Middle East. It has capacity to simultaneously fabricate more than 100,000 tonnes of structures and build topsides weighing up to 35,000 tonnes.

The Abu Dhabi-based player is currently bidding for work on several offshore projects in the emirate, including the giant Hail & Ghassha sour gas development, which is valued at more than \$10 billion.

Meanwhile, NPCC has also been involved in advising Abu Dhabi National Oil Company (Adnoc) on execution strategies and challenges as part of its front-end engineering and design effort for sour gas developments in the emirate.

NPCC has been chosen by Adnoc as one of the participants in a FEED competition for its Umm Shaif Gas Cap and Belbazem devel-

opment. The contractor is also working on an engineering, procurement and construction contract from Adnoc that comprises offshore infrastructure for its Bu Haseer full-field development.

The Abu Dhabi yard recently completed fabrication of the Umm Lulu gas treatment platform for Adnoc, which is a key part of the Umm Lulu field development.

The Umm Lulu expansion project is a crucial part of Adnoc's strategy to expand its oil production capacity.

The offshore field is expected to have crude output capacity of more than 100,000 barrels per day in 2020, NPCC said.

The contractor is a joint venture between Senaat, an Abu Dhabi government holding company, and Consolidated Contractors International Company (CCIC), with Senaat holding 70% and CCIC the remaining 30%.

The UAE-based yard has been focusing on shallow-water offshore fabrication work and pipeline installation projects for many years.

However, NPCC recently has started taking on an increasing number of onshore EPC projects, and is now looking at also venturing into deep-water pipeline installation projects.

As part of its expansion effort, NPCC this week signed memoranda of understanding with China Petroleum Engineering & Construction Corporation (CPECC) and China National Chemical Engineering Corporation to co-operate on onshore and offshore projects in the oil and gas sector.

NPCC is hoping to benefit from CPECC's expertise in executing large-scale onshore EPC projects and the duo is expected to bid together in upcoming Adnoc tenders, industry sources said.

The company also aims to support wind farm EPC projects as a part of its growth strategy.

While NPCC in the past has predominantly focused on the Middle East and South Asia, the company now aims to extend its operations to new regions.

"We are now looking to further expand our presence in Egypt, KSA (Saudi Arabia), East Asia and Africa, where there is strong opportunity to offer our expertise," Al Dhaheri said.

NPCC is already a part of Aramco's prestigious long-term agreement (LTA) arrangements with offshore contractors and has landed several key contracts from the Saudi state-owned giant since 2016.

"We have won nine awards (from Saudi Aramco) and are bidding for many more. We were the only entity to win five new contracts last year," Al Dhaheri said.

NPCC is now in the process of setting up a new offshore fabrication yard in Saudi Arabia as a part of Aramco's In Kingdom Total Value Add localisation programme.

"The yard in Saudi Arabia will be set in an area of 50 hectares in Ras Al Khair, and we aim to create over 2000 new job opportunities in the ever-growing market," Al Dhaheri added.

Also India continues to be a strong market for NPCC, where it is currently executing an offshore EPC project for state-controlled Oil & Natural Gas Corporation (ONGC) for its Ratna field.

The workscope for this \$327 million contract involves five wellhead platforms, subsea pipelines and other associated offshore infrastructure.

NPCC is also expected to participate in several ONGC offshore tenders that are likely to be offered over the next few months.

**We are looking forward to record revenues this year — over 30% more than in 2018.**

NPCC chief executive  
Ahmed Al Dhaheri

Expansion: NPCC  
chief executive  
Ahmed Al Dhaheri  
Photo: NPCC



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## INDUSTRY OUTLOOK

# Key role for natural gas in energy transition

**World Energy Congress** told sector can help strike balance between **decarbonisation and energy security**

**GARETH CHETWYND**  
Abu Dhabi

NATURAL gas has an important role in the energy transition but will encounter some bumps in the road along the way, according to participants on a World Energy Congress panel on the global dynamics of gas and unconventional.

A glowing future in terms of supply and demand for natural gas, and production, was signalled by Mubadala Petroleum chief executive Bakheet Al Katheeri.

"There may be some initial tightness up to 2025 but I think we will see annual growth (in supply) of around 7% after this," he said.

Keith Martin, chief executive of trading house Uniper Global Commodities also predicted strong demand for natural gas.

With the abundance of future liquefied natural gas supply augmented by new projects such as Russia's Arctic LNG 2, and other such schemes in Africa, the Middle East and Australia, an important determinant in an increasingly interconnected world will be the freight cost element, Martin suggested.

Its abundance also reinforces the role that gas can play in striking a balance between decarbonisation and energy security and, in the European Union at least, panellists noticed how regulatory policy was allowing natural gas to displace coal in the energy mix.

"We know there is a massive healthy future demand for gas but also that it takes a long time to create supply options", Martin commented, predicting that the most spectacular rise in output would come from unconventional gas sources in China.

"It will go as high as 100 billion cubic metres in the next 10 to 20 years, and we have seen how this can be driven by air quality, as well as decarbonisation," he said.

Peter Coleman, chief executive of of Australia's Woodside Energy noted that there is a lot of associated gas to be developed but expressed a note of caution on the rate of continued growth for unconventional resources.

"You have to ask if... technological breakthroughs will continue at the same pace. I would say not," he said.

Panellists noted that supply-demand disruption can come from unexpected quarters, such as the



Major asset: Woodside's Pluto LNG facility in Australia

Photo: WOODSIDE/AFP/SCANPIX

possibility that the initial public offering by Saudia Aramco could be on such a scale as to affect the availability of capital, while LNG business might prove vulnerable to wider trade frictions.

"There is also uncertainty about elections, such as what the Democrats might do in the White House. This kind of thing can have a big effect, especially in relation to smaller producers," Coleman said.

Hendrik Gordenker, senior corporate vice president of Japanese energy company Jera saw new drivers of growth as LNG becomes a commodity.

"Energy transition technologies, such as carbon capture from gas-fired power, can also play their part in boosting demand for

gas. There is plenty of scope for policies which support natural gas as clean energy," he said.

On the other hand, Godenker also paid heed to the scope for future disruption.

"There are many Democrats who want to ban fracking... now that would have a very significant impact on prices," he noted.

Abu Dhabi's Mubadala Petroleum is among the companies positioned to take advantage of growing markets for natural gas and LNG, with projects in countries including Egypt, Thailand and Malaysia.

"Two thirds of our production is gas and this reflects our strategy to shift toward gas. This is driven by our concerns for the best shareholder return, an energy transi-

tion that will reduce the carbon footprint and longer-term economic sustainability," said Al Katheeri.

Despite the optimism generated by the availability of technology and cheap money for natural gas projects, projects with a longer-term horizon may see the battle toward final investment decision getting more difficult, panellists said.

Coleman said: "If you look post-2050 you have to question the role of hydrocarbons, so there is a tail on natural gas which grows as more investments fall in the period after 2050.

"We have to deal with this too because, if we get that wrong, there will be a shortage of supply along the way," he added.

## India's demand to grow

INDIAN PETROLEUM Minister Dharmendra Pradhan said his country's energy demand is likely to grow by 4.2% per year through to the end of 2035, at a faster rate than all major economies in the world, writes Nishant Ugal.

Pradhan told the 8th Asian Ministerial Energy Roundtable (AMER8) in Abu Dhabi this week that India's share of total global primary energy demand is also expected to double to 11% during the next two decades.

"We are preparing for such a growth path of energy demand in the country," he said.

Pradhan said the Indian government has introduced a number of transformative policies and is significantly expanding its energy infrastructure to match the scale of growing demand for the world's third largest energy consumer.

He said that billions of dollars' worth of investments would be required for India's growing energy sector.

Pradhan added that India is substantially expanding the capacity of its liquefied natural gas terminals, gas-based infrastructure, power generation infrastructure and renewables.

India's LNG regasification capacity stands at more than 30 million tonnes and is expected to reach more than 40 million within a year or two, industry sources told Upstream.

Pradhan said the government is aggressively expanding onshore pipeline infrastructure.

"We have constructed over 16,000 kilometres of gas pipelines and an additional 11,000 kilometres is under construction," he said.

"We have covered over 400 districts and 70% of our population."

Pradhan said the country is "moving towards a gas-based economy by increasing the share of gas from 6% to 15% in its energy mix by 2030".

India's oil demand is expected to rise by 5.8 million barrels per day by 2040, accounting for almost 40% of the overall increase in global demand during the period, according to Opec.

India is projected to see a 3.7% annual growth in oil demand for the period to 2040.

Pradhan also said that India is "on the way to achieving a target of adding 175 gigawatts of renewable energy sources by 2022".

He said that in a move to provide energy access to all in a sustainable manner, the government has committed to reduce the nation's emissions intensity by between 33% and 35% from 2005 levels.

To help reduce its greenhouse gas emissions, India is aiming to have 40% of its electricity generation capacity from non-fossil fuel energy resources by 2030, Pradhan said.





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## Role for CCS in transition

AS well as emphasising renewable energy, DNV GL's 2019 Energy Transition Outlook also highlights the potential role of natural gas and carbon capture and storage (CCS) in helping to secure a rapid energy transition, arguing that "there is no single pathway to a decarbonised energy mix", writes Anamaria Deduleasa.

DNV GL's 2019 Energy Transition Outlook forecasts that gas and renewables will be the only energy sources for which demand is expected to be higher in 2050 compared to levels today.

"A combination of energy sources — primarily gas and renewables — will be the quickest route to delivering a supply of affordable, decarbonised energy in the lead-up to mid-century," the report said.

"Gas will increasingly complement variable renewables, meeting demand in peak periods such as winter in colder climates," it said, adding that by 2050, gas would account for nearly 30% of the global energy supply.

Renewable energy sources are on track to account for more than 80% of total electricity output by 2050 as the build-out of wind and solar plant expands 20-fold.

However, as there is no single pathway to a decarbonised economy. The outlook forecasts a need for CCS, which today is the only available technology to decarbonise hydrocarbon use.

DNV GL warned that CCS would not be employed at-scale until the 2040s "unless governments develop and enact more definitive policies on its use".

"All major routes to successfully decarbonising gas rely on the large-scale uptake of CCS. The future of CCS largely lies in the hands of policymakers setting a higher carbon price than the cost of the technology. Industry can also play a role in stimulating quicker adoption by focusing on finding ways to reduce the cost of CCS technology," said DNV GL Oil & Gas chief executive Liv Hovem.

"Large-scale uptake of CCS technology will unlock significant opportunities for hydrocarbon and renewable energy technologies to work together to decarbonise the energy mix. The energy industry must however also shift its mindset from 'gas versus renewables' to 'gas and renewables' for success."

DNV GL outlook forecasts global oil demand will peak in the mid-2020s, while gas demand will keep rising, but it warns that significant investment will be needed to ensure output meets demand.

According to the forecast, global upstream gas capital expenditure will need to reach \$737 billion in 2025 and \$587 billion in 2050.

## RENEWABLES



Progress: DNV GL Energy chief executive Ditlev Engel

Photo: DNV GL

# Global shift from fossil fuel energy gathers pace

**DNV GL's latest Energy Transition Outlook** also warns slow progress in streamlining regulatory frameworks is holding back **drive to reduce emissions**

## RECHARGE

DARIUS SNIECKUS

London

THE global shift away from a fossil fuel-based power system is gathering pace, with renewable energy sources on track to account for more than 80% of total electricity output by 2050 as the build-out of wind and solar plant expands 20-fold, according to energy consultancy DNV GL's latest Energy Transition Outlook.

However, the 2019 report, launched on Wednesday, underlines that despite market-making advances in wind and solar technology, slow progress in streamlining governmental regulatory frameworks to accelerate the energy transition is putting a drag on cutting emissions to levels that would meet the Paris Agreement goal of holding global warming to 1.5 to 2 degrees Celsius above pre-industrial levels.

"It is important to differentiate between the progress we are making on technology and the pro-

gress we are making on regulation," DNV GL Energy chief executive Ditlev Engel told Recharge before publication of the report.

"The progress on technology is very encouraging — both in terms of the daily impact on the transition and also on the cost [of energy] level — it's very good. So while we are 'technology-optimistic' we remain very much 'climate-concerned'."

DNV GL forecasts the global photovoltaic sector to be producing some 36,000 terawatt hours per year by 2050, and wind farms 17,000 TWh, together accounting for nearly two thirds of all electricity production globally.

However, Engel cautions that unprecedented as the build-out of wind and solar plant continues to be, it still falls "well short" of any climate-steadying effect, with the two resources having to reach

installed capacities of 3 terrawatts and 5 TW respectively by mid-century, according to DNV GL calculations, to "close the gap" on the 1.5 degrees Celsius target.

"If we let technology do its thing there is still another 1 degree Celsius that regulation has to fix," he said, pointing to modelling that suggests the world is currently heading for a 2.4 degrees Celsius temperature rise by 2100.

"Right now we are on a road to a place nobody wants to go. And the wind and solar technology — much as we are predicting a phenomenal uptake — it is still not enough [at current build-out rates]."

"The role of government the world over now is to find the 'other 1 degree Celsius' by finding ways of better implementing the build-out of wind and solar at speed. We need to get the rubber

on the road." DNV GL forecasts the 2 degrees Celsius carbon budget will be exhausted by 2049 and energy-related emissions still at 19 gigatonnes per annum by 2050. At the same time, by its forecast, global energy demand would have begun falling, down 3% from its peak.

"Business as unusual' has to become the new 'business as usual'," said Engel.

"It requires a different mindset on the part of the politicians and on the part of the planning and permitting authorities et cetera."

The report calls on international governments and business leaders to make "immediate and concerted efforts to accelerate action" on the energy transition.

"It's the elephant in the room," said Engel.

They need to determine which energy sources need to be scaled up and down, and how fast."



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## Transition to trump security

SECURITY of supply is starting to be considered less urgent for markets than the need for energy transition in a world in which decarbonisation is regarded as increasingly essential, according to a panel at the World Energy Congress, writes *Anamaria Deduleasa*.

The panel on energy security welcomed a vote by the audience that supported the notion that the need for cleaner energy is a top concern.

"Security of supply was the first important component of energy security (historically) but... the changes in the geography of supply have been very important. The US is now a very large producer of oil, producing more than Saudi Arabia and Russia," president of consultancy SVB Energy International, Sara Vakhshouri said.

"This is significant. Because, if once, political turmoil in the Middle East was an important factor impacting prices, markets and energy security in general; today it not as significant... because emissions are not limited by borders."

The panellists argued balancing energy security with equity and sustainability will change economic models around the world but policies, investments and sound leadership are needed.

Jonathan Elkind, fellow and senior research scholar at the Center on Global Energy Policy at the University of Colombia, said: "The way we make the transition to a clean energy economy is central. If we are going to succeed in responding adequately and on time to the climate issue, we must avoid creating a greater systemic vulnerability for energy security."

He said it is not energy transition that creates volatility and uncertainty but volatile and uncertain political environments around the world.

"The challenge... is to ensure that we have policies, investments and leadership from companies that can enable changes," Elkind said.

To address energy security and energy transition, panelists emphasised the importance of technology but noted barriers are in place.

"Trade is central to get deployment of (clean energy) technology around the world, particularly in emerging economies. In a time when trade itself is under threat, including from the US, we need to think carefully about what is at stake," Elkind said.

Tatiana Mitrova, director of Moscow School of Management Skolkovo, said "there have been incredible advances made in technology" that have led to significant falls in the cost of electricity from renewables.

Sun Xiansheng, secretary general at the International Energy Forum, argued that while politics, money and technology must be considered, environmental concerns have to be addressed globally.

## POLITICS



Home fire: according to Paul Smith Lomas, chief executive of UK-registered development charity Practical Action, almost 40% of the world's population currently cooks on an open fire

Photo: REUTERS/SCANPIX

# Challenges remain for sustainable energy goals

**World Energy Congress** told of hurdles in achieving UN's sustainable development target

AMANDA BATTERSBY

Abu Dhabi

THE United Nations Sustainable Development Goal 7 has a simple premise: ensure universal access to affordable, reliable, sustainable and modern energy for all.

However, significant challenges remain to implementing this goal, not least access to finance and especially to affordable financing.

That is certainly the main headache facing Cambodia, as the Southeast Asian nation moves to boost its use of renewable energy, according to Sok Khavan, Secretary of State at the Ministry of Mines & Energy.

"The biggest challenge is financing. We also talk to renewable [energy] companies and the first thing they tell us is 'financing, access to financing and access to cheap, affordable financing,'" he said.

"That is something that, I think, the international communities and development partners can really help (with) and will benefit developing countries like Cambodia that don't have the resources to subsidise, to finance, that kind of project.

Another key challenge is that

most of the world's remaining 900 million people who still do not have access to electricity live in remote rural locations, delegates at the World Energy Congress were told on Wednesday.

"We will need a different way of engaging and reaching that population," said Paul Smith Lomas, chief executive of UK-registered development charity Practical Action.

"Off-grid solar renewable energy systems provide a real solution but at the moment the money isn't even beginning to scratch the surface," Smith Lomas said.

"Less than 1% of World Bank funding currently goes to off-grid electrification."

He said the "really big beast in the room, the real challenge" is that almost 40% of the world's population currently cooks on an open fire.

"The indoor air pollution produces real effects. It kills more people than AIDS, tuberculosis and malaria together," said Smith Lomas.

He told the session entitled

'Accelerating action on the SDGs and the carbon+ agenda' that an estimated \$4 billion is required to make a real difference towards providing alternatives to cooking on open fires.

So-called clean cooking is another of the sustainable development goals.

Elana Laichena, whose company Acaca Innovations produces fuel briquettes made of recycled sugar cane waste that can be used instead of charcoal or wood for cooking, argues that such alternative solutions need to be encouraged.

There can be a lack of government support for such initiatives, plus would-be investors often shy away from clean cooking products even if they'll happily back some renewable energy schemes, according to Laichena.

"What is the solution? Because I don't think it's really viable to allow people to continue dying because of how they're cooking," she said.

Calling for increased government support, Laichena said in one nation her product attracts

16% value added tax whilst charcoal and firewood do not.

"We're not even talking about subsidies but at least just remove the taxes. Or, if you want to tax something, tax dirty fuels."

The United Nations four years ago released 17 SDGs as part of the 2030 Agenda for Sustainable Development. More than 195 countries today have committed to these goals that contain a total of 169 targets and 233 indicators.

"The main objective of the SDGs is to look at eradicating issues such as poverty and inequality," said session moderator Hanife Ymer of the Mubadala Investment Company.

Khavan said that, while Western governments and those in developed countries were driving the agenda, they were often lacking in action or commitment towards the goals.

Smith Lomas went further, saying that such governments should be held to account.

"Commitments are great but action needs to follow. Society has a real role to hold government to account," he said.