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Innovative  
Energy  
Solutions

## 23<sup>rd</sup> WPC Programme

### Technical Forum Topics

#### **BLOCK 1 - Innovation in upstream**

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*Securing the energy needs of tomorrow requires constant innovation in the upstream sector to maximise output from existing fields, find new petroleum resources and commercialize the world's large known, unconventional resources. Ongoing research and significant investments are needed to develop game-changing technologies to meet these supply challenges. With the drive for sustainability, and in the face of uncertain petroleum prices and fiscal regimes, the industry is focusing management of the business on operational efficiency, asset optimisation and financial returns while maintaining an overarching priority on safety and environmental performance. Innovations in the geosciences, drilling and completions, enhanced recovery, data management, emissions reductions and business processes will be showcased in this Block.*

##### **1. Innovative E&P Technologies**

Innovation and new technologies enable a more efficient and cost-effective oil and gas industry and help tackle both technical complexities as well as lower emission intensities. Technology drives almost every aspect in our upstream business from reservoir to point of sale. This forum will address the role of new technologies and innovative breakthroughs in geo sciences, production and development to overcome future challenges in finding, exploiting and commercializing increasingly cleaner energy sources.

##### **2. Managing Mature Fields**

Mature oil and gas fields are the core assets of oil companies and a leading contributor to the world's energy supply. To maintain effective development, technology innovation and reservoir management are of great importance. This Forum will discuss IOR/EOR technology innovation and best practices learned in reservoir management, as well as well abandonment/ facility decommissioning in both onshore and offshore operations.

##### **3. New Petroleum Resources**

As production from discovered petroleum resources continues to decline naturally, enormous capital is being invested in the hunt for new sources of petroleum supply to meet continued growth in demand, while continuing to transition to a lower-carbon future. This hunt increasingly relies on innovative technologies to cost effectively pursue conventional petroleum resources in new remote basins and ever deeper offshore areas and to unlock the huge latent potential of unconventional resources such as shale oil and gas, tight oil and gas, oil sands and gas hydrates, in an environmentally responsible and socially acceptable way. This forum will describe innovative technologies and processes that are critical drivers for the continued growth of petroleum supply.

#### **4. Impact of Digitalisation in the Upstream Sector**

Digital Technologies are a growing technology focus area, such as AI, robotics, remote monitoring, and advanced analytics, and essential to solving today's energy challenges and driving efficiency in all aspects of the upstream business. Digitalisation helps reduce operational costs through increased worker productivity with mobility, driving operational excellence and subsurface data management for the oil and gas industry. Upstream companies need to stay ahead in the digital revolution, developing in-house capabilities and adding external talent for data analytics and other leading technologies. The Forum will look at best practices and innovations in the industry.

#### **5. Improving Industry Performance**

Economic uncertainties coupled with growing technical complexities mandate our industry to improve performance, optimize costs, and reduce risks. From design to contracting and from financing to execution, partnerships must evolve toward better alignment, integration, and collaboration. Unique partnerships with regulatory bodies in terms of fiscal regimes and administrative design can encourage exploration and development of increasingly complex resources while improving performance. Adoption and integration of revolutionary technologies – such as blockchains, and the internet-of-things – provide further means to realize an improved performance. This forum will include presentations that demonstrate the value of such practices.

## **BLOCK 2 - Innovation in downstream & petrochemicals**

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*With accelerated changes in engine technologies and public carbon policies on the consumer side, paralleled with the shifts in crude slate on the producer side, the downstream landscape is in transition. Improving efficiency of existing assets continues to be a major focus area, while downstream players need to grow new competencies in product and market development to find their new customers and sustain long-term profitability. Beyond addressing innovative technologies, improved resilience and the growing role of mid-stream in today's refining envelope, this Block will encompass opportunities in shifting molecules to explore emerging operational and business models reaching into the chemicals value chain.*

#### **6. Innovative Refining Technologies**

With the need for cleaner gasoline and diesel fuels, new challenges arise with respect to lower sulphur contents in products (particularly of marine fuels, IMO 2020), cleaner feedstocks and resid processing. Improvements, e.g. of catalysts for HDS, FCC and alkylation could help in this respect. Also, emission reduction and co-processing of renewables are big issues. The major question is: Which innovative technologies will have an impact on the future of the refining sector?

#### **7. Resilient Refining**

Demand for petroleum is still expected to rise but in the refining sector there are several uncertainty factors, such as arrival of new crude oil sources including shale oil, changes in the demand structure with the increase of electric vehicles and IMO sulphur regulations, and rapid demand decrease in developed countries due to the Paris Agreement. Consequently, the refining industry will need to become better prepared for future changes by integrating upstream and downstream sectors, adopting new equipment management systems, cutting-edge digital technology etc. This forum will discuss how the oil refining sector can best respond to future uncertainties.

## **8. Chemicals on the Rise**

With accelerated changes in engine technologies and public carbon policies, the consumer side of the downstream equation comes into a transition phase. Petroleum refiners and petrochemical producers sharpen focus to find and accommodate new products in their product portfolio. This Forum will present case studies of how downstream companies develop innovative, economic and sustainable responses in their molecule management for future markets.

## **9. Integration of Refining and PetroChemicals**

Integrating refining and petrochemical sites helps reduce volatility in the petroleum value chain. When properly designed, planned and implemented, integration will not only diversify companies' product portfolio, but will reduce site specific costs, increase capital efficiency and elevate returns. The practical case studies in this Forum will demonstrate how strategic planning and operation of refining and petrochemical conversion units with common utilities capture long term business benefits.

## **10. Growing Value in Midstream**

This Forum will analyse different strategies and growth drivers to achieve value-chain margin opportunities in the oil and gas midstream segment, including proactively growing the scale and increasing utilization of its assets or looking for a market niche that provides a significant build-out opportunity for midstream providers. Other best practices could cover integrated midstream solutions across products, basins and services as well as investments into the various means of transport (pipeline, shipping, trucking, rail etc) or storage and ways to increase value in the wholesale marketing of crude or refined petroleum products and overcoming barriers to regulatory and commercial entry.

# **BLOCK 3 - Innovation in natural gas**

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*Natural gas will remain an essential part of the future energy mix during the energy transition, readily available for countries throughout the world. It is the cleanest-burning hydrocarbon and supply can typically respond quickly to changes in demand. This Block covers a variety of innovation challenges and opportunities around natural gas including future supply and demand scenarios, its role as a transition fuel, innovative technologies and processes for gas exploration and production, as well as transport, infrastructure and storage challenges.*

## **11. Transport, Infrastructure & Storage of Natural Gas**

New strategies and technologies for transport and storage of natural gas could change the availability and affordability of this energy source. Infrastructure developments and integration for pipeline and LNG options are essential to ensure the efficiency of the system, reduce duplicity, diversify sources and increase competitiveness for producers, transit countries and consumers. Shorter term gas infrastructure and storage will play an instrumental role in the development of spot markets and a transition to new energy sources. This requires continued, targeted investments and cost-efficient operations. This forum will address technical, financial, regulatory, strategic and geopolitical challenges for industry and governments.

## **12. Natural Gas and LNG Prospects**

The global natural gas market is growing, driven by the availability of shale gas and the increase in LNG trade. LNG provides a viable route to monetize large gas reserves in remote locations, which have no significant markets nearby and limited connectivity. Transformation of natural gas markets from the regional to the global level is not without challenges, but supported by low prices, large supply and lower air pollution compared with other carbon fuels, the role of natural gas in the future energy mix is assured. This forum will discuss the outlook of globalized production and transportation of natural gas, overview of the global gas reserves, supply and demand outlook and regional differences, as well as cost effectiveness and price issues.

## **13. Gas as a Transition Fuel**

The Forum will address the role of natural gas in the energy transition and look at its use across all sectors of the global economy – as feedstock for the petrochemical industry and an alternative to liquid transport fuels, as well as to heat, cool and light homes, and power industries. As the cleanest-burning hydrocarbon it helps reduce emissions by replacing coal, but the industry must increase its efforts to reduce the greenhouse gas intensity of its supply chain – from production to delivery to the customer, while ensuring that gas remains competitive with other energy sources.

## **14. Technology Innovation in Mid- and Downstream Gas**

Innovative developments in LNG and FLNG are helping to develop new frontiers and make gas more competitive, while digitalisation allows for processes to become more efficient, reservoirs to be re-evaluated and enhanced communications with all customers across the entire value chain. Other potential areas for technological innovation to be discussed include large and small-scale CHP units, capture of CO<sub>2</sub> from gas power generation, GTL, more efficient hydrogen production and the development of the next generation of natural gas-powered vehicles. We will also look at the reduction of greenhouse gases, as well as the utilization of all waste products including sulphur.

# **BLOCK 4 - Future energy landscape**

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*The global shift towards a low-carbon, circular economy has started and its pace is accelerating, with international regulations driving the process towards lower emissions and greater efficiencies in the energy transition. As cities and countries across the world adopt new models for living, commerce, transportation and industry, the oil and gas sector needs to look at innovative ways to reduce the carbon footprint in their operations and their products. Technology, policies and investment will all determine the way forward to supplying the modern energy of tomorrow.*

## **15. Low Carbon Technologies and Strategies for Oil and Gas**

Society and stakeholders are looking to the oil and gas industry to take a lead in low carbon strategies for the future and to reduce their carbon footprint. Responding to the new energy economy scenarios, oil and gas companies are developing innovative technologies, which may be based on hydrogen, methanol/alcohols, biological sources, or continued use of existing infrastructure incorporating CCUS. This Forum will be looking at a number of ways oil and gas companies can refashion themselves as the low-carbon energy companies of the future.

## **16. Low Carbon Energy Options: The Future of Renewables and Alternative Energies**

Driven by international treaties to reduce global emissions, fast changing technologies and extraordinary cost declines have led to a huge growth in renewables, resulting in alternative energies becoming more mainstream and closing the gap to fossil fuels in attracting new investments. Integrating heat, power and transport energy solutions, we are looking at the way forward for the low carbon energy options, the impact of upcoming policies and regulations on energy markets, pricing and investment models and an analysis of their risk and reward profile.

## **17. Regulatory and Policy Drivers**

The international petroleum sector is vast and complex and operates in many jurisdictions. The public expects the sector to operate in a safe, efficient, orderly and environmentally responsible manner and has entrusted regulators with oversight responsibility to ensure these objectives. The entire industry benefits from sensible regulatory practices around the world to support high standards of performance across the industry and to enhance its profile with the public. In tandem, sound public policy can drive investor confidence and thereby be a major enabler for the massive capital investment required by the petroleum industry. This forum will highlight innovative regulatory practices and public policy initiatives that support a thriving petroleum industry that meets its responsibilities to all stakeholders.

## **18. Transportation Energy of the Future**

Increasingly efficient transport systems are making the most of digital technologies, smart pricing and changes in consumer behaviour as environmental policies accelerate the move towards lower emission transport modes. The Paris Agreement and IMO's sulphur cap are leading to a growth of low carbon solutions for land, sea and air transport incl. advanced biofuels, fuel cells and hydrogen, while technical innovations continue to improve fuel quality and energy efficiency of the internal combustion engine. What are the technologies, strategies and regulations driving this process and how can the petroleum industry address them to stay competitive?

# **BLOCK 5 - Managing energy solutions**

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*Our industry faces numerous challenges, and it will be our spirit of innovation that will deliver solutions. With its global footprint, the oil and gas sector faces multiple operational risks that need to be managed. Increasingly today, societal expectations play a leading role and we must be ever conscious of the public, and how we are perceived. Our licence to operate requires that we bring affordable energy to communities around the world and accelerate energy access to those most in need. To deliver on these goals we need to ensure, that we encourage and develop the practical skills necessary within our industry.*

## **19. Risk Management**

As a society, we need to take risks to grow and develop. Oil and gas companies require detailed assessment of risks and uncertainties and the development of practical strategies for risk minimization or mitigation to achieve their objectives. They are dependent on quality data and robust workflow processes and need to have reliable procedures in place to identify, evaluate and address the broad variety of risks inherent in the oil and gas industry, including subsurface risks, project risks, geopolitical risks, economic risks, cyber risks,

financial risks, and regulatory changes, as well as continuously monitoring HSE, societal and reputational risk factors. Best practices and strategies for successful risk management as part of a good governance approach will be discussed and presented in this Forum.

## **20. Accelerating Energy Access**

Ten years before the UN's deadline to provide everyone with access to electricity and clean cooking facilities, we will assess global energy poverty alleviation initiatives and share best practices for tailor-made programmes across the world. With multi-stakeholder approaches, new financing solutions and partnerships between countries, energy providers and NGOs, the energy access challenges are a great stimulus for innovative energy solutions. How can companies embed energy access into their strategy? How can they leverage their capabilities, technology and innovation leadership to develop new business models to provide energy access for all? And how can we maximize these strategies to create sustainable benefits for the communities?

## **21. Digitalisation of the Petroleum Industry: Opportunities and Impacts**

Digital technologies have a significant role in improving efficiency and performance, leveraging innovation, transforming operations and increasing profitability, as well as providing consumer benefits. Artificial intelligence, big data, blockchain, the Internet of Things, 3-D seismic, linear program modelling and advanced process control for operations etc, boost organisations' performance higher, faster, and to a greater scale than has previously been possible. This forum will present innovative developments in digitalisation and their challenges, opportunities and impacts for the oil and gas sector. What are the next big milestones and how can we get there safely and securely?

## **22. Improving the Public Perception of the Oil and Gas Industry**

In a continuously changing industry and business environment, we need to consistently review public awareness and our sector's reputation. To effectively sustain its role to produce and deliver hydrocarbons to all, our industry has to improve its credibility. New strategies and communication tools are required to reflect the industry's key role in society, its safety culture, environmental awareness and ethical values, as well as creating trust, increasing transparency, compliance and social responsibility. This Forum will consider why the public perception of the oil and gas industry is divided, how to address these challenges, and what role stakeholders can play in improving our reputation globally and in the places we operate.

## **23. Competencies and Skills for Innovative Energy Solutions**

Oil and gas companies are confronted with three major factors affecting their Human Resources management: economic uncertainties, an aging workforce and rapid technology evolutions, adding pressure to the technical and managerial skills required to continue delivering innovative energy solutions. Attracting and retaining a wide diversity of talent, building the skillset and proficiencies to remain competitive in the future energy landscape, nurturing an innovative culture and accelerating the knowledge transfer is essential for the sustainable growth of the industry. This Forum will showcase the best practices to achieving this goal.