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THEME

THE FUTURE OF GLOBAL ENERGY SECURITY:
TRANSITION, TECHNOLOGY, TRADE AND INVESTMENT

SESSION INTRODUCTIONS

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SESSION INTRODUCTIONS

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PLENARY SESSION 1

GLOBAL SHIFTS: THE FUTURE OF GLOBAL ENERGY SECURITY: FINDING NEW BALANCES

11 APRIL 9:45-11:00

Ministerial dialogue focused on long-term energy policy, and governance

Session Objective

IEF16 Heads of Delegations are invited to discuss how global shifts and transition influence energy matrices and affect relations between producing and consuming countries, and identify through dialogue, what policy measures and market solutions are needed to ensure balanced market development overtime:

- *How will Ministers and industry leaders collaborate to mobilise investment in balanced market development to strengthen global energy security?*

Key Themes

Global shifts in energy demand and supply, new trade patterns and routes, sustainable and secure energy market development, dialogue on cohesive policy and market designs, investment cycles, technology pathways.

Session Introduction

The United Nations "Paris Agreement" and 2030 Agenda on Sustainable Development invite Ministers and industry leaders to consider new energy policies and technologies across the entire spectrum of the global energy sector. This creates new investment and employment opportunities, but naturally also raises new questions in relation to supply and demand balances that underpin global energy security. Since policy pathways vary among regions and many new energy technologies have yet to prove their scalability in different settings, producer-consumer dialogue on how global shifts may affect global energy security is essential to ensure the availability of adequate and timely investment appropriate to the needs of evolving energy supply and demand patterns.

The United Nations estimates the world population to grow from around 7.55 billion today to more than 11 billion by the end of this century, when Africa, accounting for more than 88% of this growth, shall equal Asia in population size. OPEC projects non-OECD energy demand will grow by 100 million barrels of oil equivalent per day (mboe/d) by 2040, compared to 3 mboe/d in OECD countries. Led by India, China and Nigeria, the Asian and African regions' share in world energy demand growth amounts to 75% according to IEA data. Asia's 63% and Africa's 13% share of world energy demand growth place policy and market development in these regions at the center of new developments and global energy security. Though energy consumption per person is on a downward trend in the OECD, it remains substantially higher than in the non-OECD where adoption of modern energy services is thought to hold the key to attaining the sustainable development and inclusive growth necessary to lift people from poverty and improve their living standards. Economic growth in the non-OECD fuels new energy demand, and state of the art technology deployment in the OECD supports greater energy productivity. Therefore the potential to accommodate global shifts through dialogue on the evolution of energy matrices will help to find new supply and demand balances that strengthen global energy security and achieve sustainable development goals.

The expectation is that Asian and African nations will set the pace for global shifts and related energy demand growth. Although under most scenarios fossil fuels are forecast to remain the dominant resource within the global energy mix, and an important stabilising factor responsible for underpinning inclusive growth until at least 2040, uncertainty over new policy developments may have a negative

impact on oil and gas investment decisions.

Enhanced dialogue on policy and technology choices of governments and investment strategies by industry will help to make future energy outlooks more predictable and stimulate new investment and trade opportunities that strengthen global energy security.

Questions

1. *How will global shifts affect energy demand supply and trade flows over time? What are the risks and opportunities that may emerge to challenge or support balanced development?*

2. *To what extent can inclusive growth ambitions be satisfied by new policies such as on energy efficiency and productivity measures that may complement the adoption of clean energy technologies?*

3. *Through what measures can energy policies provide greater cohesion and predictability to accelerate investment and stimulate trade over longer-term horizons?*

4. *Can producer and consumer countries reduce risks and maximise opportunities for an orderly energy transition by making investment needs and technology pathways more transparent?*

5. *How can the IEF and other multilateral organisations facilitate greater cooperation on new policies that will shape the future of global energy security?*

6. *Faced with changes in the energy demand mix of consumers, how can traditional energy producers ensure that they stay relevant in a market?*

7. *What measures can consumers consider to ensure more diverse supplies and reliably maintain energy security to balance energy demand growth?*

8. *How does investing in new clean energy technologies help both consumers and producers maintain energy security and achieve shared goals?*

PLENARY SESSION 2

SUSTAINABLE AND INCLUSIVE GROWTH: ENERGY ACCESS, AND AFFORDABILITY

11 APRIL 11:30-13:00

Ministerial dialogue with industry on achieving global goals together

Session Objective

Long-term policy and technology cooperation between producer and consumer countries will make natural resource management and use more efficient and productive. IEF16 Ministers and industry leaders are requested to share their experiences on facilitating energy access, and overcoming affordability issues and explore possible synergies to shorten timeframes for achieving sustainable development goals and broadening prospects for inclusive growth.

- *How can universal energy access and affordability be promoted, can the energy-water-food nexus create new opportunites?*

Key Themes

Energy Access, Affordability, Water-Energy and Food Nexus, Energy Productivity, Efficient and Sustainable Natural Resource and Supply Chain Management, Public and Private Financing Mechanisms.

Session Introduction

One of the world's biggest challenges is to connect the 1.1 billion people that live without grid access, and the 2.9 billion people relying on biomass for cooking and heating to modern energy services. 95% of the those affected live in Sub-Saharan Africa, South, and East Asia. Energy efficiency is fundamental to rational resource use and supply chain management. It is a key component in the collective response to ensure global warming remains within agreed thresholds, and enhances opportunities for inclusive growth. Energy efficient technologies are already playing a key role, not only in addressing these challenges, but also in resolving tightening co-dependencies between the energy-, water-, and other sectors of the global economy (Nexus).

Energy efficiency plays a key role in managing the cost of energy import dependency and improves productivity through more advanced technologies and standards in supply chains and use. Gains thus far have been the highest in energy importing economies that have pursued policies and increased standards most vigorously. Although world energy consumption has decoupled from economic growth trajectories with GDP increasing by more than 90% between 1990 and 2014 compared to a 56% rise in total energy supply over the same period, the amount of energy used to produce a unit of GDP still differs by a factor of three among OECD and non-OECD regions.

Global economic shifts and demographics place developing growth economies and energy producing countries at the centre of collective efforts in the new millennium. Major undertakings are being launched to improve energy efficiency including energy exporting countries where it has gained prominence in response to rising domestic energy demand stemming from population growth and the macroeconomic impact of a steep and sustained drop in oil and gas prices. This has strengthened momentum for economic transformations that aim to increase the competitiveness and diversity of resource economies and dynamically developing nations globally, creating new opportunities to improve energy access and strengthen global energy security.

The IEA and OPEC project that global energy demand reliance on hydrocarbons will range between 70% and 80% by 2040 depending on scenarios. When viewed through the prism of achieving sustainable

development goals and broadening prospects for inclusive growth concurrently, the need to make meaningful efficiency gains in energy supply chains and transformative processes will become ever more critical. Sharing experiences in moving from subcritical to ultra-super critical generation, or coal to gas switching in the power sector, alongside increasing efficiency standards are areas where further progress can readily be made. Attention should also be paid to the potential for renewable energy sources to help foster local solutions, and assist in making the development of regional energy supply chains more sustainable and cost efficient. While hydrocarbons already play an essential role in the reliable deployment of renewable energy by contributing to system resiliency, more efficient supply chains will enable more agile and flexible responses to future challenges. Integrating renewable energy solutions, for instance for pumping and monitoring stations, and reaping the benefits of digitalization, creates new momentum for inclusive growth and sustainable development.

Synergies between improving energy efficiency, alleviating energy poverty, and overcoming nexus issues may be explored more productively through an inclusive technology-neutral energy dialogue among producing and consuming countries.

Questions

1. *How can producer-consumer cooperation on long-term energy policy, and new technologies be improved to foster energy efficiency and productivity gains in energy supply chains?*

2. *How can governments leverage private sector engagement to improve the efficiency and sustainability of supply chains and promote sustainable consumption and production patterns?*

3. *What options exist to accelerate the elimination of inefficient energy subsidies to reduce wasteful consumption and improve energy efficiency?*

4. *How can the gathering and reliability of data on energy poverty, and end-use indicators be improved? Is there a role for JODI?*

5. *How can government and industry overcome tightening energy and water balances and identify synergies between energy and water supply-demand patterns?*

6. *How can governments provide a conducive environment for new technologies to grow and support sustainable energy access for all?*

7. *What role must traditional energy companies play and why would it be of critical importance for them to make sustainable energy access a success?*

8. *What innovative business models can help sustain robust investments into Renewables and Micro-grids?*

PLENARY SESSION 3

OIL & GAS MARKET STABILITY AND CHANGE: INVESTMENT IN A NEW ERA

12 APRIL 9:00-10:30

Ministerial dialogue with industry on energy security in the new market setting

Session Objective

IEF16 Heads of Delegations are invited to discuss the outlook for oil and gas markets in light of changing supply, and demand dynamics. Ministers and industry leaders may assess the potential impact of policy and market trends on oil and gas market volatility and related industry risk profiles that influence investment decisions. What policy and market responses are called for to stimulate the investment in oil and gas necessary to underpin a successful and sustainable global energy transition?

- *What can companies and governments do to get investment and exploration projects moving again to cope with future demand and maintain energy security?*

Key Themes

Volatility, Investor Confidence, Short-, and Long-Cycle Projects, Unconventional Resilience, Financial Markets, Inventories, Price mechanisms, Carbon budgets, Stranded assets, Price spikes, New Vehicles, Technology Choices.

Session Introduction

The disruptive effect of the new technologies and innovative business models employed by new entrants to global energy markets naturally impacts investment in hydrocarbon resources, and influences the volatility with which oil and gas markets alternate between scarcity and abundance. A knock-on effect of these boom and bust cycles is that the energy sector transformations that prompted the disruption can themselves become victim of the price swings and uncertainty they create.

On the demand side, policy support of new technologies, for instance renewables and greater emphasis on fuel efficiency or government announcements to shift vehicle technologies, present, on one hand the prospect of more variable long-term oil and gas demand outlooks, while on the other hand population growth and urbanisation continue to bolster robust demand projections. On the supply side, the momentous reversals in the U.S. oil and gas import-export balance illustrate how the U.S. shale revolution is affecting production patterns over long-term horizons and is leading to global adjustments in oil and gas investment and trade flows, including LNG and deepwater drilling activity While on the demand side growth is fueld by more moderate oil and gas prices.

Present day oil and gas market abundance has caused oil and gas sector investment to contract by around $350 billion over 2015 and 2016 alone, according to IEA assessments. U.S. shale oil's resilience and OPEC-led efforts to adjust production provide swing and spare capacity to the market in response. Persistently high stock levels present a challenge not only to OPEC's efforts to rebalance the market, but also to the investment needs of conventional resource plays. Given the long lead times associated with conventional oil and gas fields, this investment shortfall will likely have consequences for secure and stable market functioning in the mid- term. Moreover, the above shifts in energy balances also affect to different and varying degrees the revenues, economic policy and growth prospects of both producer and consumer countries, as well as the profitability and long-term viability of companies throughout an increasingly diverse energy supply chain. Greater predictability and leadership is needed to allow investment to move forward to the benefit of both government and company stakeholders.

In summary, global oil and gas market functioning is changing at many levels simultaneously. We have entered a discovery period during which there will be considerable uncertainty in the validity

of long-term outlooks relied upon by policy makers and investors to inform their decision-making. Although expectations on the penetration of new energy technologies, from renewables, to electric vehicles and CCUS vary among stakeholders, energy market stability will continue to depend on building understanding and trust among producing and consuming countries, including confidence in the division of labour to provide strategic spare capacity or intermediate supply resiliency, as well as demand security through facilitating reliable pathways on which sustainable development, inclusive growth, and energy security depend. IEF member countries would benefit from engagement in an ongoing dialogue with a focus on how present and future oil and gas market dynamics affect investment and risk profiles so as to better inform policy and investment decisions in producing and consuming countries alike.

Questions

1. *How will the substantial drop in oil and gas sector investment over the past three years affect security of supply in the short- and medium term as demand grows in the present market environment?*

2. *To what degree is market stability affected by the OPEC-led effort with non-OPEC countries to adjust production; does this herald a structural shift in oil market governance?*

3. *How do consumer and producer country governments and industries create win-win solutions in their quest for sustainability? How can the oil and gas sector contribute to the reduction of Green House Gas Emissions?*

4. *What will be the repercussions for oil market stability and new energy policies when unconventional oil and gas production technologies gain momentum outside the U.S.?*

5. *How does greater supply-demand flexibility by new technologies (FLNG), price formation (hubs) and regulation (e.g. destination clauses) affect gas sector investment? Under which conditions does LNG land in Europe, Asia or South America?*

6. *How can governments provide an environment or support oil and gas companies to continue to invest in new exploration projects during a low price regime?*

7. *What measures must oil and gas industry as a whole consider for increased investments in R&D, where it has lagged traditionally?*

8. *Is it time to transition from a traditional oil and gas company to an energy company?*

PLENARY SESSION 4

UPTAKE OF CLEAN TECHNOLOGIES: DISRUPTIONS AND COEXISTENCE OF NEW AND EXISTING TECHNOLOGIES – THE WAY AHEAD

12 APRIL 11:00-12:30

Ministerial dialogue with industry on successful energy sector transformations

Session Objective

IEF16 participants are invited to evaluate how various clean energy technologies are reliably integrated in producer-consumer energy balances of both OECD and non-OECD countries. Ministers and industry leaders are requested to share views on costs and benefits of new clean energy technologies in light of global energy market developments, and strengthen cooperation to accelerate investment and deployment in areas where they identify unrealised promise.

- *How have countries and industries successfully integrated new and existing technologies; what levers will accelerate the uptake of clean technologies in the oil and gas sector?*

Key Themes

Price Signals, Feed in Tariffs Trade Mechanisms, Energy Mix, Grid Reliability, Marginal Cost Impacts, Capacity Mechanisms, Standards, Permitting, New Business Models, Utilities, Aggregators, Prosumers, Cross Border Trade, and Infrastructure.

Session Introduction

Considerable progress has been made in the uptake of clean energy technologies and pursuit of innovation to improve the efficiency and sustainability of energy supply chains across the full spectrum of available energy sources. In the power sector, over the past five years, renewable energy has grown by more than 30%, amounting to around 24% of global power output based largely on hydro, followed by wind, bioenergy and solar sources. The promise that clean energy technology, including fossil fuel technology holds for achieving global goals of greenhouse gas emission reductions, sustainable development, and balancing global co-dependencies, will likely lead to a groundswell of support for its deployment. The rapid pace of renewables' penetration in the power sector has been at the centre of government attention and support measures. Although, in the event that this focus erodes investors' interest in the fossil-fuel plants that provide the critical baseload underpinning renewables deployment, challenges to energy security and systems resiliency may manifest themselves.

Growing requirements for flexible capacity, and downward pressure exerted on wholesale power prices by rising renewables use may hamper effective investment in other clean energy technologies such as gas, and nuclear power, that face increasing market and policy uncertainties. Coal demand has surged in parallel with the advance of renewables, meeting 47% of new power demand over the past one and a half decades according to the IEA. Against this background an unprecedented increase in LNG supplies that is expected to endure in the medium-term and contribute to the creation of a more competitive global gas market, may serve to facilitate an accelerated phase- out of inefficient coal consumption. This would add to overall energy security and the system resiliency that energy matrices in both consuming and producing countries need and make the advance of renewable energy more reliable and sustainable.

Beyond the power sector, the share of renewable energy in world total primary energy demand, including nuclear and large hydro, will range from 24% (IEA) to 27% (OPEC) in 2040 according to the IEA's New Policy Scenario and the Reference Case released by OPEC in 2016. With hydrocarbons making up the balance, ministers and industry leaders can place more focus on accelerating the uptake of clean energy technologies in the conventional fuels sector. Energy transition and sustainable development

goals impact renewables, coal, oil, and gas sectors differently; the present low-price environment may constrain support for renewable energy sources, and recent peaks in coal demand do not pre-empt rebounds later. Neither does the profusion of new LNG supplies or new drilling technologies guarantee that coal to gas switching in developing economies will ensure that the roll out of electric vehicles leads to greater sustainability. A more inclusive and technology-neutral dialogue could be beneficial to ensure energy transition and sustainable development goals become mutually reinforcing.

Proven technologies such as Carbon Capture Use and Storage, Ultra-, Super Critical and Combined Cycle Gas Power Plants offer lower emissions, higher efficiency and flexibility today. However, to successfully leverage private sector investment there must be some expectation of stability and fair return. More government support and cooperation with industry is needed. Dialogue can help shape more predictable policies to accelerate the scale-up and deployment of clean technology in high impact areas, while ensuring the timely investment in smart grids to facilitate cohesive market functioning of both conventional and new energy systems. Government and industry leaders may strengthen their dialogue by focussing on policy and regulatory measures to enable swift and system-friendly integration of clean energy technologies, without discrimination against sources, taking into due account local circumstances, choices, and trade-offs.

Questions

1. *To what extent are the complementarities (gas to power, power to gas) that exist between conventional and new technologies important to energy security, system resiliency and the successful management of the transition process?*

2. *Can the capabilities of NOCs and IOCs be better leveraged to advance clean energy technologies in the oil and gas sector? Is industry investing enough in Research Development and Deployment?*

3. *How are government ambitions for clean energy technology innovation and deployment translated into concerted action with industry that benefit the varied sustainable development and transition priorities of all stakeholders?*

4. *By what means can producing and consuming countries accelerate the deployment of Carbon Capture Use and Storage technologies?*

5. *What can producing-, and consuming countries do to leverage private sector investment in clean energy technologies and make market patterns more transparent; is there a role for the Joint Organisations Data Initiative (JODI)*

6. *Should policy regulate/constrain technological progress?*

7. *Can technology in Energy be a source of competitive advantage for countries?*

8. *Is it possible to develop a leveled and sustainable regulatory framework to achieve the various goals and functionalities required (clean, cheap, access for all)?*

9. *Is there a mature technology that should be promoted?*

PARALLEL ROUNDTABLE 1

REFINING AND PETROCHEMICAL SECTOR; NEW GROWTH POTENTIALS AND RATIONALISATION

11 APRIL 15:00-16:30

Discussion on capturing Asia's rising demand and optimising existing markets

Roundtable Objective

Producer-consumer dialogue on recent investment and trade developments in the refining and petrochemical sector should help to enhance sector performance and strengthen its resiliency in a changing environment. What levers do ministers and industry leaders have to manage the new risks and opportunities that global shifts in feedstock and product demand, inter-regional competition, new regulations, and extreme weather events bring to the refining and petrochemical sector?

- *How do global supply and demand shifts affect the refining and petrochemical sector? Are supply chains sufficiently resilient to respond to disruptions, changing feedstock and product qualities, and growing demand?*

Key Themes

Feedstock, Product Slates, Fuel Standards, Refinery and Petrochemical Capacity and Demand, Product Trade Flows and Storage Requirements.

Roundtable Introduction

The impact of hurricane Harvey on the Gulf of Mexico last summer (2017) in the heart of the U.S. energy sector, one of the world's leading hubs in crude and refined products trade, temporarily removed around 4.4 million barrels from global markets. The muted response of markets in 2017 shows how the energy landscape has changed since hurricane Katrina(2005) and Ike (2008) struck the Gulf of Mexico and the unconventional revolution had yet to impact on global oil and gas markets that then were governed by resource scarcity, surging demand, and rising prices. Although market circumstances were favourable in the face of Harvey, the pivotal role of a resurgent Gulf of Mexico was brought into sharp relief. In a fundamentally changed market it is a key anchor point in global crude and refined product supply chains, and the potential implications of future severe weather conditions must be accounted for in global energy security considerations. How will regional product supply-demand imbalances evolve and new supply chain vulnerabilities be covered by investment and trade flows among different refining and petrochemical centres?

Supply chain resilience shall feature more prominently in the global energy dialogue beyond weather related disruptions alone. Shifts in feedstock availability driven by a larger share of non-OPEC crude, and product supplies from the Americas, are facilitated by recent liberalisation of crude import and export policies in U.S., China, and Indonesia. Meanwhile the rigour with which energy transition policies are implemented in producing and consuming countries, for example in relation to fuel quality requirements, greatly influence investment, trade, new technology and storage requirements in the sector. As product slates must increasingly cater to both domestic and overseas demand, with crude and product import requirements rising most strongly in Asian markets, producer-consumer dialogue to help make policy and market developments more transparent ensures optimised investment in the refining sector and product trade to the benefit of all stakeholders.

Recent assessments of the IEA and OPEC show that global refinery runs have increased steadily over the past two years, and will have topped 81 million barrels a day (mb/d) in 2017, with non-OECD capacity reaching 43 mb/d in late fall, accounting for 53% of global throughput. While refinery runs trend lower in Europe and Russia, non-OECD countries have led investment in new refinery and petrochemical

industry capacity over the past decade driven by the Middle East, and Asia. Growing refinery and petrochemical capacity in OPEC countries is being built in response to rising domestic consumption and a drive toward economic diversification which pressures the availability of crude for export. While U.S. overseas crude imports will continue to fall, Asian crude imports are projected to grow by 3.6 mb/d reaching 24.6 mb/d by 2022 with China and India accounting for 9.5 and 5 mb/d respectively according to the IEA's 2017 medium term outlook.

As Asian growth economies move beyond industrialisation, demand for gasoline in China and other dynamically developing economies is likely to move higher. This should encourage gasoline exports to redirect from the Atlantic to Pacific basin and will likely create growing demand for overseas sourced LPG, kerosene and other higher end oil and gas products on top of Asia's growing import requirements for crude and natural gas. The Middle East, Africa, Russia and the Americas will strengthen their role as key crude and product supply sources since both OECD Europe and OECD Asia have seen the sector downsize as a consequence of slowing demand, global competition and rising regulatory requirements on account of the energy transition. In turn, some IOCs and NOCs have divested from refinery assets, creating new alliances and business opportunities for oil trading houses to ensure supply chains remain resilient, as Europe and Asia will increasingly compete for crude and products supplies in the future.

Apart from rising investment and trade interdependencies, the global refinery sector is increasingly exposed to the impact of energy transition policies and clean air requirements. The 2016 regulation of the United Nations International Maritime Organisation to reduce sulphur dioxide (SO2) content in global maritime fuel sales from 3.5% to 0.5% by 2020 illustrates this at a global level. This measure may well serve to level the regulatory playing field in global shipping and refinery operations but can also accentuate price differentials between low and high sulphur content oil products affecting business models across the industry. The IMO regulation expands on a limit of 0.1% SO2 in regional Emissions Control Areas for instance in coastal areas of the U.S. and EU. New processes and technologies such as increased diesel output and fuel blending options at refineries or the entry of small scale LNG in the maritime bunker fuel market segment and installation of vessel exhaust scrubbers at the tail end are called for to fulfil these requirements.

Vulnerabilities in the global refinery and petrochemical sector are growing as a function of the rising complexity in producing slates and products that respond to different market demands and growing supply-demand imbalances across regions. Producer-consumer dialogue on the means by which investment and interregional trade flows can strenghten the resilience against major disruptions such as shifting trade patterns and the energy transition is necessary to deepen collective understanding and to enhance overall market transparency which remain fundamental to the future of global energy security.

Questions

1. *What lessons can be drawn from the impact of Hurricane Harvey and other extreme weather events/accident for the health of the global refinery and petrochemical sector?*

2. *How will shifts in feedstock prices/crack spreads as a result of the unconventional oil and gas revolution and the import and export liberalisation in the U.S. and China, change flows and reposition energy intensive industries?*

3. *Has the global drop in oil prices diluted the U.S.'s competitive edge, and spread the benefits of a low oil price environment to the refinery and petrochemical sector, and energy intensive industries, globally?*

4. *How are sharpening global competition and fuel quality policies affecting refining and petrochemical clusters in producing and consuming countries? Are security of supply and*

demand adequately balanced?

5. *What role should JODI play to make investment and trade flows in the refined and petrochemical product sector more transparent?*

6. *How are challenges faced by Asian refiners different from their western counterparts?*

7. *How could disruptions in petrochemicals sector impact refining sector?*

8. *What could be some of the new business models that could emerge as the global refining sector rebalances itself?*

9. *What could be the government's role as a facilitator to ensure supply security and healthy growth in the sector?*

PARALLEL ROUNDTABLE 2

FISCAL REGIMES AND LEGAL REFORM TO ATTRACT INVESTMENT IN THE ENERGY SECTOR

11 APRIL 15:00-16:30

Exchange on country experiences, and industry strategies

Roundtable Objective

Dialogue on the implications that recent energy sector reforms of producing and consuming countries, and the changing trade relations among them, have for IOC and NOC investment, economic diversification and sustainable development.

- *How have oil and gas fiscal regimes and legal reforms evolved to attract investment and leverage the sector to contribute to economic diversification, inclusive growth and sustainable development?*

Key Themes

Fiscal Legal Stability & Reform, IOC-NOC Host Government Relations, Market Liberalisation, Trade, Knowledge & Technology Transfer, Institutional Capacity, Local Content, Revenue Management, Transparency.

Roundtable Introduction

Energy sector reform in both upstream and downstream sectors of energy producing and consuming countries has picked up momentum over the past five years. On one hand, energy producers rebalance risk and rewards in upstream host government industry arrangements largely in response to:

- *Deepening decline rates in well-established oil and gas producing areas,*
- *Sharper competition among more production centres for scarce investment in the downward cycle,*
- *Reduced government revenues upon market reversals, precipitated by new supply and demand trends,*
- *Growing demands in respect of economic diversification, and sovereign wealth management.*

On the other hand, downstream energy market reforms in consuming countries aim to capture benefits by focussing on:

- *Shifting import dependencies, due to greater resource availability, and more cross border trade options,*
- *Stronger demands for energy productivity, for industries to remain competitive in a globalised economy,*
- *Support for renewables, and other clean technologies to limit greenhouse gas emissions,*
- *Growing demands in respect of energy transition, inclusive growth, and sustainable development.*

The producer and consumer distinction may be less evident in a rapidly changing world energy market environment, and after the collective embrace of energy transition and sustainable development goals with the historic adoption of the United Nations' Agenda 2030, and Paris Agreement in 2015. Yet

the need for dialogue remains paramount as producer and consuming country perspectives on oil and gas market development naturally differ due to market economics and context. The number of producing countries in the non-OECD region that depend on oil and gas resource revenues, has only grown during the commodity boom, and co-dependencies with consuming countries have sharpened due to growing import requirements to satisfy demand even when growth rates have slowed down. Relatively low production costs in the Middle East will see the share of OPEC in global crude oil output increase from 47% to 51%, while investment in costly new production (deep-water and unconventional productions) is likely to remain constraint over the medium term according to IEA assessments.

The need for reform has become more apparent as crude and product import dependencies rise in Europe and Asia due to declining indigenous production and demand growthThe low oil price environment sharpens focus on revenue management and economic diversification in energy producing countries where fiscal balances have become more exposed. This has led to wide-ranging reform efforts including the restructuring of national champions in producing countries such as Mexico and Saudi Arabia and to wider market liberalisation efforts in key consuming countries such as China, India and Indonesia in developing Asia, and the U.S., European Union, Japan and Korea in the OECD region.

A new era of openness and cooperation along oil and gas sector value chains enables governments of producing and consuming countries as well as IOCs and NOCs to capitalise on the economic complementarities that exist between them. This will make oil and gas sectors more resilient to both market upswings and downturns enabling more inclusive and sustainable growth overtime.

Producer-consumer dialogue on the implications that recent changes in the investment climate of producing and consuming countries, and evolving relations among them, have for energy sector investment, trade, and collaboration will therefore help shape the future of global energy security, and can accelerate the achievement of sustainable development goals.

As both consuming and producing countries seek to make their economies more resilient by leveraging the opportunities and mitigating the risks that the new energy environment poses in accordance with their comparative advantages, ministers and industry leaders are invited to debate the new prospects for investment and trade that their reform and diversification efforts create, and explore options for wider collaboration to making energy value chains more sustainable and secure.

Questions

1. *What lessons can be learned from recent energy sector reforms in energy producing countries; are expectations being fulfilled, how do these experiences inform new initiatives?*

2. *How are energy sector reforms in major energy consuming economies affecting IOC and NOC oil and gas sector investment in producing regions? How will policy affect demand growth in future?*

3. *By what means have natural resource, and value chain management evolved across producing and consuming countries? What role do sovereign wealth funds, and initiatives such as the Extractive Industries Transparency Initiative play?*

4. *How do multilateral and regional trade and investment agreements strengthen investor confidence and the predictability of oil and gas trade flows? What do recent policy shifts mean for global energy security?*

5. *How can Ministers and industry leaders use the IEF platform to enhance dialogue on the implications of energy sector reforms in producing and consuming countries for global energy security?*

6. *What tax and legal framework can reliably attract energy sector investment in the new energy market environment?*

7. *How to use correctly 'measure' the quantum of government take?*

8. *How to use the tax and legal reforms to drive investment and hence create avenues to drive social impact?*

PARALLEL ROUNDTABLE 3

ENERGY SECTOR DIGITALISATION; BENEFITS AND CHALLENGES

11 APRIL 17:00-18:30

Oil and Gas Company CEOs, and supply industry views on digital transformation

Roundtable Objective

Dialogue on how producer and consumer countries leverage enhanced energy sector data visibility that initiatives such as the Joint Organisations Data Initiative (JODI) and the digital revolution bring to the oil and gas, and power sectors. Roundtable debate among senior experts and stakeholders should take stock of the experiences that governments and industry have acquired in leveraging enhanced market transparency and digitalisation to successfully navigate the risks and opportunities of global energy market shifts and transition.

- *How is digitalisation making oil, gas, and power sectors more efficient and resilient? What is the role of inventory data, will stocks become more transparent in the digital age?*

Key Themes

Energy Data Transparency, Digitalisation Big Data, Smart Grids, Grid Planning, Generation, Internet of Things, Cyber Security, Critical Infrastructures, Energy Sector Efficiency, Productivity, Health, and Safety Indicators.

Roundtable Introduction

The launch of the Joint Organisations Data Initiative in 2008 has greatly enhanced oil and gas market data at the global level to better inform policy and investment decisions of governments and industry, and help reduce market volatility. In the meantime, digitalisation is playing an ever-larger role in enhancing energy market data transparency at operational levels, that enables the energy sector to reduce costs and enhance the efficiency and resiliency with which it responds to changing supply and demand patterns, and business metrics. The possibilities that digitalisation offers for distilling meaningful and actionable information from data at multiple levels and often on a real-time basis, will continue to transform industries and establish new businesses and communication platforms. Digitalisation is already a leading force in making overall economic performance in energy producing and consuming countries significantly more efficient and resilient in the face of global challenges.

The power sector leads digitalisation in the energy sector, as it enables utilities, grid operators, and supply- demand aggregators to reliably integrate existing and new renewable energy sources, including a rising number of 'prosumers' into a safe, affordable, and healthy energy mix. Investment in Smart-Grids, greater interconnectivity and the need for robust trading platforms are key elements. As effective network balancing and planning for new investment is increasingly challenging in a more fluid and rapidly changing energy market environment, enhanced energy market data transparency and digitalisation offer crucial levers to facilitate cost effective system operations, model new demand and supply trends in different regions or sectors, to underpin timely and effective investments.

The oil and gas industry is catching up fast to generate greater efficiency gains and help manage the rising complexity that industry sophistications brings with enhanced digitalisation. This is borne out in the oil and gas upstream and industry services sector that has been heavily impacted by the fall in world energy market prices, but which is now well positioned to harvest the opportunities of enhanced market transparency and digitalisation to reduce costs and unlock investment on the basis of better and more reliable data, and improved operating procedures. Moreover, digitalisation will help to improve safety, health, operating and service standards. Governments and industries that master

the agility and resilience that digitalisation offers will be in a better position to navigate change from a leadership position.

Finally, digitalisation has greatly improved data collection and process monitoring capabilities, which has posed new questions as to how Big Data is most adequately and responsibly managed from both corporate and consumer perspectives. It has also exposed energy sector operations and critical infrastructures to new cybersecurity risks. Both areas will require enhanced government and industry dialogue and cooperation. Risks and adverse developments can be overcome by making successful government and industry practices more transparent, and fostering greater awareness of preventive measures and procedures to follow in case of cyber security breaches, including insurance policies, and the design of emergency response measures where critical infrastructure, and corporate or private persons may be affected.

Questions

1. *How will investment in smart grids strengthening network stability? What government and industry experiences guide future developments?*

2. *By which means is the digital revolution improving oil and gas industry performance in a rapidly changing environment and enabling investment to move forward?*

3. *How can governments and industry improve cooperation to reduce the exposure of critical infrastructures to cybersecurity risks, which policy and management tools have proven successful?*

4. *How can the Joint Organisations Data Initiative improve global energy market data visibility in new emerging LNG markets and harvest the opportunities that digitalisation offers in collecting data on new trade patterns and inventories?*

5. *What is the impact of digitalisation on employment and energy demand in specific sectors; from automated driving in transport, robotics in manufacturing industries, to consumer electronics and appliances in the commercial and residential sector)?*

6. *What are some of the most practical areas where digital can help an oil and gas company in the short term (1 to 3 years)?*

7. *How can one insure smooth infusion of technology into traditional oil and gas business/ companies without disrupting it?*

8. *What are the key challenges of going digital?*

PARALLEL ROUNDTABLE 4

HUMAN RESOURCES: ATTRACTING TALENT TO A VIBRANT INDUSTRY - INTEGRATING NEW GENERATIONS AND TECHNOLOGIES

11 APRIL 15:00-16:30

Industry-government exchanges on evolving job requirements and labour markets

Roundtable Objective

Producer-consumer dialogue on the role of human resources management in enabling healthy energy markets to strengthen global energy security and sustainability on the IEF platform, can help the energy sector to navigate the challenges that energy market cycles, and the expectations of new generations entering labour markets pose.

- *How does the industry attract and retain diverse talent in a more competitive, and advanced energy market?*

Key Themes

Restructuring, Retention of Professionals through Industry Cycles, Gender Balance, Digitalisation, New Skills and Management Styles, Industry Appeal to Millennials, Collaboration with Universities in STEM and Vocational Training Centres, Career Planning.

Roundtable Introduction

The energy sector is undergoing profound changes as a consequence of market transformations, energy transition and global efforts to render energy markets more inclusive and sustainable. This affects both the retention of highly skilled professionals, and the appeal of the industry for new generations aspiring to secure meaningful, rewarding, and fulfilling careers.

The energy industry's ability to attract, nurture, and advance talent through boom and bust cycles is a critical factor for commercial success, as well as for our future energy security. Human resource management in the energy sector has become more central to business performance, energy security, and successful delivery on globally shared goals.

Energy industry business strategies must consider volatility, technology and environmental transformations, as well as shifts in consumer behaviour and public opinion in their human resource management and engagement with universities and vocational education centers.

Overcoming 'gender gaps' will unlock available talent through merit based advancement and selection, enabling greater diversity in senior management and leadership positions, and improving industry performance and appeal with new generations. A recent study by the World Petroleum Council and the Boston Consultancy Group on gender balance in the oil and gas industry found that the percentage of woman in the industry's workforce drops over time from 25% to 17% between the middle-management and senior level career stages.

Transformation of the energy sector through new technology advancements, digitalization, new energy policy requirements, and labor force dynamics present new challenges that should inspire broader dialogue among producer and consuming countries and strengthen engagement with younger generations and society by the industry.

Questions

1. *What is the impact of the current cycle on human resources in the oil and gas industry? What lessons have been learnt form the last downturns? Do current restructuring efforts enable greater flexibility?*
2. *What is the impact of new energy technology deployment and digitalisation on human resource requirements in the oil and gas industry?*
3. *To what extent does the industry collaborate with universities and education centres to train staff to advance careers in lock-step with the shifting requirements of the industry?*
4. *What policies and practices hold the most promise to overcome the 'gender-gap' and other stereotypes that negatively impact the industry's appeal with young professionals starting careers?*
5. *How can governments and industry cooperate to ensure a sufficiently diverse, appropriately skilled, and high performing workforce in increasingly competitive and demanding labour and energy market environments?*
6. *How will the energy transition impact HR management?*
7. *How will companies confront the loss of senior resources?*
8. *How does HR strategy gets shaped after the digital overflow?*

What are the key challenges of going digital?

9. *Which are the key motivating factors for women to join and remain?*

** This roundtable builds on the outcomes of earlier IEF dialogue events including the 2nd International IEF Symposium on Human Resource Management in the Energy Industry: Implications of a New Market Environment and Energy Transition, hosted under the Patronage of the Minister of Oil of the Kingdom of Bahrain, jointly with the Ministry of Energy of the Russian Federation on 17-18 May 2017 Manama, Kingdom of Bahrain that recommended continued engagement on the role of human resources management in enabling healthy energy markets to strengthen global energy security and sustainability on the IEF platform.*

IEF16

INTERNATIONAL ENERGY FORUM

NEW DELHI 2018

10-12 April 2018

Taj Diplomatic Enclave

New Delhi, Republic of India