THE 24TH WORLD ENERGY CONGRESS PREVIEW

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WORLD ENERGY COUNCIL

ENERGY FOR PROSPERITY



Enabling Global Prosperity in the Fourth Industrial Age

or the first time in history, more than half of the global population is made up of middle-class consumers. This milestone marks a pivotal moment in human progress and is the outcome of a remarkable period of economic growth over the past 50 years. By 2030, the middle class is set to expand to 5 billion and will drive global demand for energy and higher value products as we enter the fourth industrial age. Just as the oil and gas industry was essential to powering economic growth in previous eras, so this sector will remain essential

to enabling a massive step change in global development. The goal for the oil and gas industry therefore is not simply to keep up, but to sustainably stay ahead of this demand. This is a mission we at ADNOC are calling "Oil and Gas 4.0."

We have set ambitious goals to enable us to deliver on the mission of Oil and Gas 4.0 and responsibly meet the energy demands of this era. We are committed to increasing our oil production capacity to 4 million barrels per day by 2020 and extending to 5 million barrels per day by 2030. In addition, we will increase gas production by unlocking vast reserves of untapped gas, to enable the UAE first to achieve gas self-sufficiency, and potentially transition to a net exporter.

In order to achieve these goals, we recognize that we cannot rely on business as usual, but must think and act differently in how we integrate technology, upskill our people, broaden our partnerships and demonstrate environmental leadership. At ADNOC, we are embracing breakthrough



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technology to drive efficiencies across our operations. We are applying predictive analytics to significantly reduce our maintenance costs and avoid system failures. And our Panorama digital command center monitors and manages millions of business critical data points in real time, empowering our most important assetour people-to make smarter, quicker decisions. A key success factor for meeting tomorrow's challenges will be attracting a digitally native workforce and nurturing a performance-led, commercially focused culture.

ADNOC's business model has always been based on partnership. In today's fast evolving energy landscape, we are expanding our partnership model to engage new markets, new industries and new sources of capital. We have established the first concession agreements with India and China. We have brought in strategic equity partners into our upstream, downstream and marketing businesses and we have opened up to new categories of investors, including major private equity players- all with one goal in mind: creating greater value from our assets and resources.

As ADNOC responds to the growing needs of an energy thirsty world, we take our environmental responsibilities very seriously and are harnessing the best proven technology to mitigate our footprint. We have established the first commercial-scale carbon capture and storage facility in the region and have built on the legacy of our founding father, the late Sheikh Zayed bin Sultan Al Nahyan, who established a zero intentional flaring policy for our industry, and today we have the lowest methane intensity in the industry. By opening ourselves to the benefits of technology, embracing creative thinking and pushing the boundaries of partnership, the oil and gas industry will continue to enable sustainable global prosperity in the 4th industrial age.

H.E. Dr Sultan Ahmed Al Jaber ADNOC Group, CEO





Targeting Zero: A Vision for Future Cities

Experts in Dubai are highlighting the urgent need to plan for net zero cities

here is no doubt that Dubai is blazing a new path for cities in the UAE by calling attention to energy consumption in urban buildings and highlighting the lag in the efficient collection and analysis of data available to benchmark usage rates and measure progress. With buildings accounting for 70-80% of energy consumption in the UAE, this fact underscores the importance of targeting building energy use as a key to decreasing the nation's energy consumption.

The building sector can significantly reduce energy use by incorporating energy-efficient strategies into the design, construction, and operation of new buildings, and undertaking retrofits to improve the efficiency of existing buildings. It can further reduce dependence on fossil fuel-derived energy by increasing use of on-site and off-site renewable energy sources.

The concept of a Net Zero Energy Building (NZEB), one which produces as much energy as it uses over the course of a year, has slowly been evolving from research to reality. Currently, there are only a small number of highly efficient buildings around the world that meet the criteria to be called "Net Zero".

But, as a result of advances in construction technologies, renewable energy systems, and academic research, creating Net Zero Energy buildings is becoming more and more feasible. In 2016, Dubai joined the Building Efficiency Accelerator (BEA), a global network of cities led by the WRI Ross Center for Sustainable Cities, and proposed a new policy on energy performance labels for existing buildings. The city government launched a pilot project in February 2017, led by the Emirates Green Business Council and the Dubai Supreme Council of Energy, to measure the performance of 100 buildings in three focus groups: hotels, schools and shopping malls. In 2018, Emirates GBC officially started inviting schools in Dubai to participate in the project.

"Benchmarking is an important step for schools to evaluate their energy and water usage," said Saeed Al Abbar, Chairman of Emirates GBC. "It enables the sector to make decisions backed by solid data on how to improve



Illustration of the Meraas biodome project in Dubai. Courtesy Meraas



their consumption rates and track their progress. Energy and water management are inherently embedded into the core of green schools, and today, a very limited number of schools fulfil the requirements to be sustainable. Educational institutions are a priority sector and we therefore encourage all schools in Dubai to participate in the BEA benchmarking project and become leaders, and advocates, in the drive to sustainable development in the UAE."

In October 2018 the Emirates GCB urged entities region-wide to commit to net zero carbon buildings at the annual Emirates GBC Congress.

Speaking at the congress Al Abbar said: "The Congress this year is by far the most important one to date as we face the unprecedented challenge of securing a prosperous future for upcoming generations. We have a small window of opportunity over the next 12 years, to make a significant change and confidently look to our children and future generations and tell them that we did our best and overcame this challenge. Change is achievable if we start today. We have come a long way in the past 10 years to get to the level of awareness and commitment we have today on sustainability. I believe that with the ingenuity of human spirit, the great minds we have in our industry and the leadership of the government sector that we can rise to the challenge and deliver on our global net zero emissions targets."

Achieving Net-Zero

A net-zero energy building produces the same amount of energy it consumes. A net-positive energy building produces more energy than what it consumes. Achieving this, however, could be seen to be a little far-fetched.

According to the World GBC in most situations, net zero energy buildings, i.e. buildings that generate 100% of their energy needs on-site, are not feasible. Therefore, buildings that are energy efficient, and supply energy needs from renewable sources (on-site and/ or off-site) is a more appropriate target for the mass scale required to achieve Paris Agreement levels of global emission reductions.



The Sustainable City - Diamond Developers

Saeed Al Abbar presents a more realistic picture, highlighting one of the biggest challenges when faced with achieving these ambitious targets.

"We're in situation where you design a new building and there's maybe thousands of protocols you need to comply with, which are not necessarily constituted to innovation, and also make it impossible for authorities to actually enforce the codes, because no one wants to check every building out of 30,000 buildings."

So how does one mitigate, or bypass restrictive codes and protocols? Al Abbar reckons a something revolution is required. "Performance-driven metrics. I think that that's definitely the way to go, so we're not bogging people down. A challenge with this, though, is that performance-based codes could be very, very difficult from an authority perspective to measure and enforce, and it could be open then to non-compliance slipping through." To address these challenges, the

WorldGBC has defined key steps to follow by means of its global project, Advancing Net Zero. The project, which calls for 100% net zero carbon buildings by 2050, was launched in 2016 and has already seen concerted action across its 15 participating Green Building Councils, Emirates GBC being one of them. As part of the project, these Green Building Councils have committed to developing net zero certification schemes in 2018/2019. with 5 already launched as of March 2018. Other pathways of action include engagement with corporate members and government, and developing industry capacity through training and education activities.

With thanks to Dubai Carbon Centre of Excellence an institutional supporter of the 24th World Energy Congress





Dialogue with Isabelle Kocher

One of our Congress Speakers, Isabelle Kocher, CEO, Engie provides us with her insights into challenges facing the energy sector, focus areas for innovation and her expectations of the 24th World Energy Congress

1 What are the major challenges that the world and its energy sector are facing now when the grand energy transition is accelerating?

The energy transition requires a diversity of actions: efficiency, optimization, digitalization, in networks, in lighting, in mobility, in cooling and in heating and of course innovation in renewables. Combining all these elements demands a high level of sophistication and expertise that Engie can deliver.

2^{Which will be the most} critical innovation areas?

We live in the knowledge economy. Competition will be led by the ability to bring as much (both human and artificial) intelligence as possible in the energy system. Software will be key in optimizing networks and small decentralized energy sources, in monitoring consumption, to manage peak demand and intermittent production.



3What does the future energy industry look like?

Nation-states used to be at the forefront of climate action. Thanks to citizens, consumers and civil society in general, corporations and local governmental authorities are now taking the lead. The industry will be structured by companies responding to tenders by adeptly gathering many innovations and technologies.

4 What are your expectations from the Congress 2019?

As you mentioned, the energy transition is accelerating. Why? Because almost every day a meteorological event or a scientific report brings some new and alarming light on climate change. Our call to action has never been so pressing. As entrepreneurs and innovators, our role is to find the ways and means to deliver on the zero-carbon economy and to create value and prosperity at the same time. I expect to hear colleagues and experts share their experience on how they try to do both.





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International Energy Forum's: 8th Asian Ministerial Energy Roundtable

ith a view to deepen ministerial foresight on energy market security and the role of innovation to empower responsible growth, the United Arab Emirates takes over the baton from the Kingdom of Thailand to host the 8th Asian Ministerial Energy Roundtable (AMER8) in Abu Dhabi, United Arab Emirates on 9-10 September 2019. The 24th WEC, co-hosted by India will bring together IEF Energy Ministers representing Asian energy producing

and consuming nations, heads of key international organisations and leaders of industry and academia to discuss the role of new technologies in a competitive and productive world energy mix, and advancing inclusive access to secure, affordable and sustainable energy services. Under the theme "Energy Security in the Age of Change: Empowering Responsible Growth in Asia and the World" the AMER8 will be held alongside the 24th World Energy Congress, building on the global energy dialogue and outcomes of the AMER7, the Katowice Climate Change Conference, the latest G20 Energy Ministers Meeting.

The Ministerial will give a new impetus to the energy dialogue, calling for mutually supportive relationships between producers and consumers, optimal use of



the neutral IEF platform to build a global consensus on reliable and realistic energy transformations, rational responses to the global energy challenges we face together and renewed collective action to achieve shared UN goals to combat climate change.

In the age of change, AMER8 takes note of the many new important transformative initiatives and alliances built, aiming to strengthen energy security and achieve orderly and inclusive energy sector transformations by key government and private sector stakeholders including international organisations, research centers, academia and industry in both the OECD and non-OECD regions.

Dialogue at the Asian Ministerial Energy Roundtable recognises that energy security concepts and dialogue have become more forward looking and dynamic, given the impact of the U.S. shale oil and gas revolution, the rapid advancement of renewables and the imperative of fulfilling globally shared goals together. Empowering responsible growth in Asia and the world does not ease the burden on producers and consumers to timely mobilise investment in conventional sources of supply, advance efficiency gains and innovation in energy supply chains, and avoid market disturbances with spare capacity and emergency measures. High-level and well informed data driven dialogue on the role of new technologies for a more competitive and productive world energy mix and advancing inclusive access to secure, affordable, and sustainable energy services will provide an valuable opportunity to enrich perspectives and take the global dialogue forward.

Dialogue findings at AMER8 will help to inform the 17th IEF Ministerial Meeting that will be hosted by China and co-hosted by Morocco in 2020. India will seek to advance these ministerial dialogue outcomes convening the 9th Asian Ministerial Energy Roundtable (AMER9) in New Delhi, India in 2021, providing continuity and sharpening collective focus on relevant and common global energy security issues.



Etihad Airways Exclusive Airfare Discount for 24th World Energy Congress Participants

> As a division of Etihad Airways, Hala Abu Dhabi, the official Destination Management Company for the 24th World Energy Congress, are able to secure discounts for WEC24 participants travelling on Etihad Airways through our extensive global network.

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For more information, contact us at wec24flights@etihad.ae







A sit down with the World Energy Council's Future Energy Leaders' (FEL-100) Chair



We caught up with Nuno Silva, Technology and Innovation Director at Efacec on his thoughts on energy jobs of the future and the FELs programme at the upcoming 24th World Energy Congress

1 What is the FEL programme?

The Future Energy Leaders Programme is designed to inspire, grow and develop the world energy leaders of tomorrow. It is a community of 100 bright individuals who are working in the global energy sector. The participants are invited to contribute to the World Energy Council's global energy dialogue, to support the development of balanced policy frameworks and to help shape the energy solutions of tomorrow. The community builds on the creative ideas and innovative potential of the next generation to challenge conventional thinking and explore new strategies for the future of energy systems. As I mentioned, these young professionals are bright and prominent individuals, under 35 years of age, with at least 3 years' working experience. We do leverage on one of the most positive characteristics of the programme which is diversity - gender, geographic, background and sector. We have a collection of different people who really want to make a difference

2 What inspired you?

What inspired me was really the will to make a difference. I would not be very happy if I had to sit down and wait for the energy transition to happen, and this inspired me to take matters into my own hands and join the global FEL-100 network which is helping to accelerate this energy transition. I am an engineer who has been working in this sector for more than 15 years and therefore I see that unless we accelerate the pace towards a more sustainable



world, we will clearly be endangering the transition per se, and also the way we relate to and understand the consequences for businesses in the energy sector.

3 What are the skills for the future?

We live in a unique time where there are several drivers for change in the energy sector. Definitely the transversal wide communication through high speed mobile internet, and digitalization (where I include AI, big data analytics and cloud technology as well as blockchain are technological drivers of change, but there are also other drivers - such as bridging the generation gap - that we see prominently in the energy sector as well as the gender balance in the sector. All these will shape the skill set of the future professionals and leaders of the energy sector, and all obviously will need to be carefully analysed. This is a topic that will be discussed in a specific session of the Congress, where I'll have the pleasure to participate in a panel where I'll explain in more detail what the key changes, tech and roles that we will see in the next 10-20 years in the future leaders of the energy sector.

4 What sector would I recommend for those entering the market?

It is a great time to the get into the energy sector: we are at a turmoil of transition and we can already see evidence that the future is ready here. I could name the roles that are in demand, but the list is guite exhaustive. Data analysts for example are clearly needed across the energy sector. People going into the energy sector and trying to drive digitalization forward have huge space to explore, with technologies such as artificial intelligence, blockchain, big data, cloud computing and telecommunications just a few examples that cut across the sector..

5 What do I regret not doing so far?

Well I cannot say I regret doing many things. I've been living life to the fullest in my professional career; I already have international experience; I've already worked in several different sectors – energy, environment, mobility, smart cities. What is still in my bucket list to be done would be to help contribute actively to energy access in remote communities, perhaps working as a volunteer in a region of the world where energy access is limited, and actually building something from scratch for the community.

6 Greatest challenges on the transition?

I believe the energy trilemma the World Energy Council uses is a great way to answer current challenges on the energy transition. It is comprised of three main pillars - energy security (the reliability of energy supply that must be ensured to meet current and future demands), energy equity (because energy must be accessible around the world, particularly in emerging markets, at an affordable cost) and environmental sustainability (since global warming calls for improved energy efficiency and the development of renewable and low greenhouse gas energy sources). Underlying this are several drivers: the energy mix (since we are transitioning from fossil fuels to a more clean energy landscape, there is no perfect mix but in fact several scenarios on the table); technological advances (e.g. digitalization); changes in behavior; and finally of course, policymakers and the regulatory environment also need to provide the correct frameworks for transition to happen quickly.

7 If you had a billion dollars to invest in an energy start-up – where would it go?

I wish I had, because I would actually invest it in many different startups, not only in one. There is a passion that I have and I wouldn't shut my eyes to it, which is energy access. There are an immense number of startups now developing new business models and new technologies which will help developing countries to provide their communities with adequate access to energy resources. Also on the hightech front there is also a lot happening and actually there are several startups growing very quickly because they have come up with disruptive concepts.

8 Do you think you will get on a plane powered by hydrogen or a battery first?

Well I think both technologies are suitable, and will be available in the medium term. Whether I get on a plane powered by hydrogen or battery would depend on the I'm flying to – but both options will definitely be a a reality very soon.





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Ministers in attendance



H.E. João **Baptista Borges** Minister of Energy & Water Angola



H.E. Abdul Hussain bin Ali Mirza Minister of Energy & Water Bahrain



H.E. Gabriel Mbaga Obiang Lima Minister of Mines, Industry & Energy Guinea

H.E. Mohammed

Hammad Al-

Rumhy

Minister of Oil &

Gas

Oman



H.E. Hala Adel Zawati Minister of Energy & Mineral Resources Jordan



H.E. Arnoldo Wiens Durksen Minister of Public Works & Communications Paraguay



H.E. Shaikh

Mohammed

bin Khalifa Al

Khalifa

Minister of Oil

Bahrain

H.E. Valdrin Lluka

Minister of

Economic

Development

Kosovo

H.E. Joao Galamba Secretary of State for Energy Portugal



H.E. Bachir Ismaël Ouedraogo Minister of Energy Burkina Faso



H.E. Joe Mizzi Minister of Energy & Water Management Malta



H.E. Como Manirakiza Minister of Energy & Mines Burundi



H.E. Antonio Isa Conde Minister of Energy & Mines Dominican Republic



H.E. Megan Woods Minister of Energy & Resources **New Zealand**



Alweendo Minister of Mines & Energy Namibia







H.E. Aleskander Novak Minister of Energy Russia



H.E. Khalid Al-Falih Minister of Energy, Industry & Mineral Resources Saudi Arabia



H.E. Suhail Mohamed al Mazrouei Minister of Energy United Arab Emirates



H.E. Sultan Ahmed Al Jaber Minister of State **United Arab Emirates**



H.E. Awaidha **Murshed Al Marar** Chairman. Abu Dhabi Department of Energy **United Arab Emirates**



H.E. Dan Brouillette Deputy Secretary **United States of** America



H.E. Mohammed Abdullah S Al-Anani Minister of Electricity & Energy Yemen



H.E. Joran Gumbo Minister of Energy & Power Development Zimbabwe



Are you prepared for new energy futures?

The World Energy Council has just released its **Energy Transition Toolkit and User Guide.**

Energy transition in nothing new, but the challenges of managing a successful and global energy transition are unprecedented. Energy systems are changing fast, shaped by many factors and more diverse actors.

In the drive to impact, members of the Council have developed five transition tools to help them to define, better manage and collaborate effectively on successful energy transitions. The User Guide reflects and supports an ongoing exchange of best practices across the global community network of the Council. It provides a description of each tool and includes suggestions of how each tool can be used.

The users of the Council's Energy Transition Toolkit include other international organisations, governments, businesses, cities, and local communities and combinations of these.

The application of the tools - which can be used individually or in combination - enables the development of new, timely and actionable insights. Specific uses include making sense of broad and fast moving issues- and innovationlandscapes, stress testing business models, informing national risks assessments, supporting integrated policy pathfinding and translating new energy visions into reality.

The flexibility of the toolkit recognises there are different starting points and no 'one size fits all' approach to successful transition. As such, the tools can be used to support interventions on a global, regional, national, sectoral, and/or crosssectoral basis.

The five tools are:

 Issues Monitor Index – this reality check tool is now in its 10th year. It comprises an annual horizon scan of 42 individual issues and maps perspectives on key challenges. The tool can be used to provide insightful and clarifying

visualisations of the complex realities of multi-dimensional energy transitions. A series of informative contrastable maps - global, regional, national and topical cluster maps -are produced, based on the survey of thousands of energy leaders across all regions and sectors. This unique tool is grounded in the perspectives of energy leaders across the world and whole energy systems. Member Committee commentaries explaining the national maps offer rich insights on the variation of drivers and priorities in energy transition. A supporting online tool enables uses the flexibility to develop their own maps.

•Scenarios – the Council has been developing World Energy Scenarios since 2008. Scenarios are useful tools for decision making under deep and unpredictable uncertainty. Using scenarios promotes bigger picture thinking and enables leaders to reveal deeply held assumptions, as well as identify new and better choices and options. The user Guide includes descriptions of the three current scenarios archetypes - Modern Jazz, Hard Rock and Unfinished Symphony - which its global member network have validated as plausible, relevant and challenging. Scenario lead us to confider not what energy future we prefer but how to translate new energy visions into reality in a context of unpredictable uncertainty. The Council's scenario building can be focussed on different time horizons, geographies and themes.

The Council also developed methods for effectively using its scenarios in the drive to impact.

•Energy Trilemma Index - this integrated policy pathfinding tool enables attention to the synergies and options for delivering co-benefits in managing energy-security, -sustainability and -equity. The annual assessment produced a series of global, regional and national scores which enable users to learn from leading performers and best practices.

•Dynamic Resilience - this new framework has been developed to support preparedness for new shocks and stressors that are inherent in ignoring or accelerating energy transition - including more frequent and extreme weather and cyber risks arising form increasing digitisation.

 Innovation Insights – the Council recognises that innovation is key to successful energy transition. It also promotes a broader concept of whole systems innovation which is not only about new and converging technologies, such as the digital revolution, and includes the role of incumbents, regulators new starts-ups. The current series of innovation insights briefs cover - energy blockchain, storage pathways, looking beyond basic to guality energy access, the new hydrogen economy and rethinking infrastructure economics. Innovation themes are continuously refreshed through feedback from the Council's global member network and community and the use of its other tools.

The Toolkit User Guide is available for anyone interested in playing their part in shaping and navigating a successful energy transition that lays the foundations for a new era of energy for prosperity.



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