WORLD ENERGY COUNCIL

24th CONGRESS
ABU DHABI

The official World Energy Congress 2019 show daily by
upstream RECHARGE

Monday, 9 September 2019

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H.E. Eng. Suhail Al Mazrouei Photo: AFP/SCANPIX

Welcome to the 24th World Energy Congress

On behalf of the Government of the United Arab Emirates, I would like to welcome you to Abu Dhabi for the 24th World Energy Congress — the first edition to be held in the Middle East in the event's 95-year history.

This truly global gathering comes at a time of great transition in the energy sector, presenting challenges and opportunities that we must, as an industry, address.

It is through foresight, commitment and unity that we can and will collectively meet the growing energy demands of the world.

The United Arab Emirates is honoured to host the 24th World Energy Congress, which builds on and reflects the ambitious and dynamic energy transition the country is going through at present.

As well as two of the largest solar generation projects in the world, we have also embarked on a large-scale civil nuclear programme while further developing our oil, gas and petrochemical projects.

Under the UAE's 2050 Energy Strategy, generation from clean energy sources is set to increase to make up a 50% share of generation capacity, and we are also investing heavily in energy efficiency initiatives.

Innovation is the cornerstone of the progress we are making in clean energy development and aligned sectors such as transportation, technology and water, which is why we placed it at the heart of the Congress programme and the exhibition.

Political and industry support for the 24th World Energy Congress from UAE leadership has been unprecedented and we are honoured to receive such endorsements.

As well as the patronage of His Highness Sheikh Khalifa Bin Zayed Al Nahyan, President of the United Arab Emirates, the Congress has the backing of host sponsors from across the energy and industry spectrum — Abu Dhabi Department of Energy, ADNOC, DEWA, ENEC, EWEC and Mubadala — and we thank them again for their generous commitment.

I trust that the next four days will be engaging, informative, educational and inspiring and I also hope that the topics for discussion and networking opportunities will occasionally challenge your thinking and perhaps ultimately drive action as we work through the great energy transition together for the benefit of future generations.

Yours faithfully,

H.E. Eng. Suhail Al Mazrouei
President, 24th World Energy Congress
UAE Minister of Energy & Industry

Welcome from the World Energy Council

Distinguished Ministers, Partners, Delegates and Members, I am pleased to welcome you to the 24th World Energy Congress, here in Abu Dhabi. The World Energy Council has tailored an exciting four-day programme under the theme Energy for Prosperity.

In today's era of energy abundance, we want to ensure that clean and renewable energy flows, so that all nations, people and the earth will flourish, leaving no one behind.

As the first World Energy Congress to be hosted by a Middle Eastern country, this event represents a significant milestone.

Not only is the region a major energy player, it is also undergoing critical transition efforts to sustainable energy.

Today, we face the challenge of just under 1 billion people still not having access to energy, the slowing of international co-operation and climate change.

Meeting these challenges means accelerating on both the policy and innovation fronts.

The World Energy Congress stands at the heart of the global energy transition, bringing governments, industry, innovators and academia together to share experiences and insights to deliver a successful energy transition.

As part of this endeavour, the Council is proud to present the SET100 Awards finalists, in co-operation with the German Energy Agency, dena. These are the most promising start-ups from our global network.

Finally, we are proud to launch the newest Insights from the World Energy Congress: the 2019 World Energy Scenarios and 2019 Energy Trilemma Index.

The latest version of our Energy Scenarios is the result of a strategic initiative to refresh our global foresight to 2040. Focused on innovation, these Scenarios will also look at possible Constellation of Disruptions that have the potential to change the future of energy. Our 2019 Energy Trilemma Index has improved methodology to enable countries to evaluate their performance by comparing past records. These publications contribute to the Council's essential Transition Leader's Toolkit.

The first World Energy Congress took place in 1924 and many aspects that were true for the first edition, are true today. In particular, we face shared, mounting challenges in a highly politicised international scene. The Congress provides a unique platform to explore pathways to navigate those critical challenges and deliver a sustainable global energy system for the prosperity of all.

Welcome to the 24th World Energy Congress.

Dr. Christoph Frei
Secretary General & CEO
World Energy Council

Dr Christoph Frei Photo: WORLD ENERGY COUNCIL

Welcome to the 24th World Energy Congress

Welcome to the 24th World Energy Congress on behalf of the Organising Committee. In the past few years, since being announced as the 2019 Congress host, we have worked diligently and creatively to bring you an event which we feel will be unique, insightful and thought-provoking.

All 360 degrees of the energy ecosystem will come together this week. Complementing our very essential sector, we have participation in our packed programme and exhibition from the investment, logistics, power, construction, hi-tech, telecoms, mobility and consulting sectors as well as innovators, creators and experts.

With the largest number of ministerial delegations ever assembled, the Congress will be the place where governments come together, and with the IEF and OPEC — JMMC Ministerial meetings taking place alongside the Congress, we will gather the finest minds in the industry to address the challenges, the solutions and the future opportunities.

The 24th World Energy Congress will be an embracing environment for new technology, start-ups and entrepreneurs.

Together they form a critical and essential part of the energy ecosystem, and we have brought the top 100 energy transition innovators from around the world to showcase their products and services at the Start-Up Energy Transition Zone. (SET-100)

I want you to enjoy listening to dynamic thought leader discussion in the coming days. Take time to explore new innovations and experience many unique elements throughout the venue.

Your participation is warmly welcomed and I hope this will be a Congress you will long remember and appreciate as a fresh turning point in the value and appreciation of our industry.

Yours faithfully,

H.E. Dr. Matar Al Neyadi
Chairman, 24th World Energy Congress Organising Committee
Undersecretary, UAE Ministry of Energy & Industry

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

My team and I want to welcome you to Abu Dhabi, home to the 24th World Energy Congress for four special days in September 2019. This event has been many years in the planning, spanning registrations, programme development, speaker management, exhibition management, sponsorship coordination and many other functions that come together to make a global event successful and ready for you.

I would like to take this opportunity to thank everyone involved and remind you that every contribution has been greatly appreciated.

The spotlight will be on Abu Dhabi this week; the nation's capital, the hub of innovation and the centre of the global energy debate.

Our doors are open to welcome 15,000 attendees — including 4,000 delegates — from 150 countries, 70 ministers, 500 C-suite executives, 300 exhibitors and more than 500 journalists.

Each one of you is a valuable contributor to the energy discussion; a rich and informative dialogue that will help shape the future of energy. We warmly await your interactive participation this week.

When we consider the legacy of the 24th World Energy Congress, we are not looking five or even 10 years down the road, but decades and beyond.

This is also why we wanted to include the most promising students and young energy professionals — the energy leaders of the future — from around the world in the Congress, involve them in discussions and understand their perspectives.

It is when we hear different opinions, understand each other's viewpoint and unite in our desire for a new energy future that we truly make a difference.

We welcome your fresh thinking, your experiences and your inspiration as we collectively take action to build a more holistic energy future for everyone.

Yours faithfully,

H.E. Eng. Fatima Alfoora AlShamsi
CEO, 24th World Energy Congress Organising Committee

H.E. Eng. Fatima Alfoora AlShamsi
Photo: WORLD ENERGY CONGRESS

Congress Programme

Monday 9 September

08:00 — 09:15 **Pre-congress workshop** *ICC Fishbowl*
World Energy Scenarios: Navigating disruptive innovation in the era of prosperity
Moderator: **Angela Wilkinson**, Senior Director, Scenarios and Business Insights, World Energy Council
Speakers: **Dr. Christoph Frei**, Secretary General & Chief Executive Officer, World Energy Council
Muqsit Ashraf, Senior Managing Director, Global Energy Lead, Accenture Strategy
Ged Davis, Executive Chair Scenarios, World Energy Council; President & Chief Executive Officer, Forescene SA
Dr. Tom Kober, Head, Energy Economics Group, Paul Scherrer Institute

09:15 — 09:45 **Beyond Petroleum 2.0** *ICC Fishbowl*
Interviewed by: **John Defterios**, Emerging Markets Editor and Anchor, CNN
Speaker: **Edmund John Phillip Browne**, Executive Chairman, L1 Energy

10:00 — 12:00 **Congress inauguration ceremony** *ICC Plenary*

10:00 — 10:10 **Welcome address** *ICC Plenary*
H.E. Suhail Al Mazrouei, Minister of Energy and Industry, United Arab Emirates

10:10 — 10:20 **Welcome address**
Younghoon David Kim, Chair, World Energy Council

10:20 — 10:40 **Keynote Address**
Capturing opportunity through creative partnership
H.E. Dr. Sultan Ahmed Al Jaber, Minister of State and Chief Executive Officer, ADNOC - Abu Dhabi National Oil Company

12:00 — 13:00 **Break**

13:00 — 14:00 **Global Perspectives** *ICC Plenary*
The outlook for hydrocarbon economies
Moderator: **Dr. Daniel Yergin**, Vice Chairman, IHS Markit
Speakers: **H.E. Sh. Mohamed bin Khalifa bin Ahmed Al-Khalifa**, Minister of Oil, Bahrain
H.E. Suhail Mohamed Al Mazrouei, Minister of Energy and Industry, United Arab Emirates
H.E. Mohamed Arkab, Minister of Energy, Democratic Republic of Algeria
Dan Brouillette, Deputy Secretary, United States Department of Energy

14:00 — 14:30 **Interview** *ICC Plenary*
HRH Prince Abdulaziz Bin Salman Al Saud, State Minister of Energy Affairs, Kingdom of Saudi Arabia
Interviewer: **Helima Croft**, Managing Director, Royal Bank of Canada

14:30 — 15:45 **New visions of energy: Succeeding in a context of disruption** *ICC Plenary*
Moderator: **John Defterios**, Emerging Markets Editor and Anchor, CNN
Speakers: **H.E. Awaidha Al Marar**, Chairman, Abu Dhabi Department of Energy
Claudio Descalzi, Chief Executive Officer, ENI
Dr. Fatih Birol, Executive Director, International Energy Agency (IEA)
Francesco La Camera, Director General, IRENA
Isabelle Kocher, Chief Executive Officer, ENGIE
Patrick Pouyanne, Chairman and Chief Executive Officer, TOTAL

16:00 — 17:15 **Parallel sessions**
Deep decarbonisation: New strategies for net zero carbon emissions *ICC Fishbowl*
The role of hydrogen in a sustainable and secure future *Hall 4, Block 2*
World energy scenarios: New energy narratives *Hall 4, Block 3*
Energising the circular economy *Conference Room A, Block 5*
A new dawn for nuclear? *ICC WELS*
The energy consumer 4.0 *Conference Room A, Block 6*
Megaprojects: Global impact, global implications *Conference Room A, Block 4*

16:00 — 17:15 **Special Session** *ICC Plenary*
New regional perspectives: The role of gas in the transition to a lower carbon economy in the MENA region
Moderator: **Helima Croft**, Managing Director, Royal Bank of Canada
Speakers: **H.E. Tarek El Molla**, Minister of Petroleum and Mineral Resources, Arab Republic of Egypt
H.E. Yury Sentyurin, Secretary General, Gas Exporting Countries Forum (GECF)
Fatema M. Al Nuaimi, Chief Executive Officer, Abu Dhabi National Oil Company (ADNOC) LNG
Gerald Schotman, EVP Joint Ventures, Royal Dutch Shell
Majid Jafar, Chief Executive Officer, Crescent Petroleum
Olivier Le Peuch, Chief Executive Officer, Schlumberger Limited
Saji Sam, Partner , Oliver Wyman Group

17:15 — 17:30 **Break**

17:30 — 18:45 **Parallel Sessions**
Scaling new heights: Global renewables outlook *Hall 4, Block 1*
The age of digitalisation: Reimagining energy systems *Conference Room A, Block 5*
Beyond batteries: Reinventing energy storage *Hall 4, Block 2*
New technology frontiers *Hall 4, Block 3*
Refueling the talent pipeline: The energy professional of the future *Conference Room A, Block 6*
Reshaping the future of mobility *ICC Fishbowl*
New regional perspectives: Designing attractive energy markets for Latin America and the Caribbean *ICC WELS*

World Energy Issues Monitor 2019 — Managing the Grand Energy Transition

The World Energy Issues Monitor provides a snapshot of what keeps CEOs, Ministers and experts awake at night in nearly 90 countries.

The monitor helps to define the world energy agenda and its evolution over time.

It provides a high-level perception of what constitute issues of critical uncertainty, in contrast to those that require immediate action or act as developing signals for the future.

It is an essential tool for understanding the complex and uncertain environment in which energy leaders must operate, and a tool through which one can challenge one's own assumptions on the key drivers within the energy landscape.

This tenth iteration of the monitor is based on insights provided by nearly 2,300 energy leaders to provide 50 national assessments across six world regions.

In addition to this report, the interactive online Issues Monitor tool allows the visualisation of the data that underpins the Issues Maps. This tool has been developed in collaboration with our Project Supporter ARUP

Where specific narratives explaining the country data exist, they are included in the tool.

Christoph Frei, Secretary General, World Energy Council said: "For 10 consecutive years, the World Energy Issues Monitor has been gathering the perspectives of energy leaders in public and private sectors from 86 countries across the six regions on 42 key issues that shape and drive our energy system.

"The Issues Monitor has become the energy leaders' foremost platform to identify, share and track critical issues surrounding the Energy Transition and assess which ones keep them most awake at night or busy at work and how these change across time and space."

To access the all-new Issues Monitor online tool, go to: http://www.im.worldenergy.org

Global Foresight Refresh Forum in partnership with Accenture Strategy

This Workshop is a milestone in the Council's strategic initiative to refresh its global foresight, carrying over the focus from previous forums. The workshop aimed at updating scenarios, building global stories to 2040.

The World Energy Council, in partnership with Accenture Strategy, hosted the Global Foresight Refresh Forum on 4 and 5 April.

This Workshop represents a milestone in the Council's strategic initiative to refresh its global foresight and support energy leaders in defining and driving a successful energy transition.

Carrying over the focus from previous forums, the workshop aimed at updating scenarios, building global stories to 2040 and exploring different opportunities for disruptive innovations.

This was an opportunity for leaders from around the world to engage with and champion one of 12 key themes explored as part of the Council's energy refresh initiative.

Across the two-day workshop, participants benefited from the Council's collaborative approach to contribute specialised inputs and take away valuable insights.

A critical step on the road to the 24th World Energy Congress, the Global Foresight Refresh Forum continues to provide leaders with a collaborative platform for dialogue and to shape long term energy policy and strategy.

Objectives of the workshop:

- Promote knowledge exchange on main drivers of change, what is inevitable and what is uncertain in future developments to 2040
- Clarify plausible energy future in 2040 and build global stories within each of the Council's archetypes — Modern Jazz, Unfinished Symphony and Hard Rock
- Contrast and enrich global scenarios with qualitative indicators and metrics
- Explore the role of energy innovations

Outcomes:

The insight from the workshop will be used to synthetise and prepare the draft of updated scenarios with global stories that will be shared with the scenarios working group and participants for review and further development.

The new set of global stories will be quantified later by the modelling partner The Paul Scherrer Institute.

- *The global foresight refresh 'slimline' report will be launched at the 24th World Energy Congress, in Abu Dhabi in September 2019.*

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FIELD DEVELOPMENT

Adnoc steps up the pace with

Abu Dhabi giant moving fast to boost production at **onshore and offshore** oil and gas assets

NISHANT UGAL
New Delhi

ABU Dhabi National Oil Company (Adnoc) is swiftly moving ahead on a series of onshore and offshore development projects as it aims to significantly ramp up its oil and gas production capacity by 2030.

The state-owned giant is investing billions of dollars in a programme to boost its oil production capacity to up to 4 million barrels per day by 2020, and to 5 million bpd by 2030.

In addition, as a part of an ambitious effort to boost domestic gas production, it has embarked on a $20 billion-plus plan to develop sour gas projects, including the Hail & Ghasha, Dalma, Nasr and Shuwaihat fields.

Adnoc presently produces more than 10.5 billion cubic feet per day of natural gas and aims to add more than 1.5 Bcfd of incremental production from offshore sour gas developments over the next five years.

The oil and gas company has issued tenders this year for multiple packages involving its giant Hail and Ghasha sour gas development, which together are likely to be worth upwards of $10 billion.

Adnoc chief executive Sultan Ahmed al-Jaber said earlier this year that, "as one of the world's largest sour gas projects, (the Hail & Ghasha development) will make a significant contribution to the United Arab Emirates' objective to become gas self-sufficient and transition to a potential net gas exporter".

The sour gas development is centred around new artificial drill centre (DC) production facilities located at each field, which will route well fluids via subsea pipelines to a new common Ghasha offshore processing facility.

Most contracts for the tender packages involving the giant gas development project are likely to be awarded by the end of this year.

In addition, Adnoc is also progressing on its $1.5 billion-plus Dalma sour gas development, and is expected to finalise engineering, procurement and construction contracts for this project within a month or two.

Adnoc recently awarded Norway's Aker Solutions a Nkr700 million ($78 million) contract to deliver umbilicals for Dalma.

Developing the emirate's offshore sour gas assets is seen as a crucial element of Abu Dhabi's Gas Master Plan and Adnoc's 2030 strategy, which envisage boosting domestic gas availability.

In addition to the sour gas reservoirs, Adnoc is also making progress on the planned development of the Umm Shaif gas cap offshore project. It is also expected to further ramp up gas production from the large Shah onshore gas project.

On top of these conventional production efforts, Adnoc aims to reach a production target of 1 Bcfd from its unconventional gas reserves before 2030.

Adnoc signed an agreement with France's Total last year, awarding it a 40% stake in the Ruwais Diyab unconventional gas concession. With several ongoing projects, Abu Dhabi has emerged as a hotspot for engineering, procurement and construction activity in the region, offering billions of dollars' worth of projects to contractors.

The emirate presently has an oil production capacity of 3.5 million bpd and is aiming to boost its production by 500,000 bpd by next year.

The state-owned giant is understood to be working on several long-term development plans for its Umm Shaif, Lower Zakum and Upper Zakum offshore oilfields.

Most of the long-term developments are still thought to be in the works, with the conceptual part of the workscope likely to be executed within a year or two, sources said.

Adnoc is already working on the development of the Belbazem oilfield and is understood to be carrying out a front-end engineering and design competition for work on this project.

On the onshore front, Adnoc Onshore is also expected to carry out several expansion projects.

Adnoc Onshore is already expanding its Bab field, which is likely to boost and sustain oil production at 485,000 bpd.

Along with the Bab expansion project, Adnoc is also carrying out a separate tender process for a $500 million contract that covers

Looking ahead: Adnoc chief executive Sultan Ahmed al-Jaber

project expansion plans

Photo: ADNOC

work on its Bab sustainable facilities project.

It is also executing several expansion projects on its North East Bab asset, which involves the Al-Dabbiya field - which is actually located in shallow water - and the Rumaitha and Shanayel onshore fields.

As well as pursuing its own development efforts, Adnoc is also seeking to encourage new investment in Abu Dhabi's upstream sector by international players through licensing rounds, the first of which concluded earlier this year with the award of five out of six blocks.

The state operator currently has a second round under way for which bids are expected to be submitted in November, involving three offshore and two onshore blocks.

The blocks will be awarded after approval by Abu Dhabi's Supreme Petroleum Council. The acreage covers more than 34,000 square kilometres, with the five blocks together holding 290 targeted reservoirs across 92 prospects and leads, Adnoc has said.

The tracts on offer are offshore blocks 3, 4 and 5, and onshore blocks 2 and 5.

Adnoc boss Jaber said at the time of its launch that the new round provides a "major opportunity for both new and existing partners" to help further unlock Abu Dhabi's hydrocarbon resources.

In the first round, offshore blocks 1 and 2 were awarded to a consortium led by Italy's Eni and Thailand's PTTEP, onshore Block 1 was awarded to Bharat Petroleum Corporation and Indian Oil, while onshore Block 3 was awarded to Occidental Petroleum of the US and onshore Block 4 went to Japanese company Inpex.

CCUS drive set for expansion

ABU Dhabi National Oil Company (Adnoc) plans to expand its carbon capture, utilisation and storage (CCUS) programme as it seeks to reduce greenhouse gas emissions from its operations by 10% in another four years, while also improving oil recovery from its ageing oilfields, *writes Nishant Ugal.*

The Abu Dhabi state-owned operator has laid down plans to spend $1.8 billion by 2023 in projects involving CCUS, on the abatement of flaring and reducing unintended emissions.

It has already made investments of up to $2.3 billion over the past five years in CCUS projects and on other efforts to reduce its carbon footprint.

Adnoc is planning to expand the capture of carbon dioxide from its operations for use in Enhanced Oil Recovery (EOR) projects.

The company said earlier this year that from 2021 it "will gradually increase the utilisation of CO_2, reaching a total of 2.3 million tonnes per annum by 2025, by capturing additional CO_2 from its gas processing plants and injecting it into different onshore oilfields".

Adnoc initiated its CCUS programme 10 years ago with a pilot project aimed at injecting CO_2 for EOR projects.

Three years ago, the Abu Dhabi clean energy company Masdar teamed up with Adnoc to launch Al Reyadah, which is now owned by Adnoc.

The state-owned giant's Al Reyadah facility is already capable of capturing 800,000 tpa of CO_2 and injecting those volumes into reservoirs in the Rumaitha and Bab onshore oilfields to boost oil recovery.

The increased use of CCUS technology for EOR will have a double environmental benefit, Adnoc said earlier this year.

"Replacing gas with CO_2 injection into Adnoc's maturing fields will allow the more productive use of valuable, cleaner-burning, lower emissions natural gas, whether for power generation, desalination or as petrochemicals' feedstock," the company said.

In addition, CCUS projects would "lock away significant amounts of CO_2 that would otherwise have been absorbed into the atmosphere," it added.

Adnoc has set a target of positioning itself as one of the industry's lowest emitters of greenhouse gases and limit the impact of its operations on the environment.

The company argued this year, citing International Association of Oil & Gas Producers (IOGP) Environmental Performance Report for 2017, that it ranked among the top five lowest greenhouse gas emitters in the industry.

Adnoc said its emissions were less than half the industry average, at 39.68 million tonnes of CO_2 equivalent, and that it had one of the lowest methane intensities of 0.01 %.

MIDDLE EAST

Prince Abdulaziz gets Saudi oil minister role

Replacement for Falih at Energy Ministry played leading role in negotiations within Opec

NASSIR SHIRKHANI
Abu Dhabi

SAUDI Arabia has appointed Prince Abdulaziz bin Salman, a son of the king, as Energy Minister as the world's largest crude exporter moves closer to a stock market listing of state oil company Saudi Aramco.

Prince Abdulaziz replaces Khalid al-Falih, in the key role at the head of the ministry, which sets policy and co-ordinates efforts within Opec to stablise the oil market.

Falih had already been replaced as Aramco chairman amid Saudi moves to streamline management of the energy sector ahead of the delayed initial public offering (IPO) of shares in Aramco, the world's biggest oil company.

Efforts to get the listing off the ground are reported to be gathering pace under plans by Crown Prince Mohammed bin Salman to diversify the Saudi economy to make it less reliant on oil revenues.

Prince Abdulaziz has significant experience of the oil sector, having long been an adviser to the Energy Ministry and playing a leading role in negotiations within Opec.

Industry analysts said Saudi oil policy is likely to remain unchanged after the ministerial change, although Aramco is seen as likely to become more independent of the Energy Ministry in Riyadh as part of a radical shake-up of the government over the past week.

Prince Abdulaziz helped negotiate the current agreement between Opec and non-Opec producers, known as Opec+, to curb crude supplies to prop up faltering oil prices.

The prince, a half-brother of the Crown Prince, was named minister of state for energy affairs in 2017.

He had worked closely with both Falih and former oil minister Ali al-Naimi for years as his deputy.

The recent Cabinet changes have also seen the promotion of Yasser al-Rumayyan, who heads the country's sovereign wealth fund, PIF, to be the new Aramco chairman.

Saudi Arabia is reported to have cut its oil production to less than 10 million barrels per day — 500,000 bpd below its quota — as part of efforts to support oil prices.

The Crown Prince expects Aramco to be valued at more than $2 trillion when it does list although analysts see $1.5 trillion as more realistic.

The original IPO plan, announced in 2016, was to sell up to 5% of Aramco on the Riyadh stock market and at least one international market.

The IPO is central to the Crown Prince's Vision 2030 to transform the Saudi economy in a bid to create more jobs for a fast growing population.

Plans for the Saudi Aramco IPO were revived following positive investor reaction to an over-subscribed bond sale by the state oil company in April. Aramco reported recently its profit fell 12% in the first half of its financial year to $46.9 billion due to weaker global oil prices.

Despite the drop, it is still said to remain the most profitable company in the world.

New role: Prince Abdulaziz bin Salman has been appointed Saudi Arabia's new Energy Minister Photo: AFP/SCANPIX

Oil price ends week on a high

OIL prices ended last week on a strong footing, posting their biggest weekly gain since July as the US central bank vowed to act to sustain economic growth in the world's biggest economy, *writes Nassir Shirkhani*.

Federal Reserve chairman Jerome Powell said the most likely outlook for the US and global economies was continued moderate growth, while adding that the Central Bank was monitoring "significant risks".

His comments came after the release of a lacklustre US jobs report that had raised recessionary fears.

West Texas Intermediate for October delivery was up 22 cents on Friday in New York, ending the week at $56.52 per barrel.

International benchmark Brent for November delivery added 59 cents to settle at $61.54.

Both benchmarks had been hit earlier by concerns over falling US job growth and continued US-China trade tensions.

The weekly oil market strength followed data by the Energy Information Administration (EIA), which said on Thursday that US crude inventories fell sharply the previous week for a third consecutive week.

The prolonged trade dispute between the US and China, the world's second-largest oil consumer, has had a dampening effect on oil prices, which have been sustained by supply cuts co-ordinated by Opec and non-member producers, such as Russia.

ExxonMobil in Vaar pact

EXXONMOBIL and Vaar Energi have signed an exclusivity agreement in relation to the possible purchase of assets from the US supermajor's Norwegian North Sea portfolio, according to Upstream's sister publication DN.

A spokesman for Vaar, created by the merger of Point Resources and Eni Norge, confirmed the ongoing talks to Upstream, clarifying that the agreement covered non-operated assets.

ExxonMobil's Norwegian assets have production of about 150,000 to 160,000 barrels of oil equivalent per day from 12 non-operated fields, including Snorre, Grane and Ormen Lange, making the US supermajor the country's fifth-largest oil and gas producer.

Upstream previously reported, that given the estimated value of between $3 billion and $4 billion indicated by analysts, the number of companies with enough financial clout to buy the entire portfolio would likely be limited to a handful of players.

H.E Abdulla Al Maeeni, ESMA Director General

> *"As the National Standards Body of the UAE, we take lead in establishing technical regulations geared to support the UAE Vision. International best practices and latest innovative technologies in the energy sector provides valuable insights in making sure that the country is at par globally in safeguarding consumers, industries as well as the national economy."*

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RUSSIA

Partners give go-ahead to Arctic LNG 2 project

Final investment decision for Novatek-led scheme on Russia's **Gydan Peninsula**

AMANDA BATTERSBY
Abu Dhabi

RUSSIAN independent Novatek and its Arctic LNG 2 partners have taken the final investment decision on the large liquefied natural gas scheme on the Gydan peninsula.

Capital expenditure to launch the full three trains with combined capacity of 19.8 million tonnes per annum is estimated at $21.3 billion in Russian roubles equivalent, operator Novatek said.

The first of the three trains — each of equal nameplate capacity — is set to start up in 2023, with the second a year later and the third in 2026.

"Arctic LNG 2 employs an innovative concept using gravity-based structures (GBS) and provides for localising the majority of equipment manufacturing and materials fabrication in Russia," Novatek said.

"The GBS construction, assembly and installation of LNG modules will be performed at Novatek-Murmansk's LNG Construction Centre located near Belokamenka in the Murmansk region."

Novatek chairman Leonid Mikhelson said: "We have taken another step forward in our goal to become one of the largest LNG producers in the world by approving the final investment decision on our second large-scale LNG project."

The first was Yamal LNG, which is already operational.

"We are confident that the accumulated construction experience, state-of-the-art technologies, proven logistics solutions and partnerships with best-in-class international companies will ensure the effective implementation of our new LNG project.

"Our long-term strategy is to develop our vast low-cost hydrocarbon resources on the Yamal and Gydan peninsulas, as well as to maximise our cost competitiveness across LNG markets," added Mikhelson.

Novatek has a 60% stake in Arctic LNG 2, with French supermajor Total holding a direct 10% stake but also an 11.6% indirect stake through its 19.4% holding in Novatek itself, which translates to an aggregated economic interest of 21.6% in the project.

China National Petroleum Corporation and China National Offshore Oil Corporation each hold 10%, with Japan Arctic LNG — a consortium of Japanese players Mitsui and Jogmec — also on 10%. "Arctic LNG 2 will leverage the success of the Yamal LNG project and will deliver competitive LNG to the markets in four years' time," said Patrick Pouyanne, Total's chief executive.

"Arctic LNG 2 adds to our growing portfolio of competitive LNG developments based on giant low-cost resources primarily intended for the fast-growing Asian markets."

The French player did not refer to the capital budget but said the project has "very low upstream costs" from the development of the giant resources from the Utrenneye onshore gas condensate field.

The installation of three concrete GBS in the Gulf of Ob will contribute to a significant capital expenditure reduction — more than 30% per tonne of LNG — compared to Yamal LNG, according to Total.

Also, the close proximity to Yamal LNG will allow Arctic LNG 2 to leverage synergies with existing infrastructure and logistics facilities.

Arctic LNG 2 production will be delivered to international markets by a fleet of ice-class LNG carriers that will be able to use the Northern Sea Route and the transshipment terminal in Kamchatka for cargoes destined for Asia and the transshipment terminal close to Murmansk for cargoes en route to Europe. Nikolai Novikov, senior analyst at consultant Wood Mackenzie noted: "Novatek keeps delivering on its promises and is on schedule with commissioning in 2023.

"This FID brings Novatek closer to its long-term strategy of maximising cost competitiveness across LNG markets and becoming a global LNG player."

He added: "Novatek played the safety card by ordering the topsides modules for Train 1 at Chinese yards. The next steps for Novatek will be contracting the remaining equipment, finalising the financing structure and deciding if it wants to attract a last partner in the project."

Progress: Novatek chairman Leonid Mikhelson Photo: REUTERS/SCANPIX

Sakhalin 1 moves on LNG plant

EXXONMOBIL, Rosneft and their partners in the Sakhalin 1 development in Russia's far east have decided to build a liquefied natural gas plant to commercialise offshore gas reserves, *writes Amanda Battersby.*

Igor Sechin, president of Russian state oil giant Rosneft, told an economic forum in the far east port city of Vladivostok that the plans - which stop short of a final investment decision - call for construction of a plant with output of 6.2 million tonnes per annum of LNG.

The single-train liquefaction facility will be located near the port of De-Kastri in the Khabarovsk region, which already hosts the Sakhalin 1 oil export terminal that is linked via a dedicated pipeline to the north of Sakhalin Island.

Sakhalin 1 is operated by Exxon Neftegaz, where US supermajor ExxonMobil and Japan's Sodeco each holds 30%, with the remaining shareholding of 40% split equally between Rosneft and India's ONGC Videsh.

Exxon Neftegaz since 2016 has been working on the design of the plant in De-Kastri and optimisation of required investments, while Rosneft researched an alternative option to build an LNG plant in the south of Sakhalin Island, close to the existing Sakhalin 2 LNG facility operated by Gazprom-led Sakhalin Energy.

According to Exxon Neftegaz, pre-front end engineering and design and some FEED work on the De-Kastri plant was completed early last year.

However, the project is understood to require the approval of Russian authorities as Sakhalin 1 is operated under a production sharing arrangement.

The project has also met with opposition from Russia's Gazprom, which wants to buy Sakhalin 1 gas for feedstock at the Sakhalin 2 LNG plant.

Exxon Neftegaz in 2018 said that new gas wells would be drilled from the existing Orlan offshore platform and the Chayvo onshore site into offshore reservoirs in the Okhotsk Sea using extended reach technology.

Untreated gas would then flow to a new processing plant to be built at the Chayvo onshore oil and gas facility to remove water and bring it to market specifications, before it is pumped to De-Kastri.

Sechin last week confirmed that Japan would remain the prime market for Sakhalin 1 LNG volumes.

Decision: Rosneft president Igor Sechin

Photo: REUTERS/ SCANPIX

Total eyes UK wind sector

FRANCE'S Total has signalled its interest in entering the UK offshore wind sector, with chief executive Partick Pouyanne highlighting the rapid emergence of floating wind technology.

Pouyanne last week in Aberdeen confirmed the French group's ambitions in the world's largest offshore wind market, singling out plans by Scotland to offer new development leases.

"Total intends to participate in the coming round," Pouyanne said, without giving further details.

The UK is poised for a new round of leasing off England and Wales, with a parallel process under way in Scotland that is expected to result in leases being awarded in 2020.

Pouyanne pointed out the rapid advance of floating technologies as he predicted offshore wind will be "an engine of growth" for the North Sea in the years ahead.

"It offers size, it is more and more competitive," he said.

Confirmation of Total's ambitions in the UK follows its first foray into offshore wind, an unsuccessful bid in conjunction with Orsted for the 600-megawatt Dunkirk zone off France.

Total joins a growing roll-call of oil and gas-led groups seeking to deepen their offshore wind footprints, with Shell and Equinor the most prominent.

The French player is already active in solar photovoltaic and onshore wind, the former via US module group SunPower and the latter through its Total Eren development subsidiary.

Duo power up for Gela

NORWEGIAN energy storage start-up EnergyNext has signed a contract with Italy's Eni to develop a first industrial-scale version of its thermal battery technology at a refinery on the southern coast of Sicily.

The Gela project will be built around a steel and concrete-based Heatcrete battery connecting an existing concentrate solar power installation and a steam turbine used for electricity generation.

The proto-battery, the size of which was not disclosed, during the night will release solar energy stored during the day to supply the refinery, which until now has been powered by fossil fuels.

The project is due to be operational in the second half of 2020, saving 60 tonnes of carbon dioxide emissions per year.

EnergyNest has been testing a 1 megawatt-hour demonstration thermal battery unit in Masdar City, Abu Dhabi over several years.

ENVIRONMENT

Speaking out: Mission 2020 convenor Christiana Figueres Photo: REUTERS/SCANPIX

Figueres urges industry to act now on emissions

Mission 2020 convenor says companies must offer **'radical reduction'** to extend sector's shelf life

IAIN ESAU and ROB WATTS
Aberdeen

OIL and gas industry officials last week were urged by the former head of the United Nations Framework Convention on Climate Change to control emissions from their operations if they want to extend the industry's shelf life at a time when public sentiment is driving investors and politicians away from fossil fuels.

"By 2050, we will have net zero emissions come what may because if we don't... humanity... is condemned," Mission 2020 convenor Christiana Figueres told delegates at the Offshore Europe conference.

Mission 2020 is a global initiative to reduce greenhouse gas emissions sufficiently by 2020 to protect the world's most vulnerable people from the worst impacts of climate change.

Figueres argued the oil and gas sector must offer a "radical reduction" in methane emissions to zero and "dramatic investment" in carbon capture, utilisation and storage. "Future energy provision has to be really clean, has to be dependable, has to be low cost and it has to be there 24/7," she said.

Figueres also argued the oil and gas industry needs to make sure it is not linked to lobbying against climate change regulation, either directly or indirectly.

"If you are seen to be decarbonising on the one side and lobbying against climate change on the other side, then you will totally lose whatever license you have to operate — that is not what you want," said Figueres, who is also on the advisory board of Italian major Eni.

Industry officials at the same event also highlighted the importance of reducing emissions, with Total chief executive Patrick Pouyanne echoing the arguments of Figueres and warning that the oil and gas industry must act now to maintain a license to operate amid growing public concern about climate change.

"We have a lot of stakeholders today who look at us as dinosaurs. Dinosaurs have disappeared. I don't want Total to disappear. But the only way not to become a dinosaur is to act, to invest and progress together. We have the technologies, people and financing," he said.

Pouyanne said the industry needed to improve its energy efficiency, invest in and trial more technologies such as carbon capture and storage, while also developing profitable low-carbon electricity businesses.

"Our mission is to... provide reliable, affordable and clean energy to the world. All of these words are equally important, even if in fact the reality is today society is clearly putting more emphasis on... clean energy," he said.

"We all claim that we want to become responsible energy majors...to achieve this, we need to have some clear actions, not just speech."

Pouyanne said Total is aiming to reduce its carbon intensity by 15% based on the emissions of the products it sells.

Wael Sawan, upstream director of Anglo-Dutch supermajor Shell added that "society's trust in us as a sector is questionable at the moment", with much endeavour needed to change public perception.

Sawan said this lack of trust is one of the underlying reasons why industry is finding it so hard to recruit young people who find the allure of technology companies such as Google and Amazon more rewarding.

"We are trying to grapple with some of the most challenging issues that mankind faces today. Those are the challenges that hopefully can attract (and retain) the youth of today to join our sector so (we) can be part of the solution," he suggested.

The official World Energy Congress 2019 show daily is published by Upstream, an NHST Media Group company, Christian Krohgs gate 16, PO Box 1182, Sentrum, N-0107 Oslo and printed by UPP, Abu Dhabi.

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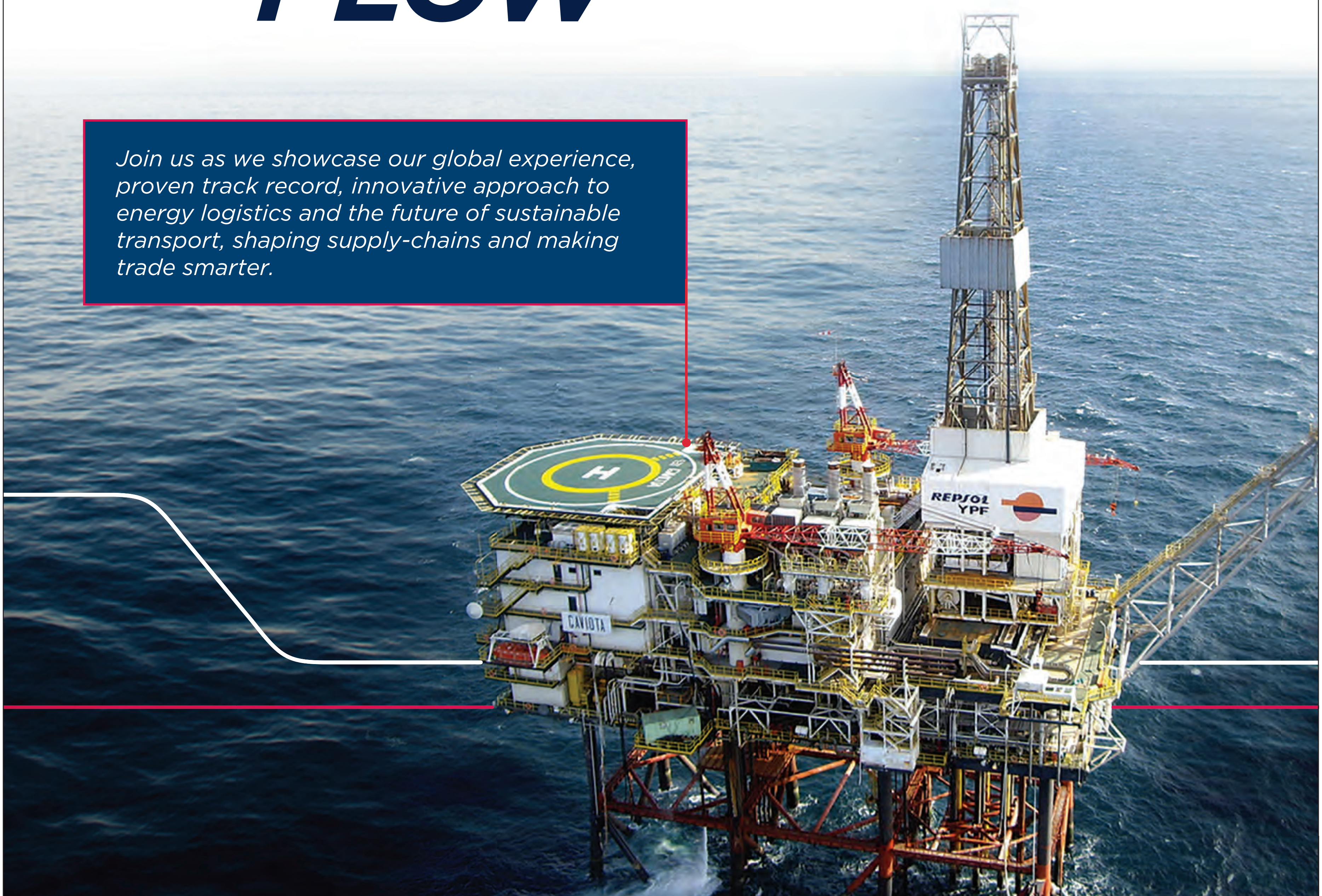

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