OPEC bulletin

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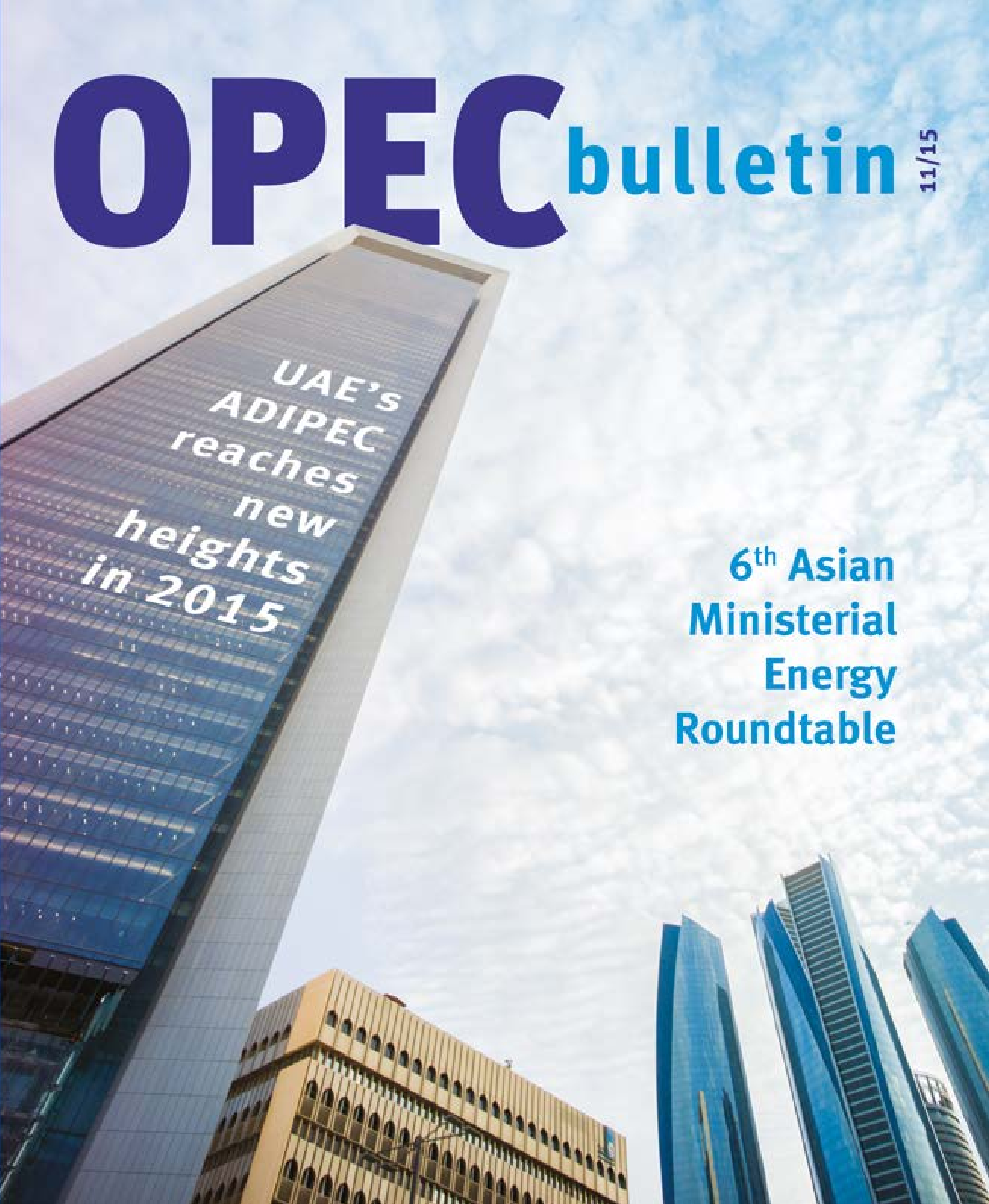

UAE's ADIPEC reaches new heights in 2015

6th Asian Ministerial Energy Roundtable


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The need for multilateral action

On Friday, December 4, 2015, the world's media will once again descend on Vienna to witness and report on the latest round of OPEC Ministerial talks. They are indeed no stranger to the Austrian capital. In fact, the Organization's last few meetings have attracted record interest such is the precarious state of the global oil market right now. For certain on this day, the basement of OPEC's eight-storey Secretariat in Vienna's historic first district will be buzzing with activity as reporters grapple to get prized exclusive comments and reaction from OPEC's Oil and Energy Ministers as they review and discuss the latest oil market developments.

At the same time, cameramen will jockey for position to get the best angle for their shots of the high-ranking delegates. One has heard of the proverbial media circus. Well this is it, with abandon! But by now, after what will be 168 such Meetings, arrangements for the customary end-of-year parley run like a well-oiled machine, for want of a more apt description. The Meeting of the OPEC Conference may come and go in just one day — but it always leaves its mark!

If there is one thing OPEC cannot be accused of, it is a lack of international exposure — to its policies, aims and objectives. Its very being is a main news item! As the Organization has grown in stature over its 55 years of existence, then so too has its importance as one of the most relevant, purposeful and responsible international organizations on the planet. Such is its global standing today that the world's leading media houses assign teams of journalists to shadow the Organization and report on its every move. Needless to say, this attention has spiraled over the last 14 months or so, what with the latest problems to hit the oil market.

With international crude oil prices today struggling to stay above $40/barrel, it is proving to be a very challenging time for the oil sector and its primary stakeholders. Fast-reverse to the first half of 2014, when prices were averaging around $100/b, and one can fully appreciate the problems the industry is facing today. In particular, there is now a real danger the production capacity additions needed to meet future demand will be in jeopardy. Ironically, that could result in prices eventually spiking in the other direction.

As for the numerous oil companies that service the industry and supply the various markets with raw crude and finished products, they have seen their operations turned on their head. Profit margins sharply reduced, development budgets slashed and workforces decimated by redundancy — in most cases it has led to huge rationalization of existing activities. But such is the general acceptance of the volatile nature of this industry there is no remonstration, no real sense of bad feeling and no outward evidence of panic, despite the obvious seriousness of the situation. It is all rather accepted as matter-of-fact. Maybe that is because these experienced and hardened entities, who refer to the latest market downturn as "the next cycle", are just too busy rolling up their sleeves to plan for their survival, working tirelessly to find ways and means of adapting to the prevailing market conditions. By now, they are used to it.

As Bob Dudley, the longstanding Chief Executive Officer of oil major BP, told the recent Kuwait Oil and Gas Show and Conference, this was the fourth time he had seen oil prices collapse in his career. "While they created real stress at the time, the industry adapted and recovered each time," he said in a keynote address. But such periods of low oil prices require increased efficiency and heightened innovation. "That means companies need to demonstrate rigorous cost and capital discipline as they look to generate value in a lower price environment," commented Dudley, adding that the age of 'easy' oil "is behind us — there are new challenges to recovery."

Since its inception, OPEC has been responding to the challenges and various changes thrust on the international oil market. But the 21st century threatens to take this to another level, one where technology and innovation become critical in helping to satisfy ever-stringent environmental demands on the exploitation of fossil fuels. The world needs to be kept safe and it needs to be kept clean for future generations — and rightly so. But this will come at a cost.

And as OPEC has continually repeated, the only way forward in meeting these demands and other challenges is through concerted cooperation among all the main parties that make up the international oil and gas sector. That means serious dialogue, primarily among the producers, but also between the producers and the consumers. History tells us that the current oil price regime will not last. But is it not better for the stakeholders that have a vested interest in providing a stable oil market to join forces and bring about a measured and orderly recovery?

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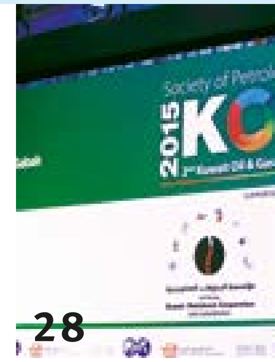

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OPEC Membership and aims

OPEC is a permanent, intergovernmental Organization, established in Baghdad, on September 10–14, 1960, by IR Iran, Iraq, Kuwait, Saudi Arabia and Venezuela. Its objective — to coordinate and unify petroleum policies among its Member Countries, in order to secure a steady income to the producing countries; an efficient, economic and regular supply of petroleum to consuming nations; and a fair return on capital to those investing in the petroleum industry. Today, the Organization comprises 12 Members: Qatar joined in 1961; Libya (1962); United Arab Emirates (Abu Dhabi, 1967); Algeria (1969); Nigeria (1971); Angola (2007). Ecuador joined OPEC in 1973, suspended its Membership in 1992, and rejoined in 2007. Gabon joined in 1975 and left in 1995. Indonesia joined in 1962 and suspended its Membership on December 31, 2008.

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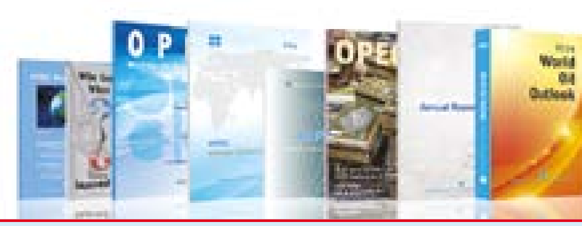

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The *OPEC Bulletin* welcomes original contributions on the technical, financial and environmental aspects of all stages of the energy industry, research reports and project descriptions with supporting illustrations and photographs.

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6th Asian Ministerial Energy Roundtable stresses importance of energy dialogue

Sheikh Abdullah bin Nasser bin Khalifa Al Thani (c), Prime Minister and Minister of Interior, Qatar; HRH Prince Abdulaziz bin Salman Al-Saud (seated left), Deputy Minister of Petroleum and Mineral Resources, Saudi Arabia; and Dr Mohammed Bin Saleh Al-Sada (seated right), Qatari Energy and Industry Minister.

Qatari Prime Minister and Minister of the Interior, Sheikh Abdullah bin Nasser bin Khalifa Al-Thani, opened the 6th Asian Ministerial Energy Roundtable at the Sheraton Doha Resort and Convention Hotel in Doha on November 9, 2015.

The biennial event, held on this occasion under the patronage of the Emir of Qatar, Sheikh Tamim bin Hamad Al Thani, was co-hosted by Thailand.

Seen as a key feature of the global energy dialogue, it was convened under the umbrella of the International Energy Forum (IEF) and had as its objective the enhancement of cooperation in the field of energy among Asian countries.

Over the three days, the gathering was attended by energy ministers and high-level delegations from 20 Asian countries, as well as the chief representatives of six international organizations, who spoke on a variety of topical issues relevant to today's challenging industry environment.

Speakers included Dr Mohammed Bin Saleh Al-Sada, Qatar's Minister of Energy and Industry; Sudirman Said, Indonesia's

Minister of Energy and Mineral Resources; HRH Prince Abdulaziz bin Salman Al-Saud, Saudi Arabia's Deputy Minister of Petroleum and Mineral Resources; Dr Abdul-Hussain Bin Ali Mirza, Bahrain's Minister of Energy; Dr Dharmendra Pradhan, India's State Minister for Petroleum and Natural Gas; Abdalla Salem El-Badri, OPEC Secretary General; Dr Aldo Flores-Quiroga, Secretary General of the IEF; Keisuke Sadamori, Director, Energy Markets and Security, at the International Energy Agency (IEA); and Suleiman Jasir Al-Herbish, Director-General of the OPEC Fund for International Development (OFID).

In his opening remarks, The Qatari Prime Minister stated that the Roundtable was particularly significant as it came at a time when world energy markets had been witnessing drastic changes for more than a year.

"It comes to emphasize the importance of having such meetings among partners and fellow Asians to look into the regional challenges facing this great continent and come up with solutions and common stances that would serve the interests of all," he affirmed.

Sheikh Abdullah pointed out that the Roundtable, held under the umbrella of the IEF, was another endeavour to reinforce the principle of dialogue among nations.

"While highly appreciating the efforts of the IEF, we seize this opportunity to reiterate that the conditions the energy sector is currently going through highlight the need for dialogue between all producers and consumers with the aim to reach a common understanding of the challenges this sector is facing," he stated.

Sheikh Abdullah urged the IEF to go further in its attempts to open more channels of communication among all players in the energy sector.

"All nations are called upon to learn from the lessons offered by the history of the world economy. Despite the challenging economic conditions that our nations have been through over the past decades, our determination to provide a decent life for our peoples has been our motivation to improve our economic conditions and overcome all challenges," he asserted.

Sheikh Abdullah stressed that Qatar was making considerable investments to "lighten up the world" with liquefied natural gas (LNG) as a source of clean and reliable energy.

"Our leadership believes that the world has become one large family. Out of a firm belief in the values of fairness and integrity in dealing with our partners, we are exerting the utmost efforts to be an Asian role model in our compassion with the hardships mankind is facing nowadays, in the hope of relieving the economic burdens some governments are currently shouldering," he said.

The Roundtable was divided into four plenary sessions. Session one had the theme 'Oil markets: a new normal or just another cycle, and what does it mean for Asia?', while session two looked at 'Gas and coal in Asia's energy mix: interactions and uncertainties'.

In the third session, delegates addressed the topic 'Delivering on the clean energy agenda: prospects and the role for policy', while the last session featured the concluding statement.

This pointed out that the Roundtable had focused on important energy issues and challenges and had served as a good opportunity to review and reflect on the consequences and prospects of the energy market in the aftermath of the last one-and-a-half years of extreme challenges and turbulence in the energy sector.

It noted that Roundtable participants had reached agreement on many key issues and agreed that active dialogue was of paramount importance to achieve respective development goals.

The key issues Roundtable participants reached agreement on:

- The importance of continuous international dialogue between consumers and producers, as the only way to reach development goals by all nations, as part of our right as sovereign nations.
- Current market instability will not last forever, and all parties have to take the required actions to sustain investments in the energy sector to meet future energy demand and strike a market balance.
- Asia remains a vital engine of growth for the world's economy, and it will remain so in the foreseeable future. The demographic changes will have increasing influence on energy demand in the future.
- All resources available are needed to answer future growth in energy demand. It is becoming more evident that world economic stability is dependent on stable and transparent Asian energy policies.
- It was acknowledged that every nation has the right to development and growth, in line with their national visions, to meet the aspirations of its people and to contribute to the betterment of their communities.
- It was reaffirmed that energy security is an essential component to any economic development dialogue. Therefore, the role of international organizations and agencies needs to be made more active.
- There was agreement emphasizing the importance of reducing the carbon footprint and the important role natural gas plays in the transition to a decarbonized world. In this context, the use of natural gas as a clean and affordable source of energy was stressed. Natural gas will play a critical role in the climate change negotiations in COP21 in Paris.
- It was highlighted that coal continues to be less expensive than gas, even amid the low oil price environment, making it difficult to reduce the rate of emissions coming from coal.
- Delegates endorsed the proposal of the Kingdom of Saudi Arabia delivered by HRH Prince Abdulaziz bin Salman Al-Saud, to establish an Asian Energy Efficiency Knowledge Sharing Framework under the IEF.
- At the end of the roundtable, participants agreed that active dialogue is of paramount importance to achieve our own development goals.

Saudi Prince Abdulaziz addresses Asian Ministerial Energy Roundtable

Achieving oil market stability “a shared responsibility”

HRH Prince Abdulaziz Bin Salman Al-Saud (l), Deputy Minister of Petroleum and Mineral Resources, Saudi Arabia, during his opening remarks. Pictured with Dr Mohammed Bin Saleh Al-Sada (r), Qatar’s Energy and Industry Minister.

HRH Prince Abdulaziz bin Salman Al Saud, Saudi Arabia’s Deputy Minister of Petroleum and Mineral Resources, addressed the 6th Asian Ministerial Energy Roundtable in Doha, Qatar. In his remarks, he spoke about the importance of energy interdependence and constructive dialogue between the producers and consumers for promoting trust, cooperation, information exchange and a deeper understanding of each other’s policies. He also reiterated the Kingdom’s commitment to the long-term welfare of the international oil market through continuing investment.

Saudi Arabia plays, and will continue to play, a proactive role in stabilizing international oil market conditions by building on its close relationship and ongoing cooperation with both producers and consumers, and through its effective and constructive engagement in OPEC and the International Energy Forum (IEF).

That was one of the important messages conveyed by HRH Prince Abdulaziz bin Salman Al Saud, Saudi Arabia's Deputy Minister of Petroleum and Mineral Resources, to delegates attending the 6th Asian Ministerial Energy Roundtable in Doha.

Making the Chair's opening remarks, he stressed that in an increasingly interdependent world, achieving the above objective was a shared responsibility.

"Both consumers and producers have a common interest in working collectively to achieve a more stable market," he professed. "This is essential for sustaining much-needed investment and for ensuring a stable, secure and sustainable energy system to the benefit of all."

IEF should extend reach

Prince Abdulaziz pointed out that the International Energy Forum (IEF), based in the Saudi capital, Riyadh, remained the only international energy body under whose umbrella both producers and consumers could cooperate on energy issues, exchange information, and gain deeper understanding of each other's energy concerns to enhance their common interests.

"The IEF should continue to organize roundtable events and extend their reach to other regions. Back in 2010, in Cancun, Mexico, I stated that the IEF 'is an embodiment of the shared views of producers and consumers and recognition of the need for stronger, broader and more effective cooperation.' This could not be more true than it is now, during these times of challenge and uncertainty," he affirmed.

Prince Abdulaziz stated that globalization, together with stronger trade and financial ties, meant that each nation's prosperity had become closely intertwined with that of the rest of the world.

"This cannot be seen more clearly than in the area of energy," he contended. "Rather than independence, the world of energy is one of interdependence, where security of supply — and that of demand — are two sides of the same coin."

He said that in such an interdependent world, constructive dialogue between consumers and producers was essential to promote trust, cooperation, information exchange and a deeper understanding of each other's policies.

The Asian Ministerial Energy Round Table had become a key feature of this global energy dialogue, he stated.

Prince Abdulaziz noted that the last few months had been, without doubt, very unusual, if not unique, for the oil market. After years of relative stability, the oil price started falling in the second half of 2014, losing more than 50 per cent of its value in a relatively short period of time.

"The sharpness and the speed at which the price fell has fuelled many analysts' imaginations, with some explaining the fall in the oil price in terms of conspiracy theories and geopolitical games."

He observed that others considered the current changes to be structural in nature — "where we have entered a 'new oil order' with oil prices staying at this level, or falling even lower, for a long period of time; the cost curve for oil shifting downwards; United States shale producers assuming the role of the swing producer; and OPEC as an Organization playing no, or only a limited, role in market stabilization, with some even going so far as declaring the death of OPEC."

"Rather than independence, the world of energy is one of interdependence, where security of supply — and that of demand — are two sides of the same coin."

He continued: "Virtually every oil price cycle in the past has generated its own narrative; this one is no different."

Prince Abdulaziz said that despite their fundamental flaws, such narratives often dominated the energy discourse and tended to shape market expectations and beliefs.

"For a major reserve holder, oil producer and exporter such as Saudi Arabia, our focus has always been on the long-term trends shaping the oil market," he maintained.

"Rather than being a commodity in decline, as some would like to portray, supply and demand patterns indicate that the long-term fundamentals of the oil complex remain robust."

"Globalization, industrialization, urbanization and rapid development — all fuelled by energy — will continue to lift hundreds of millions of people out of poverty."

He said one fundamental flaw in the current narrative was the tendency to compare the current oil price fall with that of the mid-1980s.

"This comparison is simply misguided. Market conditions now are fundamentally different from what they were then."

In 1985, he explained, global oil consumption stood at just over 59 million barrels/day and available spare capacity was at a historical level of over 10m b/d, with the ratio of spare capacity to global oil consumption standing at about 17 per cent.

In 2015, oil consumption was estimated to reach 94m b/d, while usable spare capacity, mainly held in Saudi Arabia, was estimated at 2m b/d — a ratio of spare capacity to oil consumption of about two per cent.

"This is one of the few industries in the world that is operating with such a thin cushion. Spare capacity acts as an insurance policy against unanticipated changes in oil market conditions and is key to maintaining oil price and global economic stability," he affirmed.

Prince Abdulaziz said there was another fundamental difference from the mid-1980s. Despite all the macroeconomic uncertainties engulfing the global economy, oil demand continued to grow at a robust pace and was set to increase by 1.5m b/d in 2015, the strongest growth seen in the past few years.

"This is in contrast to the early 1980s where global oil consumption fell between 1980 and 1984 by more than 2.3m b/d."

He told delegates that there may be some bumps on the road, and the phenomenal growth seen in the last three decades in Asia may not be repeated, as growth in oil demand would be moderated by efforts to efficiency enhancement and oil substitution.

"To meet the expected increase in demand, the world needs all sources of energy, including oil, gas, renewables, nuclear, and solar."

"But the petroleum industry should not lose sight of the fact that scale matters. Globalization, industrialization, urbanization and rapid development — all fuelled by energy — will continue to lift hundreds of millions of people out of poverty and to expand the size of the middle class from the current level of 1.8 billion to 3.2bn in 2020, and to 4.9bn in 2030, with the bulk of this expansion occurring in Asia," he stated.

The new emerging middle class, he said, would be made up of people who were younger and eager to increase their consumption. Such young demographics amidst rising income levels would keep energy demand on an upward trend.

Prince Abdulaziz said the current low levels of spare capacity, together with the robust growth in demand, indicated that the current market fundamentals were different from those of the early 1980s and that comparisons with that period were therefore misplaced.

"To meet the expected increase in demand, the world needs all sources of energy — including oil, gas, renewables, nuclear, and solar. The Kingdom has always been of the view that there are plenty of resources to meet the projected increase in demand."

He said the peak oil theories that dominated the energy discourse a few years ago, insisting that global oil production had already reached a peak, had proved to be simply wrong. "The pendulum has now moved in the opposite direction and expectations of 'scarcity' have been replaced with expectations of 'abundance'."

Right incentives required

However, he said, while the availability of resources had never been the constraint, it was also true that conditions must be put in place to provide the right incentives for the industry to explore and to develop these reserves in an efficient and timely manner.

"There is a sense of complacency and a misconceived perception that the challenges faced by the industry a few years ago, ranging from the small number of new oil discoveries, to the sharp rise in industry costs, to the difficulty in retaining talent, to the high decline rates in mature areas, and to the increasing complexity of developing new finds, have all but disappeared.

"The fast and sharp industry response to the current fall in the oil price, however, has shown clearly that the sustainability of investment and output growth cannot be achieved 'at any price'."

Prince Abdulaziz said that while it was true that underground resources were abundant, the technical and human resources and the financial resources needed to develop these reserves, were not.

Roundtable delegates take time out for a group photograph.

Both the industry and the supply chain remained highly vulnerable to sharp price movements. Around $200bn of investments in energy had been cancelled this year, with energy companies planning to cut another three to eight per cent from their investments next year, he observed.

"This is the first time since the mid-1980s that the oil and gas industry will have cut investment in two consecutive years."

Under increasing fiscal pressure, many governments in key oil-producing countries were being forced to cut their investments in the energy sector and to revise downward their expansion targets.

Prince Abdulaziz noted that the impact of the recent cut in capital expenditure had not just been confined to oil exporters — it was also being felt in importing countries, where the decline in oil prices had increased the risks for firms in the Asian oil and gas sector, affecting their investment plans.

"The potential impact of current cuts in expenditure on future oil supplies is both substantial and long-lasting. Nearly 5m b/d of projects have already been deferred or cancelled. Also, the reduction in capex at existing producing fields — including investment in enhanced oil recovery projects — will only accelerate the already high decline rates, especially in offshore ageing fields," he maintained.

Prince Abdulaziz stated that, in fact, after three years of positive growth, non-OPEC supply was expected to fall in 2016, only one year after the deep cuts in investment.

"Beyond 2016, the fall in non-OPEC supply is likely to accelerate as the cancellation and postponement of projects will start feeding into future supplies and the impact of previous record investments in oil output starts to fade away."

He said that an important part of the current narrative was that these cuts in investment and output could be quickly reversed when oil prices start rising again. This was attributed to the view that investment cycles were becoming shorter and the supply curve more elastic.

"But this is wishful thinking," he ascerted. "Previous cycles have shown that the impact of low oil prices is long-lasting and that the scars from a sustained period of low oil prices cannot be easily 'erased'."

Extreme movements harmful

Prince Abdulaziz maintained that during sharp downturns, the industry tended to lose talent, technical expertise, financial resilience and the confidence to embark on new investments.

"Unfortunately, none of these adverse impacts on our industry can be quickly reversed. The extreme price movements that we have witnessed recently are very harmful for producers, consumers and industry players."

He said that for producers whose economies were highly reliant on oil revenues, they undermined their development plans and complicated their macroeconomic management.

For consumers, oil price volatility induced uncertainty in the general macroeconomic environment, reducing investment and capital formation and undermining the viability of their energy policies.

For the oil industry, sharp price swings made future planning extremely difficult, delaying much-needed investment in the oil sector.

"The impact of such price instability is not just confirmed to the oil sector; the spillovers are being strongly felt in other parts of the energy complex, such as renewables and natural gas," said Prince Abdulaziz.

"This is because price instability undermines the viability of energy policies — of both producers and consumers — that are aimed at increasing the share of renewables in the energy mix and enhancing energy efficiency.

"Beyond 2016, the fall in non-OPEC supply is likely to accelerate as the cancellation and postponement of projects will start feeding into future supplies ..."

"As we saw back in 2008, high oil prices proved to be unsustainable and the price fell sharply following the great financial crisis. But this works in the opposite direction. A prolonged period of low oil prices is also unsustainable as it will induce large investment cuts and reduce the resilience of the oil industry, undermining future security of supply and setting the scene for another sharp price rise," he stated.

"Just as the assertions, heard a few years ago — that the oil price would reach $200/b — were proved wrong, so the recent assertion that the oil price has shifted to a new low structural equilibrium will also tum out to have been wrong," he maintained.

As a responsible and reliable producer with a long-term horizon, Saudi Arabia, said Prince Abdulaziz, was committed to continuing to invest in its oil and gas sector, despite the drop in the oil price.

"Concrete steps are also under way to reduce the energy intensity of the Kingdom's economic activity, through the implementation of energy efficiency schemes."

He said Saudi Arabia had also taken steps to diversify its use of energy resources. "These measures validate our belief in the strength of the long-term fundamentals of energy markets and demonstrate the importance that Saudi Arabia attaches to maintaining its oil export capability and spare capacity."

OPEC Secretary General attends Energy Roundtable

El-Badri sees more balance returning to oil market in 2016

OPEC Secretary General, Abdalla Salem El-Badri (pictured), addressed the 6th Asian Ministerial Energy Roundtable in the Qatari capital, Doha. In the session, which had the theme 'Oil markets: a new normal or just another cycle, and what does it mean for Asia?', he spoke about the importance of the Asian region to future oil demand and how cooperation and dialogue was vital for gaining a better understanding of the main issues involved. El-Badri also forecast more balance returning to the oil market in 2016.

OPEC Secretary General, Abdalla Salem El-Badri, has said the expectation is that the international oil market will return to more balance in 2016.

"We see global oil demand maintaining its recent healthy growth. We see less non-OPEC supply. And we see an increase in the demand for OPEC crude," he told delegates attending the 6th Asian Ministerial Energy Roundtable in Doha.

"A more balanced market is clearly beneficial to us all — both producers and consumers," he pointed out.

El-Badri said that in looking back over the past 18 months or so, there was much to discuss. Since July 2014, the market had witnessed a great deal of volatility. Prices had fallen by 60 per cent, many investments had been deferred or even cancelled, manpower had been laid off, supply had been greater than demand, stocks had risen above their five-year average, and the market had been searching for balance. "It leads me to the question asked by this session: have recent events created 'a new normal' for the oil market, or is it just 'another cycle' in the oil industry's history?"

The OPEC Secretary General said the industry had gone through many cycles. "We have had periods when prices were low and periods when prices were high. We have seen times when supply outstripped demand and times when supply has struggled to keep up. There have been long periods of stability, as well as some periods of instability."

"I am sure some of us here can recall the supply and demand challenges of the early 1980s and the price drop in 1985–86. The OPEC Reference Basket fell from around $25/barrel in November 1985 to just $8/b in July 1986.

"In 1997 and 1998, there was the Asian financial crisis — and another price drop. The OPEC Reference Basket fell from around $20/b in October 1997 to $9/b in December 1998. In the early years of the last decade we saw strong demand growth, particularly in Asia, which led to rising prices.

"And at the end of 2008, there was the global financial crisis, when prices dropped from around $140/b to the mid-$30/b range."

El-Badri said the current cycle was triggered by oversupply. "But what is different on this occasion is that most of the supply increases in recent years have come from high-cost production. The market is now taking on board this new reality and gradually resetting itself, as we can see with falling non-OPEC supply growth and stronger demand."

He said that, as with previous cycles, the industry would come through this one. In fact, cycles had helped made it increasingly resilient and more efficient.

"Our industry is built on strong foundations. Nevertheless, we should recognize that each cycle does bring with it changes and challenges."

For example, said El-Badri, from 2014 to 2015 the industry had seen a fall in exploration and production investment of around $130 billion. This equated to a 20 per cent drop.

"And questions are being asked as to what might be the medium- and long-term impacts of the recent manpower cuts, particularly given that the industry was experiencing critical shortages even before this cycle."

The OPEC secretary General said that, of course, there were also many other ongoing challenges: the uncertain prospects for the global economy; environmental issues and concerns; excessive speculation and the role of financial markets; the impact of geopolitics; and advances in technology and their impacts on exploration and production, to name just a few.

"Moreover, many new factors may be just around the corner; there are always unknowns," he maintained.

"So while cycles come and go, we need to appreciate that the industry never stands still."

El-Badri said this brought him to the second question of the session: 'what does it mean for Asia?'

Asia, he said, had a number of significant producers, but overall it was a major importer of crude and products. Thus, the price fall would no doubt have been beneficial to many of its economies. "We should also recall that many Asian economies flourished during periods of higher prices."

"However, low prices for a long time are not good for anyone. The same goes for high prices."

More investment needed

El-Badri said the industry would need to supply more oil in the future, much of it going to the Asian region. And this would need more investment.

"We see oil demand increasing by around 17 million b/d between now and 2040, reaching close to 110m b/d by then. And 70 per cent of this growth alone is expected to come from the developing Asia region.

"It will mean that over the next 25 years or so, Asia will see energy and oil imports increase from almost all regions — but mainly from the Middle East, where many OPEC Members are located.

"Let me stress here that all our Member Countries remain committed to making sure customers receive secure and regular oil supplies to meet their demand needs."

El-Badri said in terms of oil-related investment requirements, these were estimated to be around $10 trillion between now and 2040.

"There are huge investments that need to be made. Thus, it is vital to keep in mind the link between the marginal cost, the price and investments.

"It leads me to the question: 'are current prices at a level that will see all the necessary future investments take place?' It is clear they are not. At current price levels not all of the necessary future investment is viable," he affirmed.

El-Badri said that given Asia was central to the global oil market's future, as the engine of economic growth and oil demand in the decades ahead, it was vital the region understood the oil market's short- and long-term market dynamics.

"It is clear that the importance of dialogue between the world's energy stakeholders — especially in terms of bringing together producers and consumers — has never been greater. In this regard, I am sure we can all appreciate the benefits of this Roundtable," he stated.

"A more balanced market is clearly beneficial to us all — both producers and consumers."

"There are huge investments that need to be made. Thus, it is vital to keep in mind the link between the marginal cost, the price and investments."

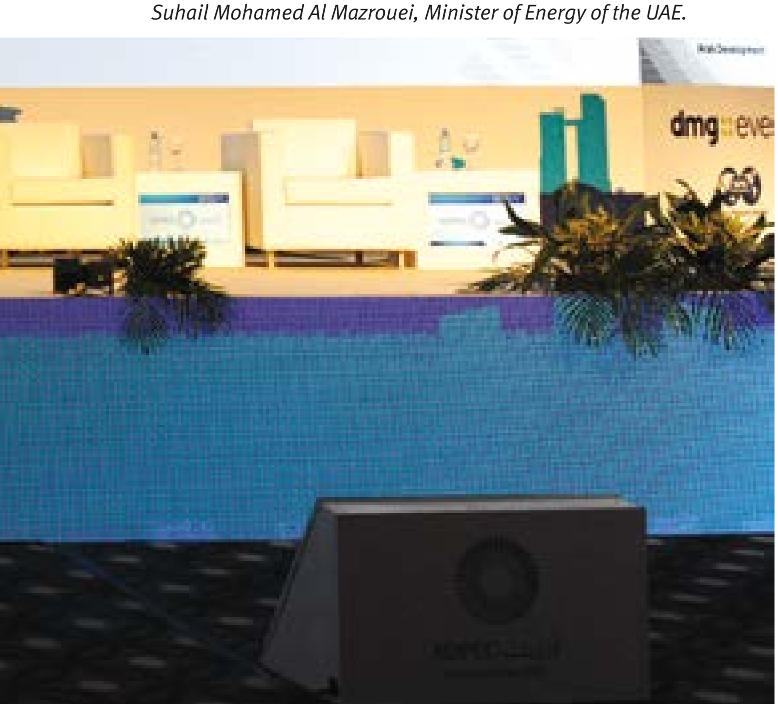
ADIPEC 2015

A mega-event for the petroleum industry

ADIPEC أديبك
9-12 November 2015

The Abu Dhabi International Petroleum Exhibition & Conference (ADIPEC) took place in the United Arab Emirates (UAE) on November 9–12, 2015. With speakers, delegations and participants from across the oil and gas industry, and from around the world, it has become a requisite stop on the annual events' calendar. With the OPEC Bulletin *invited to attend this year,* ***Alvino-Mario Fantini*** *files this detailed report.*

Suhail Mohamed Al Mazrouei, Minister of Energy of the UAE.



L–r: Suhail Mohamed Al Mazrouei, Minister of Energy of the UAE; Sudirman Said, Indonesia's Minister of Energy and Mineral Resources; Abdalla Salem El-Badri, Secretary General of OPEC.

The United Arab Emirates (UAE) is a place made for superlatives. The nation holds the world's sixth-largest oil reserves and seventh largest gas deposits; the city of Dubai is home to the world's tallest skyscraper; and the capital city of Abu Dhabi has become the site of the oil and gas industry's largest event — the Abu Dhabi International Petroleum Exhibition & Conference (ADIPEC).

The event, which became an annual gathering only in 2013, transforms the large exhibition hall on the outskirts of Abu Dhabi into a meeting place for some of the biggest and most important players in the oil and gas industry. And, in the process, ADIPEC has become one of the world's most influential energy conferences.

The simple fact is that ADIPEC offers an unrivalled global platform for industry professionals to learn about new products, share field experiences with each other, attend technical research presentations, listen to high-level speakers, learn about new products and techniques, and conduct business with players, both large and small, working in all areas of the industry.

However, it is not just about deal-making but about the sharing of knowledge and the discovery of what innovators are doing around the world. And it is not just about formality, protocol and diplomatic relations with industry counterparts; it is also about global friendships and open communications — and those other intangibles on which relationships are built and through which truly successful business deals can be made. That is what ADIPEC offers.

Ali Khalifa Al Shamsi, Director of Strategy and Coordination at the Abu Dhabi National Oil Company (ADNOC).

High-level speeches

This year's ADIPEC programme took place under the theme of 'Innovation and Sustainability in a New Energy World', chosen by the members of the 59-member ADIPEC Executive Committee. The theme informed and guided both the conference, as well as the industry exhibition, which took place concurrently. It was also the theme around which many other related side activities — which ran from the academic to the corporate — were organized.

The level of interest in this year's ADIPEC turned out to be truly staggering. There were media reports of some organizations not being able to register in time and of exhibitors who failed to secure a much-coveted spot in the exhibition hall.

Also, this year ADIPEC was forced to extend its floor space to include a new Hall 15 for exhibitors, based on the increased demand from companies and countries around the world.

Organizers even saw a need to include a special 'zone' dedicated to heavy machinery, which was located on the shore next to Gulf waters. Even after a few days, the overall effect was dizzying, with exhibitor booths and stands — some quite simple, others flashy, with lights and heavy-duty machinery — snaking their way through the conference centre, into every available nook and cranny, while the passageways and hallways were jam-packed with visitors at all hours of the day.

If forced to decide, one might say that the heart of ADIPEC is really the conference at which important keynote speeches and high-level panels take place. It is there that audience members can listen to industry leaders, government officials and energy ministers from all manner of countries — and, if lucky and time permits, can even have the chance to ask questions of them about the state of the oil market and the direction of the industry.

On November 9, the first day of the event, Suhail Mohamed Al Mazrouei, Minister of Energy of the UAE, officially opened ADIPEC with a keynote speech that touched on its official theme, while also putting it all into the context of recent events in the industry.

"This is not only the largest conference specializing in oil and gas in the world," he said, "but also the world's largest exhibition … with 2,050 exhibitors."

He added that it was important to recognize that the success of ADIPEC is solely the result of hard work on the part of the Executive Committee — and, perhaps most importantly, the result of the generous patronage of HH Sheikh Khalifa Bin Zayed Al Nahyan, President of the UAE.

Turning his attention to the state of the oil market and the industry, the Minister then spoke of recent challenges affecting the industry, such as the recent low oil

Left: Dr Daniel Yergin, founder of CERA and Vice Chairman of IHS.

Above: Dr Mohammed bin Hamad Al Rumhy, Oil and Gas Minister of Oman.

price environment. But he quickly noted that the UAE is not planning on cancelling any projects. In fact, it intends to continue to be a solid oil producer and "we will continue to be a reliable [energy] supplier," he said.

The Minister recognized that some observers might be more concerned than others. That is why one of the main purposes of this year's ADIPEC, he said, is to offer everyone a "ray of hope that things will improve."

His comments were followed by a short statement by Ali Khalifa Al Shamsi, Director of Strategy and Coordination at the Abu Dhabi National Oil Company (ADNOC), who took the opportunity to speak in his role as Chairman of ADIPEC 2015.

"In spite of the [price] fluctuations … interest in ADIPEC has grown again," he noted, announcing record attendance levels. "We have raised our bar."

He also said that "we know and accept that we must utilize our resources" to find common areas of agreement and ways to work together. And as 'easy oil' becomes a thing of the past, he said more and more people in the industry will need to "forge ahead together."

Indeed, survey results after the conclusion of the conference indicate that the total value of deals signed at ADIPEC this year topped $9 billion, suggesting that despite the vagaries of the market and other recent challenges, the industry continues moving forward.

The real 'show-stopper' during the opening ceremony was the wide-ranging keynote address given by Dr Daniel Yergin, founder of CERA and Vice Chairman of IHS, the global research and information company. He gave what others have called a "sweeping analysis" of the energy sector, bringing together many of the cross-cutting issues, lingering concerns and emerging challenges that have impacted the markets in recent months.

On the whole, Yergin seemed optimistic about the future. But he hastened to add that things have shifted in significant and important ways. There is now an "intense focus on costs," he said, adding that "we are no longer chasing barrels; we are chasing efficiency."

Yergin also talked about the adjustment that people have to make to recent price levels. Pointing out that many people in the industry had become too used to barrels at around $100, he said the entire situation was now different and that this required not just a change of mentality but also marked a "time for the industry … to get back to basics."

The 'name of the game' is no longer solely about demand but increasingly about supply — and this requires those in the industry to get back to the bread-and-butter of their businesses.

On the whole, Yergin sounded bullish about the outlook for oil and gas, noting that, for example, despite recent economic challenges, China's demand was looking quite good. On the whole, he said he expected

Tarek El Molla, Minister of Petroleum and Mineral Resources of Egypt.

improvements in the energy industry in 2016 and 2017 — though the next few quarters are likely to be quite tough for everyone.

Yergin's generally optimistic keynote address was followed by an Opening Ceremony Ministerial Panel. Moderated by Yergin himself, the panel included UAE Minister Al Mazrouei; Dr Mohammed bin Hamad Al Rumhy, Oil and Gas Minister of Oman; Tarek El Molla, Minister of Petroleum and Mineral Resources of Egypt; and Etienne D Ngoubou, Minister of Petroleum and Hydrocarbons of Gabon.

This was a particularly lively panel, with the discussion ranging from the possible contributors to the current low oil price environment to the use of fuel subsidies in different countries and the role of multilateral organizations. There was also discussion of the changing level of oil consumption around the world and in select countries, and how this has impacted the industry as a whole.

Industry panels

There were various CEO plenary sessions throughout the week. These included panels on specialized topics such as Innovation and Sustainability in a New Energy World: Strategies and Initiatives from the NOCs (Monday afternoon); Innovation and Sustainability in a New Energy World: Strategies and Initiatives from the IOCs and Service Providers (Tuesday morning); The Global Energy Mix: Pathway to Affordable Energy (Tuesday afternoon); The New Era of Operations Efficiency (Wednesday morning); Driving Innovation through Global-Local R&D Partnerships (Thursday morning); and Using Technology and Innovation to Address Industry Challenges (Thursday afternoon).

These diverse panels were insightful, interesting, extensive and, at times, provocative, with speakers from across the industry speaking about their experiences at some of the world's leading companies.

A few of the industry leaders who served on these different panels included Lars Christian Bacher, Executive Vice President for Development and Production International at Statoil; Jack Williams, Senior Vice President at ExxonMobil; Patrick Pouyanné, CEO and Member of the Board of Directors of Total; Lamar McKay, CEO of Upstream at BP; Paul Piche, Vice President of Strategy and Portfolio Development and Production International at Statoil; Guo Yueliang, UAE Country Manager at CNPC Middle East Ltd; Otto van der Molen, Partner at McKinsey & Company; John MacArthur, Vice

Left: Etienne D Ngoubou, Minister of Petroleum and Hydrocarbons of Gabon.

Above: Patrick Pouyanné, CEO and Member of the Board of Directors of Total.

President of Gas and Technology at Shell; Demosthnis Pafitis, Vice President of Engineering Manufacturing and Commercial Products at Schlumberger; and Saeed Al Rashedi, Senior Vice President of ADNOC, among many others.

OPEC Secretary General as panelist

Each day at ADIPEC also offered a high-level panel with experienced professionals and fascinating speakers. On Tuesday, for example, there was a ministerial and industry leaders' panel moderated by Minister Al Mazrouei. This included Indonesia's Minister of Energy and Mineral Resources, Sudirman Said, who was joined by the Secretary General of OPEC, Abdalla Salem El-Badri, for a discussion on the global energy outlook, the challenge of market stability, and the role of investments, production, and innovation in exploration and production activities.

El-Badri talked about recent OPEC ministerial conferences, pointing to various kinds of considerations that were made and which informed the Organization's decisions. He then turned to the future, saying that 2016 would be a very interesting year for the industry worldwide — but stressing that there needs to be collaboration and a "joint effort between OPEC and non-OPEC" when tackling the challenge of low prices. "The burden must be shared," he said.

Looking at current trends, the Secretary General noted that there had been more balance in the market and that there seemed to be a renewed emphasis on dialogue and communication. The balance that he noted seemed to be emerging as demand and supply levels sorted themselves out. In fact, non-OPEC supply, he noted, has been going down while the call on OPEC oil is now expected to rise again.

Turning his attention to oil market stability and price volatility, El-Badri said they are issues that need to be tackled jointly as well. "We should really work on [these] … all of us," he said. "So either we do it together or we do it alone. That's it," he commented.

And as he has often said in the past, although there is no price target, "we need a price where producers can invest and also have a decent supply." What is also needed is a price environment that is conducive to maintaining investments, which are important since there are still massive reserves to be tapped in Member Countries — and across the world.

Interestingly, the OPEC Secretary General's comments were complemented elsewhere by statements made by

Maarten Wetselaar, Executive Vice President of Shell Integrated Gas.

Al Mazrouei, who spoke about the UAE and its role in the Organization.

"As a Member of OPEC, the UAE is committed to filling shortages in global oil supplies should any Members face trouble in maintaining production levels," he said. "The market will determine sustainable oil prices. Supply and demand will enforce the price that is good for producers," he noted.

And echoing the OPEC Secretary General, Al Mazrouei said "current data makes me optimistic enough to expect that in 2016 there will be a gradual correction of prices."

Minister Said of Indonesia also offered his thoughts on the market and the state of the industry in 2015. Noting that his country has recently asked to re-join OPEC, and noting recent oil output levels, he said: "Indonesia is an aspirational country."

The country, which is blessed with extensive natural resources, is "producing around 800,000 b/d," he said, but "we are now an oil-importing country because we consume up to 1.5m b/d." But Indonesia is working to diversify its energy sources and hopes that it will once again start exporting oil, especially as a Member of OPEC.

There was also a panel for the closing ceremony on the last day and Al Mazrouei gave a final, keynote address which summed up some of the topics and themes that had been discussed during the previous three days. He also tried to summarize the mood at ADIPEC 2015, offering some thoughts to be considered as delegates and others already began to look to next year's event.

The Minister was joined by Saif Ahmed Alghfeli, CEO of Al Hosn Gas, and Co-Chairman of ADIPEC 2015; Christopher Hudson, President of dmg Global Energy Events; and Eithne Treanor, presenter for ADIPEC TV and CEO of E-Treanor Media, each of whom offered their own assessment about the success of this year's ADIPEC and commented on the staggering number of participants, visitors and delegates at the event.

Technical sessions/ePoster sessions

It is not only the industry and business dimensions of ADIPEC that have grown; even interest in the technical

Left: Paul Piche, Vice President of Strategy and Portfolio Development and Production International at Statoil.

Above: Sudirman Said, Indonesia's Minister of Energy and Mineral Resources.

or academic side of ADIPEC has increased, a fact that seemed to have been a pleasant surprise to some of the organizers.

According to Al Shamsi, Chairman of ADIPEC 2015, more than 2,200 abstracts were received in the weeks and months leading up to the actual event. This was an increase of 15 per cent over last year's levels, according to organizers. "This was a clear indication," Al Shamsi said, "that ADIPEC is now a global event."

Of these thousands of abstracts, 79 were selected for presentation during the scheduled technical sessions, which took place in smaller rooms along the mezzanine.

These sessions were designed to introduce audiences to some of the latest, cutting-edge research being done in all areas of the industry — in both the upstream and the downstream; in oil, gas, and other energy sectors; and in areas ranging from safety and security, to animal and environmental management, to carbon emissions reduction, to enhanced oil recovery techniques, fracking and flaring.

In addition, another group of abstracts was accepted to be presented during so-called 'ePoster' sessions, also on the mezzanine, where younger researchers and scholars could present their work.

Some of these technical sessions included detailed and exhaustive examinations of new and innovative technology being used by the industry. With titles such as *An economic approach to horizontal well length optimisation; Recent technologies for land seismic imaging over a complex near surface overburden;* and *Key technologies for deep and ultra-deep wells in HTHP and sour gas fields in China,* these ePoster sessions gave people a glimpse into some of the newer methods and techniques being used by field operators.

There was even one ePoster session that looked at the use of artificial intelligence by the industry. Titled Integrated Leak Detection in Gas Pipelines Using OLGA Simulator and Artificial Neural Networks, the ePoster session focused on the increasing use of fuzzy logic, neural networks and genetic algorithms by those working on the technical side of the industry. Not only was such a topic fascinating, it was an example of some of the incredible innovative work being done by technically proficient professionals in the industry.

Abdalla Salem El-Badri, Secretary General of OPEC.

Middle East Petroleum Club

Special events were also held at something called the Middle East Petroleum Club, which was set up alongside one of the main conference centre wings.

Providing access only to those with a special 'Gold Pass', the Club had an inner garden with tables and chairs, as well as a larger indoor dining area and a small auditorium where various VIP events were held during the week.

During the course of the week, high-level speakers there had an opportunity to discuss specific themes with other invited guests and with small audiences.

These themes included things like *Innovation Through Industry Collaborations,* which counted on the participation of Dr Robert Armstrong, Director of the MIT Energy Initiative; Daniel Plathey, Vice President of R&D at Total E&P; and which was moderated by Dr Wafik Beydoun, Manager of the R&D Division at ADNOC.

Another theme was *Harnessing Africa's potential: opportunities for foreign investors,* held on Wednesday morning, where Dr Timi Austen Peters, Chairman of Dorman Long Engineering Ltd in Nigeria, joined Geoffrey White, CEO Africa at Agility, and Olalekan Aldnyanmi, CEO of Nigerian oil and gas exploration company, Lekoil, as panelists, while David Phillips, Chairman of the Board of the Bilateral US-Arab Chamber of Commerce, served as moderator.

Also, a session was held on *Energy investment: the broader perspective* on Wednesday afternoon, which counted on the participation of Christof Rühl, Global Head of Research at the Abu Dhabi Investment Authority, and Bakheet Al Katheeri, Chief Operating officer of Mabadala Petroleum, while Gamal Hassan, CEO of ADH International Energy, served as moderator.

However, once again, the biggest draw at the Petroleum Club was on Monday, when ADIPEC's keynote speaker, Daniel Yergin, the Pulitzer Prize-winning author of *The Prize: The Epic Quest for Oil, Money, and Power,* one of the most widely read histories of the petroleum industry, fielded questions of all kinds from the audience. After the scheduled time, he was surrounded by people with even more questions.

But besides these formal activities, those who visited the Club — whether it was for lunch or simply to take in some sun and some refreshment — had plenty of opportunity to meet others. In fact, according to the Club's promotional material, the primary objective of the Club is "to strengthen the connections that exist between oil and gas executives and to forge new connections."

Left: Dr Daniel Yergin, founder of CERA and Vice Chairman of IHS.

Above: Eithne Treanor, presenter for ADIPEC TV and CEO of E-Treanor Media.

This was clearly on display during the week, as company executives, heads of industry associations, international organizations and visiting dignitaries met, talked, discussed and negotiated their way into the early evening hours.

Offshore and marine activities

As one delegate commented, ADIPEC is really more like three or four conferences in one. In addition to the official conference and exhibition, and the special events at the Club, there were 16 sessions that formed part of the Offshore and Marine Conference. This, too, took place under the auspices of ADIPEC.

Held in a special 'purpose-built dedicated theatre' on the waterfront, the Offshore and Marine Conference brought together thousands of other people — from global industry experts to researchers and business leaders — who engaged in presentations and discussions about key offshore projects, the challenges ahead and the opportunities that may exist in the near future.

In addition, as Al Shamsi pointed out in his official welcome speech to ADIPEC participants on the first day, experts at the Offshore and Marine Conference also provided important updates on maritime security and safety issues and recent technological advances in shipping and offshore exploration and production.

The sessions at this conference were wider-ranging, in keeping with the nature of the rest of ADIPEC. They included presentations on the growth in offshore operations across the Middle East, advanced methods in offshore sub-sea exploration, strategic considerations for maritime security and safety, and the changing role of the shipping industry in the 21st century.

However, the most well-attended sessions by far were the keynote speech on Monday and the very first session immediately afterwards. Both focused on something that everyone in the industry has on their mind: the impact on the industry of current global economic conditions.

With top-notch speakers such as Philip Whitaker, Director of Boston Consulting Group, Amer Al Shaikh Ali, CEO of Total ABK, and Khalil Ibrahim Mohamed Hosany, Geosciences team Leader at ADMA-OPCO, current economic conditions and the outlook for the future were discussed.

In addition, the impact of recent economic events in large consuming countries and the effect of low oil and gas prices on the offshore and marine sector were analysed, discussed, and debated — with the conclusions being that people need to work together and that fear should not guide investment and business decisions.

Young ADIPEC

Lest anyone think that ADIPEC is solely about mature businessmen and researchers getting together to talk, it is worth pointing out the existence of the 'Young ADIPEC' exhibit. This reflected the activities and achievements of a long-running programme aimed at young people in the UAE.

Involving about 400 students from 12 Abu Dhabi schools and four international schools, the programme is now in its third year. Set up under the generous patronage of Sheikh Nahyan bin Mubarak Al Nahyan, UAE Minister of Culture, Youth and Social Development, the programme is designed to stimulate interest among students in the oil and gas industry — by organizing field trips to oil and gas installations; opportunities for gaining 'hands-on' experiences at different companies and organizations; live demonstrations and competitions.

Al Nahyan himself visited ADIPEC on Tuesday and toured the Young ADIPEC area. He stopped and spoke with great warmth to many of the young people in attendance, occasionally allowing them to take 'selfies' with him.

In comments to the press that day, he said: "ADIPEC serves … as a hub for knowledge and exchange … [and] inspires students to forge a career path in energy. This is of great importance as our youth are the future of our country."

Al Nahyan, who was joined by OPEC Secretary General El-Badri and Abdul Munim Saif Al-Kindy, CEO of ADNOC, later visited other exhibits and stands, stopping to chat with students and other visitors.

One of the people he visited was Rashid Al Dhaheri, who the *OPEC Bulletin* previously interviewed in a June 2015 article titled 'The fastest boy in the Gulf'. Rashid had his own stand at ADIPEC, with one of the 'karts' he uses for track racing on display, as well as his state-of-the-art racing simulator that he uses for training, which was made available for use by visitors.

His coach, Paul Chatenay, was also there to answer questions and meet with people. But the young racing marvel answered questions like a pro and Rashid spoke with wisdom beyond his years, even while he took the opportunity to be photographed with Al Nahyan.

Accompanied by the OPEC Secretary General, Al Nahyan also made a special visit to the OPEC stand outside Hall 5, where there was an opportunity to look at some of the recent material published by the Organization, including the *World Oil Outlook,* the *Annual Statistical Bulletin* and recent copies of the *OPEC Bulletin*.

The industry's female leaders

There was also a special one-day event on 'Women in industry', which was held on the Sunday before the

'Young ADIPEC' reflected the activities and achievements of a long-running programme aimed at young people in the UAE.

Sheikh Nahyan bin Mubarak Al Nahyan, UAE Minister of Culture, Youth, and Social Development.

official opening of ADIPEC on Monday morning. Taking place at the Eastern Mangroves Resort and Spa in Abu Dhabi, the event was organized around 16 sessions and was inspired by the increasing numbers of women working in the oil and gas industry.

The 'Women in Industry' conference counted on the participation of Sheikha Lubna Al Qasimi, Minister of the Ministry of International Cooperation and Development. She was joined by Al Shamsi, Chairman of ADIPEC 2015, as well as Vicki Hollub, President of Occidental Oil and Gas, Sara Akbar, CEO of Kuwait Energy, and Mariam Al Badr, Director of the Corporate Communications Department at Dolphin Energy.

Later that same evening, at a formal dinner, the winners of the 2015 ADIPEC Awards were honoured, with prizes given for the Best Oil & Gas Mega Project, the Oil & Gas Woman of the Year, and the Best Dissertation of the Year.

A colourful display of culture

While ADIPEC takes place in a large exhibition hall on the outskirts of Abu Dhabi proper, there were still a few chances to take in some local culture. In fact, culture and tradition were well on display at ADIPEC itself.

The full colour and rich diversity of the many countries represented at ADIPEC and the camaraderie of those working in the oil and gas industry was all quite evident throughout the busy week.

Delegates from India and Pakistan engaged in animated conversation wearing traditional gowns; others from Angola and Nigeria spoke to colleagues on their cellphones; and others from Western Europe and the Americas tried to meet their counterparts from other countries.

Separately, with their flowing white — or, alternatively, light tan — *dishdashas*, delegates and visitors from across the Middle East and North Africa milled about. Some wore simple white *dishdashas*, open at the collar and the sleeve; others had more formal versions, with closed collars buttoned to the top and elegant cuffs and cufflinks.

Some greeted each other with Western-style handshakes, while others kissed on the cheek. The Emirati way of greeting each other among the men was to touch noses to each other briefly, in a way reminiscent of Eskimo traditions in the North Pole.

And throughout each day, organizers arranged for a group of Emirati men to dance within the cavernous halls of the conference e centre. Holding canes, a dozen or so men performed a traditional Bedouin folk dance which is generally known simply as the *'stick dance'*. The dancers, who perform in a tight row (said to symbolize unity among tribal people), were accompanied by a drummer.

Al Nahyan visited Rashid Al Dhaheri, who the OPEC Bulletin *previously interviewed in a June 2015 article titled 'The fastest boy in the Gulf'. Rashid had his own stand at ADIPEC, with one of the 'karts' he uses for track racing on display.*

The gentle, rolling percussive rhythm and the soft swaying of the dancers entertained and enchanted visitors several times a day.

But not far from the exhibition hall, there were other sights to be seen. The one that stood out, which could be seen on the way to and from the exhibition centre each morning and each afternoon, was the Sheikh Zayed Grand Mosque.

Rising out of the ground and reaching up to the blue skies with its four large minarets, one large central dome flanked by two smaller ones, the impressive white mosque has capacity for 41,000 worshippers. It also contains the world's largest hand-made carpet, measuring 5,627 metres square.

As noted one day by a driver, although the mosque itself is finished, construction at the site continues as workers complete the walkway that leads to the main entrance and as side lots and gardens continue to be developed. It is no surprise then that the mosque has been ranked by TripAdvisor as the fourth most popular landmark in the country.

A record-setting year

As these remarks hopefully demonstrate, ADIPEC was a massive event with far too many facets to be covered exhaustively in one brief article. There shall certainly be a follow-up article, focusing on some of the comments made by participants and profiling some of the innovative companies and the technology they had on exhibit.

Sponsorship and support

However, it is worth noting here that to pull off such a massive event, it not only helped to have an experienced events management organization — dmg Global Energy Events — in charge of logistics and programming; it also helped to have the official support and sponsorship of many of the world's leading oil and gas leaders.

These included not just NOCs and IOCs but also key service providers, many of whom formed part of the ADIPEC Executive Committee. Other members of the Committee included representatives from JODCO, McKinsey and Company, NPCC, Masdar, University of Tulsa, Total, Schlumberger, Shell, Qatar Petroleum, OXY, OMV, Mubadala Petroleum, Eni, ESNAAD, ExxonMobil, Halliburton, the Massachusetts Institute of Technology, and Korea NOC.

The Committee — and ADIPEC itself — also received local support from the Abu Dhabi Ministry of Energy, ADNOC, Abu Dhabi Chamber, and the Abu Dhabi Tourism

A group of Emirati men perform the 'stick dance', a traditional Bedouin folk dance.

and Culture Authority, all of whom had officials at the event.

All this led to the unqualified success of the event. And by the time this year's ADIPEC had closed, organizers said several previous records had been broken. More than 90,000 people attended this year's ADIPEC, including 8,000 official delegates, participating in 140 conference sessions.

In the massive exhibitors' hall, which stretched from one end of the horse-shoe shaped building to the other, spilling out into Hall 15 across a bridge, there were 23 national pavilions, and flashy, high-tech stands by various NOCs and IOCs. In fact, all told, there were 30 NOCs and IOCs in attendance during the week. Next year, even more are expected and things will be, in the words of one organizer "bigger and better".

Looking to 2016

There is no doubt that ADIPEC is the go-to industry event of the year. The OPEC delegation to the conference and exhibition was impressed at the size, intensity, and content — and, perhaps more importantly, by the obvious resilience of the industry.

Delegates expressed continuing optimism about the future, which is a message worthy of transmitting to others. As OPEC, its Member Countries, NOCs and other industry stakeholders look to 2016 and to the possibility of participating in ADIPEC again, one is reminded of the ongoing challenges that face the industry.

Yet, when one considers the number of visitors this year and the level of participation from people from all corners of the earth, one can only marvel at the power and influence and dynamism of all those working in oil and gas, whether large or small.

As Christopher Hudson, President of dmg Global Energy Events, told the OPEC delegation after the official closing of ADIPEC 2015, this was truly a spectacular year — and "we are glad that OPEC could be part of it and hope they will join us again next year."

This is gratifying; but it must be recognized that it is thanks to the assistance and guidance of the UAE's OPEC Governor, Dr Ali Obaid Al Yabhouni, who was on hand to introduce the *OPEC Bulletin's* delegation to so many other officials, that so much could be achieved, and so many contacts could be made, in such a short amount of time.

Along with industry stakeholders of all kinds around the world, OPEC looks forward to next year's ADIPEC. With the dates of November 7–10, 2016, already having been chosen, the only advice one can give those who were unable to participate or attend this year is: start making plans to attend now!

During the closing ceremoney, Suhail Al Mazrouei (second l), UAE Minister of Energy; Saif Alghfeli (second r), CEO, Al Hosn Gas, ADIPIC 2015 Co-Chairman; Christopher Hudson (r), President of dmg Global Energy Events; and Eithne Treanor (l), presenter for ADIPEC TV.

Impressions of

ADIPEC 2015

Kuwait plays host to second Oil and Gas Show and Conference

On the heels of a successful inaugural edition in 2013, the Kuwait Oil and Gas Show and Conference (KOGS) returned to Kuwait City on October 11–14, 2015. With more than 3,500 participating delegates and 260 expert speakers from 60 companies across 27 countries, the event is now classified as Kuwait's largest oil and gas industry gathering. The OPEC Bulletin*'s Scott Laury was present at the event and takes you behind the scenes for an in-depth look at the major issues and topics addressed by some of the industry's most prominent leaders.*

Hosted under the patronage of His Highness Sheikh Jaber Mubarak Al-Hamad Al-Sabah, Prime Minister of the State of Kuwait, KOGS 2015 featured an engaging multidisciplinary conference programme, along with a world-class international exhibition of oil and gas hardware and services. The event was held at the Kuwait International Fair in Mishref, located around 20 minutes south-east of the capital, Kuwait City.

The conference's wide-ranging programme was developed by the Society of Petroleum Engineers (SPE) in cooperation with a committee of regional and international geoscientists, petroleum engineers and chemical engineers. With the theme of *Future hydrocarbon resources: innovations, technology and opportunities,* topics focused on both the upstream and downstream sectors, including facilities and construction, reservoir management, refineries, unconventional resources, HSE, sustainable development, drilling and completion technologies, innovation and petrochemical industries.

In parallel with the conference, the international exhibition featured 14,000 square metres of exhibition space showcasing key industry stakeholders, suppliers and service providers from all areas of the oil and gas industry. As in the 2013 edition of the event, OPEC hosted a stand at the exhibit from which it distributed a wide range of information on the Organization and its Member Countries.

A rousing opening ceremony

The conference was officially kicked off on Sunday October 11, 2015, with a special opening ceremony held at the lavish Al Dorra Ballroom of the Hilton Kuwait Resort, a pristine seaside location on the Gulf.

His Highness Sheikh Jaber Mubarak Al-Hamad Al-Sabah, Prime Minister of Kuwait.

The evening began with the regal sound of an official musical fanfare, signalling the grand entry of His Highness Sheikh Jaber Mubarak Al-Hamad Al-Sabah, the Prime Minister of Kuwait. After warmly greeting the high-level officials and keynote speakers, he was seated and an opening prayer was sung before the official programme got underway.

Dr Ali Saleh Al-Omair, Kuwait's Minister of Oil and Minister of State for the National Assembly, then welcomed officials, delegates, exhibitors and special guests to Kuwait for KOGS 2015 and wished all a pleasant stay and a rewarding and fruitful conference and exhibition. He expressed his appreciation to Prime Minister Al-Sabah for his loyal support of the event and of Kuwait's oil and gas industry generally.

"We highly appreciate your Highness' permanent attention and tuning in to the oil sector, which we would look upon as an important encouragement that touches deeply the hearts of all of the participants in the conference," he said. "Furthermore, it stimulates us to make more sincere efforts to promote overall productivity in the oil sector of Kuwait and to be in the lead in the Gulf and the world in many aspects."

Dr Ali Saleh Al-Omair, Kuwait's Minister of Oil and Minister of State for the National Assembly.

He went on to thank the KOGS organizers for their dedicated efforts in organizing the event, which, he added, has become a leading industry event in Kuwait.

"It is, without doubt, an important platform for showcasing the industry's latest developments, achievements and technologies," he affirmed. "It also offers participants an opportunity to network with leading oil, gas and petroleum companies as well as government officials, regulators and business executives involved in the oil and gas industry."

Shifting his focus to the oil industry outlook, Al-Omair stated that the future energy mix would continue to be predominately based on fossil fuels.

"Recent OPEC *World Oil Outlook* projections indicate that global energy demand will increase by almost 50 per cent in the period to 2040, where the mix continues to be dominated by fossil fuels," he stated. "This means one thing: oil is, and will continue to be, a prominent source of energy to meet future demand."

Turning to the current oil market situation, in which oil prices have dropped to their lowest levels since early 2009, the Minister discussed how the industry and OPEC can provide solutions to address this predicament.

"Our industry is obliged to reinforce our business strategies, discover new and innovative methods of increasing efficiency through technological advances, while keeping our operations safe and environmentally friendly," he stated.

"In this regard, OPEC's decision to keep its output ceiling at 30 million barrels/day in November 2014, and later during the June 2015 Ministerial Meeting, continues to be the optimum solution to rebalance the market and support prices," he maintained.

Investing for future growth

Despite this challenging market environment, Al-Omair said Kuwait would continue to carry out its long-term strategic plan to boost production through investments to construct gathering centres and develop heavy oil in the northern part of the country.

"I would like to reassure you that the development of projects would not be slowed down by the fall in oil prices," he said. "We have already embarked on major capital projects of strategic importance encompassing upstream oil and gas production, and crude oil refining and distribution. Such projects will enhance the environmental and safety performance of operations, provide new employment opportunities, as well as support the country's economic growth."

As examples of this, he cited the Clean Fuel Project, which will transform and integrate the Mina Abdulla and Mina Al-Ahmadi refineries, improving the competitiveness of Kuwait's petroleum product offering. Another major project is the Al-Zour refinery, which will meet the low-sulphur fuel requirements of local power stations. The Al-Zour contract signing ceremony took place on October 13 during the KOGS 2015 event *(see separate coverage of this on page 50)*.

Al-Omair concluded his remarks on a hopeful note, claiming that the temporary ripples in the market can be overcome to secure a bright future for the industry.

"Despite the uncertainties and challenges facing the energy sector, we all agree that our main objective must focus on providing a stable and sustainable energy future for the next generations," he said. "Through innovation, new technologies and collaboration, we can move forward and overcome such challenges."

The next official to take the stage and deliver welcoming remarks was Nizar Al-Adsani, Chief Executive Officer of the Kuwait Petroleum Corporation (KPC) and KOGS 2015 Chairperson.

He began by welcoming all those in attendance to Kuwait for this special event and then gave special

Nizar Al-Adsani, Chief Executive Officer of the Kuwait Petroleum Corporation.

thanks to the Prime Minister for his highl-valued support of the country's oil and gas industry. As KOGS 2015 Chairperson, Al-Adsani also expressed his appreciation to the conference and exhibition organizers, namely SPE and Arabian Exhibition Management.

He noted that the event and its chosen theme came at just the right time as companies are seeking solutions to help them cope with a challenging market situation.

"The KOGS theme for this year is *Future hydrocarbon resources: innovations, technology and opportunities,* which is timely with all the ongoing developments, when companies have announced strategies to help them survive the challenges in a weak market environment," he affirmed.

He then proceeded to outline KPC's ambitious strategy up to 2030.

"Today, Kuwait is producing 3m b/d of crude oil. By 2020, we should be able to produce 4m b/d," he explained. "Expanding crude oil as well as gas capacities will be achieved by increasing the number of rigs, building four gathering centres and two booster stations, developing heavy oil in the north, developing free gas, gas ultilization projects through the Wafra and Khafji joint operations, drilling over 2,000 wells in all areas by 2020 and developing gas train units 4 and 5."

He also outlined KPC's downstream planning with facilities being developed for integrated refining of petrochemicals and for producing high-value, environmentally friendly clean products.

Energy through clean fuels

The new Al-Zour refinery, which will provide 615,000 b/d of low-sulphur clean fuel to Kuwait's power stations, is slated to come online in 2019. The Clean Fuel Project, to be commissioned in 2018, will upgrade existing refineries to produce cleaner petroleum products. An integrated olefins and aromatics facility is also planned as part of the Al-Zour complex. Other projects include the construction of a permanent LNG import facility, an integrated refining/petrochemical complex in Vietnam and additional downstream opportunities to be explored in the Asian and North American markets.

Al-Adsani was firm that Kuwait will continue to invest not only in its projects, but also in attracting and maintaining the skilled labour necessary for KPC to achieve its strategic goals.

"We anticipate an expenditure of 32 billion Kuwaiti dinars (€93bn) over the next five years to achieve this target, of which 15bn dinars (€43bn) is already committed to specifically identified projects. We have already spent 4bn dinars during this fiscal year," he said.

"We strongly believe that a national caliber [of skilled labour] is of great importance to ensure a competitive edge for KPC to execute its strategies. Hence, we have undertaken various training programmes to promote our overall capabilities, technical as well as leadership."

KPC also has plans to promote economic diversification and ensure that its operations are sustainable and environmentally sound.

"Recognizing its importance, KPC is committed to enhance its role in the development of the Kuwaiti economy and promote private-sector participation in selected activities on a commercial basis," he said.

"In our efforts to diversify national income resources, we coordinate with various parties to ensure that renewables will contribute to generate 15 per cent of total energy demand in line with the directions and guidance of HH Sabah Al-Ahmad Al-Jaber Al-Sabah, the Emir of Kuwait.

"Kuwait's energy sector faces the important challenge of securing the energy supply needed to sustain a domestic growing economy, while addressing pollution and global greenhouse gas emission issues. KPC is committed to playing a role in addressing this common concern of humankind," he stressed.

Al-Adsani concluded his remarks by reiterating Kuwait's goal to maintain a leading position in the global oil and gas industry.

"We in Kuwait fully intend to ensure that KPC maintains its position as a leading and reliable source of energy supply in the world, contributing to market and price stability and fully committed to a clean environment," he proclaimed.

"We understand that the success of the oil sector is only achieved if we all work as one team with all our stakeholders in conformity with the guidance and support of HH the Emir of Kuwait, HH the Crown Prince and HH the Prime Minister," he added.

Next on the agenda was Hosnia Hashim, Vice President of Operations at the Kuwait Foreign Petroleum Exploration Company (KUFPEC), who began her remarks by speaking about the impressive growth and increasing importance of the KOGS event, now in its second installment.

Hosnia Hashim, Vice President of Operations at the Kuwait Foreign Petroleum Exploration Company.

A new milestone for KOGS

She added that this progress was even more remarkable considering the challenging period through which the oil and gas industry is currently moving.

"This is the second time that Kuwait is hosting a conference and exhibition of this scale, size and outreach, covering upstream and downstream as well as technical topics of our main industry — the oil and gas industry," she stated.

"I am convinced that KOGS establishes a new milestone every time, which makes all of us absolutely proud, as it is a magnificent framework in which to share our accomplishments, achievements and success stories. This year is especially meaningful as these successes are taking place as our industry faces exceptional challenges with prices at their current levels."

After sharing some impressive statistics on the Conference and Exhibition, she said the event reinforces and helps communicate Kuwait's role as a leading player in the international oil and gas industry to the world.

"Kuwait is naturally called to be one of the leaders of the world energy sector, not only for its reserves and levels of production, but for the ability to network and innovate in the oil and gas sector," she proclaimed. "The Kuwait Oil and Gas Show is a perfect example of this trend."

She then touched on the conference's theme and content, saying it was carefully designed to make the event relevant, cutting-edge and interesting for all attendees.

"The conference will cover the latest technology, innovation and solutions that address our industry's

Janeen Judah, 2017 President of the Society of Petroleum Engineers.

most pressing challenges," she stated. "The technology experts and the programme committee have designed the content to ensure that KOGS not only remains at the forefront of the industry, but also that it will be an event of prime interest for sharing the most recent knowledge and expertise in the industry."

Bringing her remarks to a close, she expressed her personal thanks to all those involved in helping organize the event.

"I want to sincerely thank all the people who collaborated in the wonderful effort to launch KOGS 2015," she said. "I do hope our programme will inspire everyone from students and young professionals to the most senior executives, and I hope you enjoy all that KOGS has to offer. Thank you very much!"

The final speaker providing welcoming remarks was Janeen Judah, the 2017 President of the Society of Petroleum Engineers, which has now completed its second year as KOGS conference organizer.

A thriving event

She began by thanking the Prime Minister, the Minster of Oil and the KPC Chief Executive Officer for their support of KOGS 2015, which she said is now Kuwait's premier industry event.

"The Kuwait Oil and Gas Show and Conference is thriving," she proclaimed. "After the inaugural KOGS event in 2013, we are now following up with the 2015 edition which — when combined with the exhibition — is the single biggest gathering of the oil and gas industry ever seen in Kuwait."

She then explained how SPE is playing an increasingly important role amidst a challenging oil and gas market.

"With the industry downturn, we need to view this turning point as an opportunity for innovation. SPE's core mission is technology transfer and that is needed now more than ever to cut costs, increase production and optimize ingenuity," she said.

"Those who will succeed will be those who reassess assets, create more efficient technology, be open to new, original ideas, optimize what we have and augment where investment can bring higher returns. To do so, we must think in the long-term mindset instead of reacting."

Ideas to spark innovation

In closing, she urged all attendees to make the most of their time spent at the conference and exhibition, which could provide useful results for their businesses and organizations.

"For those of you who are here attending these next three days, I encourage you to learn as much as you can, meet and network with peer colleagues and walk through the exhibit hall to see the latest new technological products and services," she said.

"It is very likely that the ideas and connections you make here this week could spark a new innovative way to look at ways to increase efficiency, streamline operations and find an 'ah-ha' moment that will help you and your company solve problems, save money or find a way to make more revenue."

L–r: Abdalla Salem El-Badri, Secretary General, OPEC; Bob Dudley, Chief Executive, BP; Farouk Al-Zanki, moderator; Mohammad Al-Mutairi, Chief Executive Officer, Kuwait National Petroleum Company (KNPC); Samir Brikho, Chief Executive, Amec Foster Wheeler.

Executive Plenary Session

Moderated by independent consultant, Farouk Al-Zanki, the Executive Plenary Session featured four keynote speakers who are all international energy industry leaders in their particular domains: Abdalla Salem El-Badri, Secretary General, OPEC; Mohammad Al-Mutairi, Chief Executive Officer, Kuwait National Petroleum Company (KNPC); Bob Dudley, Chief Executive, BP; and Samir Brikho, Chief Executive, Amec Foster Wheeler.

Their thought-provoking presentations set the stage and tone for the Conference by tackling the event's theme through sharing their unique and diverse perspectives on the future of hydrocarbon resources in relation to innovation, technology and opportunities for efficiency, safety and sustainability.

Abdalla Salem El-Badri, OPEC Secretary General, began his remarks with a look back to 1960, the year OPEC was founded, and reflected on the explosive growth the industry has experienced since then.

"Looking back to 1960, the year OPEC was founded, global crude oil production was just 21m b/d. Today, it is around 75m b/d. This is an increase of over 250 per cent. On top of this, we also need to factor in the rise of other liquids, which currently add up to close to 18m b/d," he said. "In terms of natural gas, production was close to 445bn standard cubic metres in 1960. Today, it has risen to almost 3.6 trillion standard cu m. This is an increase of over 700 per cent."

This dramatic growth, he stated, stems from innovation, technology and human ingenuity, which has resulted in a continual transformation and reinvention of the industry over time.

"Our industry has seen technological innovation move E&P opportunities from onshore to offshore, then to deep water and frontier regions and most recently to unconventionals," he pointed out. "Improvements in the quantity and quality of information about different geological structures have meant we have been able to find more oil and gas."

Significant progress has also been seen over these years in the areas of health, safety and environment.

"Advancements have also improved the safety of our industry; for those working in it, and also in terms of exploration, production and supply," he maintained. "And they have allowed us to continually improve the environmental credentials of oil and gas, both in production and use."

El-Badri then shifted his focus to the future outlook for the industry, saying that demand for all types of energy will grow substantially in the years to come, in order to meet the needs of a rapidly expanding global population and growing economies, as well as to provide the poor access to modern energy resources. He noted that fossil fuels will continue to be central in the energy mix.

"To 2040, global energy demand is expected to expand by around 50 per cent. In this regard, all forms of energy will be needed — wind, solar, hydro, nuclear and of course fossil fuels, which will continue to play the major role in meeting demand," he stated.

"In terms of oil, with demand projected to grow to 110m b/d by 2040, oil-related investment requirements

Left: Abdalla Salem El-Badri, OPEC Secretary General.

Right: Mohammad Al-Mutairi, KNPC Chief Executive Officer.

are estimated to be around $10tr between now and then."

He affirmed that the world has adequate resources to meet the expected future demand, but that continued innovation and development of new technologies will be crucial to securing resources for future generations.

"The industry's past successes are a reminder that innovation and new technologies are key to unlocking the abundant sources of oil and energy in an ever more sound, secure and responsible manner," he said.

Securing future supply

"In the coming years and decades, the industry can expect to see additional new technologies shift perceptions and prospects once more. This will be achieved through such developments as carbon capture and storage, advancements in enhanced oil recovery and the development of new oil-based materials for various industry sectors."

El-Badri then turned his attention to the urgent issue of ensuring the industry has the talent and skilled human resources it needs to meet future demand.

"At its heart, the oil business is about people. All the innovation, technology and opportunities that are created in the industry depend to a great extent on the availability of talented and skilled people," he stated.

"Globally there is a shortage of young people entering the industry. It is vital that this is rectified. It is the sustained support for the industry's scientists, engineers and visionaries — the people who create new ventures, new technologies and new techniques — that will drive our industry forward and expand supplies."

He then spoke about the recent fall in oil prices and subsequent volatility, but emphasized the importance of a long-term perspective and continued investment even in the midst of the current volatility in the market.

"Developments over the past year or so have led to a number of projects being cancelled or put on hold. Investment plans have been revised. Rig counts have fallen dramatically and redundancies have been made," he said.

"Some cost-cutting and efficiency measures will make the industry a little more nimble and agile. But with less investment, fewer project developments and reduced manpower on the scale that we have witnessed recently, the industry will no doubt be impacted in the short and medium term — and potentially, in the long term too.

"However, as my speech today has emphasized, we need to keep investing. It is essential for our industry's future. It is essential to all those consumers around the world who rely on hydrocarbon resources for their everyday needs. And it will be essential to the future of those currently without access to modern energy services."

Concluding his remarks on a positive note, El-Badri said he is confident that the industry will recover and thrive in the future.

"I remain confident that our industry's best days are yet to come. We have an abundance of hydrocarbon resources. And oil and gas demand continues to grow. All of this points to tremendous opportunities," he proclaimed.

"To turn existing and future challenges into promising opportunities, however, requires strength, resilience and vision. And this means working towards more stability in the market."

The next keynote address came from Mohammad Al-Mutairi, KNPC Chief Executive Officer, who spoke about Kuwait's ambitious downstream initiatives.

He began by providing an overview of Kuwait's oil and gas industry, from upstream to downstream, with the Kuwait Petroleum Corporation (KPC) being the mother company that oversees the activities of its eight subsidiaries.

Continual downstream expansion

He then transitioned to focus on KNPC, which is responsible for domestic refining and gas processing. The company dates back to 1949, when the Mina Al-Ahmadi refinery was commissioned to produce 25,000 b/d of gasoline, kerosene and diesel for the local market.

Since that time, the company has grown at a rapid pace. By 1958, the Al-Ahmadi refinery's capacity had reached 190,000 b/d and in 1963, it was at 250,000 b/d. The Mina Abdullah refinery was built in 1958 and contained one crude distillation unit with a capacity of 30,000 b/d. After expansion projects in the mid-1960s, its capacity rose to 145,000 b/d. In 1968, the Shuaiba refinery was built with a capacity of 95,000 b/d.

These downstream activities continued to grow with major expansion projects in 1986 and 1988, which have contributed to today's overall capacity of nearly 1m b/d. With further upgrades to come at the Abdullah port and the Al-Ahmadi refinery, along with the Clean Fuel Project and the Al-Zour refinery coming online in 2017 and 2019, respectively, KNPC expects to reach an overall capacity of 1.4m b/d.

Al-Mutairi then spoke about the current supply and demand dynamics in the oil and gas market, pointing out the major shifts that have been taking place recently in the industry.

"The development in the US of new hydraulic fracturing technology for shale oil and gas has generated enormous growth of new oil and gas supply," he noted. "However, with the fall of the oil price, US light tight oil production has also started to decrease from the recent highs.

"The US shale revolution has been a game changer for the region's energy industry and has seen the US exceed Saudi Arabia as the world's largest producer for the first time. Couple this with the enormous amount of ethylene being produced from shale gas in North America — and the chemical industry has once again been investing large amounts of money in creating new petrochemicals for the producing facilities in the US," he stated.

Al-Mutairi noted that China's economic slowdown has also been a contributing factor to the current market situation. He holds out hope, though, that overall demand will pick up next year.

"This slowing was driven in part by the rebalancing of China's economy, away from the energy-intensive sector, causing the growth of energy consumption in China to drop to the lowest rate since 1998," he stated.

"With the falling price, demand growth is expected to gain momentum. You can notice the gap between supply and demand started to widen, yet it is expected to narrow by around the third quarter of next year."

Looking ahead, Al-Mutairi expects investment in the downstream to continue despite the current market and is confident that KNPC will be positioned to achieve its long-term goals.

"As part of KPC's strategic direction 2030, KNPC will capture opportunities arising out of the future of hydrocarbon resources. We will grow KPC's domestic refinery capacity to 1.4m b/d in the medium term," he proclaimed. "We will maximize the disposal of Kuwaiti heavy crude in domestic refineries, optimizing the complexity of KPC's domestic refineries to provide petroleum products that meet domestic energy, transport and industrial requirements as well as international market needs."

He then provided an update on two of KNPC's key projects: the Clean Fuel Project and the Al-Zour refinery, which were detailed earlier by KPC CEO, Al-Adsani, during his remarks.

"The Clean Fuels Project is currently in the construction phase and completion is expected in April 2018. This project will ensure the production of high-quality products, including gasoline, gasoil, bunker fuel oil and naphtha," he stated.

"The Al-Zour refinery … will produce low-sulphur fuel oil to satisfy domestic energy demand. The contracts have been awarded, and the project completion is scheduled for October 2019."

Al-Mutairi concluded his remarks by speaking about the importance of an integrated approach and how innovation and technology are vital to KNPC's future success.

"The integration between upstream and downstream and within downstream petrochemicals is crucial to our mission and vision of adding value to Kuwaiti hydrocarbons," he said. "Innovation and technology have allowed refineries and petrochemical producers globally to remain economical and efficient in an increasingly competitive market. Technology holds the key to cutting costs and growing profitability."

Providing keen insights from the international oil company perspective, Bob Dudley, Chief Executive of BP, delivered the third keynote address of the evening.

He began with a reference to a photo projected on the large overhead screen depicting a meeting of the directors of the Kuwait Oil Company back in May 1938. A section of the image was highlighted to show where they had struck oil at Kuwait's massive Burgan field. This image, he said, was a reminder of the long and fruitful relationship BP has had with Kuwait dating all the way back to that monumental discovery.

"It's a copy of a treasured record of our long-term commitment to Kuwait, having been a partner right back at the start," he stated. "It's a reminder of the long history of our industry and its resilience — and how we have adapted to changes and challenges over many decades."

Turning to the current market volatility, he noted that this was not the first time he had seen markets decline, and, in the past, markets recovered each time.

A cyclical industry

"Today we are all focused on the price of oil — but when I think about it, this is at least the fourth oil price collapse I have seen in my career. And while they create real stresses, the industry has adapted and recovered each time.

"Crashes come when demand is too low or supply too high — and today's is a classic case of oversupply," he affirmed. "Supply and demand will eventually come back into balance, but that could take some time and will still leave the market with inventories at excessive levels that will need to be worked off.

"The cycle will turn, but there is also a structural shift in the energy mix taking place — so we should be prepared for a return to the norm of volatility — and for a future with recurring periods of low prices."

To address this situation, he claimed, the industry will need to increase efficiency and innovation.

"That means we need to demonstrate rigorous cost discipline — and of course capital discipline — as we look to generate value in a lower price environment," he said. "With the age of easy oil behind us, there are new challenges to recovery. However, I believe here in the Middle East we have the partnerships, the technology and the track record to meet the challenges."

Dudley then touched on the history and rapid evolution of the Kuwait oil industry as technology has come to play an increasingly important role.

"The 80-year history of oil in Kuwait is one of giant fields, strong partnerships and constant advances in technology," he stated.

"Actually, one of the most important technologies available to the early explorers remains a prized asset today. It was nothing less than the trained eye. Burgan — the biggest sandstone reservoir in the world — was discovered by geologists advising where to drill, having spotted oil seeps in the desert. Since those days we have seen technology taking massive strides forward."

He then pointed out how technology has transformed the industry, contrasting the traditional methods of exploration and drilling techniques with the latest technology.

Examples cited through images were exploration moving from hand-drawn images from the 1930s to today's 3D seismic surveys and drilling being transformed from simple vertical wells to today's sophisticated horizontal, multilateral wells guided by digital sensors.

Relating this to Kuwait's industry, he stated that the Burgan field will continue to be a profitable operation for years to come.

"This kind of progress in technology means that the Burgan field and Kuwait can continue to rise to the challenge of world energy demand. Kuwait's mature oil fields have been consistently growing production towards 3m b/d of crude.

"That translates into four in every 100 barrels worldwide coming from this one country. And they are some of the lowest-cost barrels anywhere in the world. That is a distinct advantage in any environment — particularly today's," he affirmed.

Bob Dudley, Chief Executive of BP.

"I was here in 2009 for the celebrations to mark 75 years of the Kuwait Oil Company and I expect there will be preparations in due course to celebrate 100 years and then the 150-year anniversary for this great company."

In order to demonstrate how today's advanced technology is dramatically increasing recovery rates, Dudley used BP's massive Prudhoe Bay field in Alaska as an example of what can be done in the Middle East.

Enhancing recovery

"Conventionally, it was assumed that only about a third of a reservoir's oil was accessible — with two-thirds left in the ground as too difficult to produce. Those assumptions about low recovery rates are now being overturned," he said.

"For example, in 1977, the estimated recovery from our super-giant Prudhoe Bay field in Alaska was expected to be less than 40 per cent at the end of field life. It has already passed 40 per cent. In fact, we are expecting to recover more than 60 per cent of the initial oil in place. Essentially, Prudhoe Bay's period of 'easy oil' ended around 25 years ago and since then it has been a hugely successful test-bed for enhanced oil recovery."

Lessons learned from this success story can be applied to fields in the Middle East as well.

"There is a particular advantage in transferring this technology and knowledge to fields such as Burgan or Rumaila or Zakum in the Middle East — and it is one of scale," he stated.

"In the case of the Wara reservoir, a BP team has been working with KOC to help start-up a world-class waterflood project. By listening to the challenges, gaining an understanding of the problems and reviewing existing activities, the partnership is helping to identify and execute compelling solutions."

Dudley then spoke about BP projects in other parts of the Middle East, including Iraq, Oman and the UAE and how these investments in enhanced recovery yield results for the countries involved.

"A common factor in all of these examples is the need to balance current demands with long-term aspirations. It is something we have learned a lot about as an industry — and continue to do so," he said.

"And we estimate that each one per cent improvement in recovery delivered across all the conventional oil fields of this region would equate to between 16 and 20bn b of oil equivalent. Or to put that another way — every one per cent is like discovering a whole new super-giant field."

In conclusion, he reiterated BP's commitment to the Middle East and the importance of strong partnerships in the industry, especially those between the IOCs and the NOCs, particularly at this time of volatility in the oil market.

"With oil and gas becoming more difficult to extract and low prices putting pressure on costs, the challenges may have grown. But so has our ability to meet the challenges of today and the demands of tomorrow. We can do that by combining the complementary strengths of NOCS and IOCs to the benefit of countries around the globe," he asserted.

"Speaking for BP, we have a long history in the Middle East — and a deep commitment to its future as one of the world's energy heartlands. We were here at the start. We are proud to be here today. And we look forward to working with you for many decades to come."

The evening's final address came from Samir Brikho, Chief Executive of Amec Foster Wheeler, who focused on opportunities for oil service providers to offer innovative solutions to the industry's challenges.

He began by saying that his company is one of the few in the world that offers services across the entire value chain of the oil and gas industry. He added that being a service provider, the company is not often requested to speak at conferences, except when the industry is either thriving or experiencing a downturn.

"We get invitations to speak mainly on two occasions," he stated. "When the oil prices are high, because everybody is asking us to deliver the skilled talents and when the oil prices are down, in order to see how and what we are going to cut down in our costs."

He then provided an overview of the Amec Foster Wheeler projects being carried out in Kuwait, including the Al-Zour refinery project, the Clean Fuel Project and on major upstream gas projects. Additionally, he mentioned radiation and environmental projects being conducted in coordination with KOC.

Transitioning to research, development and technology, he said there are many opportunities for oil field service providers to offer innovative solutions, especially in today's market.

"Immediate opportunities for oil field service providers lie with innovation and innovative approaches, if not with entirely new technology," he said. "When comparing the oil and gas industry with technology-intensive industries like computing, telecoms, biomedical technology or aerospace, some may conclude that the sector has exploited technology to the lesser degree and experienced less innovation.

"But to take a broader view, the advances in exploration, drilling and production of oil and gas have transformed the industry and have had wide-reaching global effects.

"Techniques, such as deeper or horizontal drilling and using different stimulating techniques, have harvested multiple sources of developments on an industrial scale and unlocked huge new resources. In this regard, our industry does use advanced technology and has been at the forefront of innovation."

The challenge, said Brikho, is to continue being profitable in a high-cost, low oil price environment.

"Transforming the industry to deliver capital efficiency beyond cost-cutting is essential. The unfortunate picture here is that despite many advances in technology and innovation, unit investment costs are higher and schedules are longer than ever," he stated.

"This has been masked in recent years by high oil prices but has quickly been brought to the forefront now that prices are low. While companies in the oil and gas supply chain have innovated on the technological side to accelerate oil recovery and improve safety, sufficient efforts have not been made to address the capital efficiency of improvements related to production and processes."

He said the industry needs to change its way of doing business in order to deliver more for less.

"I believe that our industry must transform itself and aim to deliver solutions at 50 per cent of the price and in half the time," he claimed. "The solutions we generate must go beyond the initial steps of cost-cutting and look to embed a new way of working.

"The industry must be willing to change and integrate new innovative approaches into the way it works. We need to aim for certification and fit-for-purpose facilities, integrity and safety in the most efficient way. Although this may seem counter to the idea of harnessing innovation and technology, it would constitute a significant advance for the industry, which has become reliant on disposed solutions and is frequently guilty of over-specification."

There is much that the oil and gas industry can learn from other major industries that have experienced similar challenges, he suggested.

"There are opportunities for oil and gas leaders to explore other industries to deliver the transformation and changes required," he stated. "Other sectors, such as the automotive and aerospace industries, have experienced tough economic downturns, which resulted in structural reductions in those industries.

"To survive, companies had to significantly change a wide range of their operating practices. These changes offer the oil and gas industry valuable lessons on how to deal with the current situation of falling productivity and efficiency, alongside oil prices," he maintained.

Some examples he cited of the solutions companies implemented included categorization and standardization of components in the automotive industry, innovative performance availability based on tracking models in the aerospace industry and increased collaboration between operators and manufacturers for standardization and service requirements in the rail industries.

Samir Brikho, Chief Executive of Amec Foster Wheeler.

Long-term partnerships

He stressed the need for strong long-term partnerships and collaboration to avoid short-term reactive decision-making.

"As a whole, the industry needs to leverage technology and innovative ways of working more systemically to fully realize opportunities," he professed. "Partnerships and relationship building are key to unlock the potential innovation and new approaches to challenges.

"Through collaborative partnerships, owners, operators and service providers can share risk, rewards and lean on each other's capabilities and resources to deliver projects better, faster and more cost-effectively."

Concluding on a positive note, he said he sees a bright future for the industry and one in which it will become more efficient and effective.

"Despite the current challenges, the role of oil and gas is very sound for the future," he stated. "But we are moving into a new phase, where efficiency is king and those that can deliver services faster, more linearly and more cost-effectively will flourish.

"Companies need to innovate and find new partnerships to stay in business, but we must be willing to try new approaches to make projects profitable. There can only be collaborative solutions to today's challenges."

Opening of the exhibition and topical sessions

The next morning, the spotlight moved to the Kuwait International Fair, located in Mishref, just south of Kuwait City, where the exhibition was officially opened and the various topical sessions got underway.

The exhibition featured an estimated 200 companies from 24 countries over 14,000 square metres of exhibition space, where key stakeholders, suppliers and service providers were able to connect and exhibit their offerings.

Principal exhibitors included key regional players such as ADNOC, BAPCO, KPC, Saudi Aramco and Equate. Other international exhibitors included Amec Foster Wheeler, Baker Hughes, BP, GE Oil & Gas, Halliburton, ONGC, Schlumberger, Shell, Total and Weatherford, among others. Additionally, there were independent specialist suppliers and distributors from Kuwait and across the globe, as well as large national groups from France, Egypt and Malaysia.

OPEC was represented at the exhibition with a stand where it distributed information on the Organization and its Member Countries, as well as its key publications and brochures. Representatives from OPEC's Department of Public Relations and Information were available to meet and greet participants and answer their questions about the Organization and its work.

On the opening day of the exhibition, OPEC Secretary General, Abdalla Salem El-Badri, was accompanied by several officials from the OPEC Secretariat and the Kuwait Ministry of Oil on a tour of the exhibition.

On the tour, the delegation stopped along the way to see the various stands, with a special stop at the OPEC stand for photographs.

Topical sessions

In parallel to the exhibition, a series of topical sessions were held within the exhibition hall, including four industry panel sessions, five special sessions led by executives and managers of national and international oil companies and the service industry, and a wide range of technical sessions.

Topics discussed included industry strategies in the face of unstable oil prices; the role of gas in the region; innovation; overcoming a scarcity of talent and human resources; refining industry drivers; women's networking; local content; and the role of the banking sectors.

Dr Ali Saleh Al-Omair, Kuwait's Minister of Oil and Minister of State for the National Assembly.

Industry panel sessions

Panel 1: Industry strategies for addressing the unstable oil prices and the high-cost environment

The first panel session tackled arguably the most pressing and timely issue of the moment: addressing unstable oil prices in a high-cost environment.

Three moderators — A Salim David Khemakhem, Vice President of Well Operations at ZADCO; Lionel Levha, General Manager at Total; and Waffa'a Al-Zaabi, Deputy Managing Director at KPC — guided the lively and informative discussions held by the esteemed panel, which consisted of four speakers: Jamal Abulaziz Jaffer, Deputy Chief Executive Officer at KOC; Stephane Michel, President for the Middle East and North Africa (E&P) at Total; Stuart Clayton, Vice President of Hydrocarbon Recovery Technologies at Shell; Ahmed Kenawi, Vice President for the Middle East at Halliburton; and Aaron Gatt Floridia, President of the Reservoir Characterisation Group at Schlumberger.

The panel's discussions centered on how the energy industry might best respond to the current challenges facing the world oil and gas markets, which has seen the oil price drop by more than 50 per cent in a matter of months.

It was agreed that industry players must act sooner than later and that to weather the storm and restore future investment in the industry, all stakeholders will be required to buckle down and seek efficient solutions.

The panel shared how their respective organizations were reacting to this dire situation and shared strategies they are implementing to address the problem.

Panel 2: The role of gas in the region

The second panel looked at the growing role of gas in the region and had two moderators guiding the discussions — Mohammad Husain, President and Chief Executive Officer of Equate; and Walid Al-Nader, General Manager and Country Chair for Kuwait Shell Limited.

The featured speakers were Menahi Al-Enezi, Deputy Chief Executive Officer of KOC; Shaikh Mohammed Al-Khalifa, Chief Executive of NOGA Holding; Khaled Al-Saati, Regional NOC Director for Baker Hughes; and Jefferson Edwards, General Manager for Gas Advocacy and SRM at Shell.

With gas increasingly becoming a major source of growth in energy supply, this panel considered some of the challenges and opportunities surrounding the fuel, particularly in the Middle East. For example, it was pointed out that the MENA region accounts for around 40 per cent of the world's proven gas reserves, but only ten per cent of current production.

Other issues discussed included providing gas as a cost-effective source of fuel for domestic industrialization; bolstering cross-border trade in gas; expanding options for new pipelines and LNG transport; ensuring high-tech treatment of sour gas with high H_2S content; assessing the potential for unconventional gas sources; and maintaining oil as an export commodity to keep budgets balanced.

The discussions also touched on pricing policies for gas, Asian oil-indexation and European hybrid spot-term pricing.

Panel 3: Managing innovation

The third panel discussed strategies for managing and optimizing innovation efforts. The session's moderators were Maria A Capello, Consultant for KOC's South and East Kuwait Directorate; Saleh Al-Ghamdi, Asset Development Manager at Chevron; and Saleh Al-Mutairi, Senior Petroleum Engineer at Chevron's SAC Technology Centre.

The four experts on the panel were Rod MacGregor, President and Chief Executive Officer of GlassPoint Solar; Adnan Shihab Eldin, Director General of KFAS; Abdullah Al-Sultan, Director of the Centre for Petroleum and Minerals; and Gilles Bourdarot, EOR Project Director for Total Kuwait.

This session's panel considered the all-important question of the moment, which is how the industry can optimize their R&D investments amidst a very challenging market with low prices and oversupply. It was agreed that this situation will require the industry to be extra selective in the innovation ventures they decide to pursue in order to maximize their investments.

Developing cost-effective technologies and solutions will be of paramount importance for the foreseeable future.

The discussions covered areas such as IOC and NOC technology strategies; the role of innovation in the success of different oil and gas sectors; government R&D efforts; the role of research companies, institutes and universities; the major R&D challenges facing the industry; the outlook for R&D investment; the shortage of human resources in R&D; workflows that turn good ideas into marketable innovations; managing and tracking new product development; and the importance of collaboration in R&D.

Panel 4: Overcoming scarcity of resources

Because of the dire need for human resources in the industry, the role of human resources in the oil and gas sector has become central to the core business strategy. Senior leadership will be required to make this a priority in the years to come as they develop long-term planning to provide solutions during times of peak activity that will require a large pool of highly skilled and experienced personnel.

This panel was moderated by Hosnia Hashim, Vice President of Operations for the Kuwait Foreign Petroleum Exploration Company; and Sultan Al-Shidhani, Petroleum Engineering Manager for Petroleum Development in Oman.

The featured speakers were Emad Sultan, Deputy Chief Executive Officer of KOC; Ibtisam Al-Riyami, Human Resource and Change Director for Petroleum Development in Oman; Farooq Qureshi, Vice President of Business Consulting for Schlumberger; and Richard Byrnes, Vice President of Consulting for Halliburton.

The discussions covered a wide range of topics, including career planning during times of personnel scarcity; new trends for recruitment; retention strategies; succession planning; performance appraisal; plans for employee motivation and reward; talent development; strategies for addressing the aging workforce; methods for enhancing HR departments; and linking business objectives with people management.

Special sessions

In addition to the panel discussions, five special sessions were held to discuss other issues, such as refining; women's networking; petrochemicals; support of Kuwait's local oil and gas sector; and the performance of the banking sector during the recent oil price decline.

Session 1: Refining industry drivers: strategic vs. commercial

The session was moderated by Abdulla Al-Ajmi, Manager of KNPC; and Shukri Al-Mahrous, Deputy Chief Executive Officer of KNPC.

The four speakers were Nadia Bader Hajji Yousef, Manager of Technical Services for KNPC; Robert Hurny, Technical Service Engineer for Chevron Lummus Global; Suleyman M. Ozmen, Downstream Licensing Vice President for Shell Global Solutions (US); and Tomas Torrez, Manager of Process Engineering for the KNPC Clean Fuel Project/Amec Foster Wheeler Energy Limited (Kuwait Operations).

The session addressed the main challenges currently facing the refining industry and identified potential solutions. Today's emphasis is on cost-cutting, efficiency improvement and enhancing reliability. The refining business is forecast to become more integrated with petrochemicals to enhance profitability in the longer term.

Energy intensity and HSE performance were also discussed as key elements for profitability and maintaining a positive image for the industry. The two main ingredients to success were identified as operational excellence combined with technical innovation, resulting in cleaner fuel that is less expensive.

Session 2: Women's networking

The moderators for this session were Farida Abdulla, Manager of Field Development (South East Kuwait) for KOC; and Maria A Capello, Consultant for the South and East Kuwait Directorate at KOC.

The keynote speaker was Hinda Gharbi, President of Wireline Services for Schlumberger, while the panel comprised Leila Vandenabeele, R&D Partnership Manager for Total (seconded to ADNOC); Mais Taha, Head of Business Performance at Maersk Oil; Sana Bardawi, Head of Communications for MENA at Shell; and Shaima Salmeen, UAE Artificial Lift Operation Manager for Schlumberger.

The discussions centered on the role and status of women in the oil and gas industry, including challenges women face in moving up the corporate ladder and efforts that might be considered by the industry to enhance the intake, retention and promotion of women in a traditionally male-dominated industry.

A series of cases were presented in which attempts to increase diversity were applied by organizations with varying rates of success. Best practices were then considered and solutions to promote gender-diversity in the oil industry were put forward.

Session 3: Petrochemicals: assurance of the industry's future

The two moderators for this session were Ahmad Al Jemaz, Deputy Chief Executive Officer at KNPC; and Tareq Jafar, Senior Executive for Business Development at Equate.

The panelists comprised Khaled Al Awadhi, Manager of Projects for KNPC; Jerome Fileni, Managing Director of Chemicals for HSBC Bank Middle East Limited; Mahmoud Al Qattan, Chief Executive

Officer for the Kuwait Aromatics Company; Ahmed Al Saleh, PE Business Director for Equate; and Pradeep Handa, General Manager and Head of Foreign Corporate, Oil and Trade Finance Group for the National Bank of Kuwait.

This session focused on the current and future outlooks for the petrochemicals industry. Discussions centered on the integration of refining and petrochemicals as a key strategy for creating value in the industry.

Challenges facing the industry were also considered, including the increased competition stemming from globalization; fluctuations in high-volume petrochemical prices and margins; the rising prices of feedstock and energy; and the increasingly strict environmental regulations and their impacts on operational costs.

Finally, the panel considered solutions that could help the industry meet these challenges and remain competitive, including operational efficiency; feedstock flexibility and integration; decreasing operating costs; and reducing inventories, while increasing capacity and speeding up the time it takes to get products to market.

Session 4: Supporting local content

The moderators for this session were Ali Abdulla, Deputy Chief Executive Officer for Finance and Administrative Affairs at KNPC; and Tariq Alduwaisan, Vice Dean for Planning and Career Development at Kuwait University’s College of Engineering and Petroleum.

The panel speakers were Abdulaziz Al-Loughoni, Vice Chairman of the Kuwait National Fund, SME Development; Chady Ghanem, Manager of Strategy Consulting at Accenture; and Sami Al-Mukhaizeem, Senior Business Development Consultant at Saudi Aramco.

Discussions in this session focused on how KPC and its affiliates are supporting the local oil and gas industry through programmes that foster new capital investments, generate employment for the local workforce and increase economic activity.

Several examples of these initiatives were provided, including KNPC’s groundbreaking programme called ‘Encouraging the Local Sector (ELS)’ and the ‘Partnership Programme with Suppliers’, which both seek to bolster the local oil and gas industry through enhanced collaboration between KNPC and its many local suppliers and contractors.

Session 5: Economics, banking and financing elements, and risks of the oil sector

The moderators for this session were Khalid Al-Ajeel, Deputy Managing Director of Finance for KPC; and Mohammad Husain, President and Chief Executive Officer of Equate.

The speakers consisted of Khaled Al Khayyat, Manager of Corporate Planning at KNPC; Suhail Farhan, Finance Manager at Equate; and Pradeep Handa, General Manager and Head of Foreign Corporate, Oil and Trade Finance Group at the National Bank of Kuwait.

Discussions in this session looked at how the banking sector handled the recent drop in the oil price and considered what role the banks should play in such situations.

The session also assessed whether local banks were in a position to support large-scale government oil and gas development projects. Specific examples from the Kuwaiti oil and gas market were provided and lessons learned were shared.

Technical sessions

KOGS 2015 also featured more than 180 technical sessions and poster presentations that provided a forum for participating companies and organizations to share their specialized areas of knowledge and experience with their industry peers.

Subject areas covered all facets of the oil and gas industry, ranging from enhanced oil recovery to smart fields and from shale oil and gas to well surveillance and field monitoring.

Delegates attend panel session on the scarcity of human resources.

KOGS exhibition excels ...

BP committed to enhancing Kuwait's oil future

Kuwait has a long history as a Founder Member of OPEC stretching back to 1960, the year it joined together with Iran, Iraq, Saudi Arabia and Venezuela to establish the Organization at the foundational meeting in Baghdad. As one of the founders of the original Kuwait Oil Company (KOC), BP's relationship with Kuwait goes back even farther. The OPEC Bulletin's Scott Laury was able to sit down with BP Chief Executive, Bob Dudley (pictured), on the sidelines of the Kuwait Oil and Gas Show and Conference (KOGS) and discuss the company's nearly 80-year collaboration with Kuwait.

Being here at the 2nd Kuwait Oil and Gas Show and Conference must be of significance to BP considering the company's deep roots in this country. Can you walk us through this long and rich history?

There is some great history here. In fact, today at the Conference, I showed an old photograph from the original records of a meeting held in May 1938 at which the directors of the Kuwait Oil Company (KOC) announced the discovery of oil at the Burgan field, which is one of the great oil fields of the world. Today, the field is producing around 1.7 million barrels/day, which makes it one of the largest.

We have been working with Kuwait for nearly 80 years now. Earlier on, BP's geological work involved looking at the surface, but now, we are working deep down below the ground.

We have been working here on technical service agreements since the stewardship passed from the IOCs to KOC back in time. Kuwait has a very successful national oil company, both upstream and downstream. We have been working with them since 1992 and continue to do that now. We currently have a team working on the Wara reservoir in the Burgan field to help implement some of the most modern water-flooding techniques. I humbly believe that BP is very good at working in giant fields, in reservoir management and subsurface work, and currently we are seeing some very positive results. Today, I saw some figures that 50,000 b/d are being generated at the site through this cooperation, which is very good.

I came back here in 2009 for KOC's 75th anniversary celebrations, held down at the field offices in Burgan. That was a rich source of history as they showed photographs and movies documenting the entire history of the site. BP has had many of its people living and working in Kuwait over the years, so it really gets into the DNA of the company.

Moving from this rich history to the present and then a glance into the future, how do you see BP's relationship with Kuwait developing in the years to come?

This will, of course, depend on Kuwait's decisions based on what it hopes to accomplish, but I believe enhanced technical service agreements can bring more expertise in to help increase production in Kuwait, which is currently just under 3m b/d.

I think with some of the technology that BP and some of the other companies offer in reservoir management, we are hopeful we can expand our cooperation here. I think BP has an especially strong background in the area of conventional oil fields in Kuwait.

Kuwait has set a strategic goal to reach a production capacity of 4m b/d by 2020? How will BP contribute to helping Kuwait reach this ambitious target?

Of course, it will be completely up to Kuwait. I think it is always better to demonstrate what you can do by what you do, rather than just with words. And, I think we at BP are actually doing that by what we are doing today. The decision will be up to them, but the commitment from us is to be a part of this.

At the OPEC International Seminar in the summer and here at this event, you have mentioned the key factor of establishing and maintaining good working relationships over time. Can you expound upon that?

Oil and gas are such important resources for producing countries and so the involvement of companies like BP in the stewardship of these important natural resources cannot be transactional. There has to be a rate of return for the company, because we are a business, but there must also be a long-term commitment through good times and bad.

In addition to Kuwait, BP is active in some of OPEC's other Member Countries. Can you take us on a short tour of these projects?

In Iraq, we have been working with the South Oil Company (SOC) and PetroChina on the giant Rumaila field, which is actually just up the road here from Kuwait. It produces about 1.35m b/d, putting it in the same league as the Burgan field. We are providing large-scale water flooding and petroleum engineering services there, working with a really talented group of engineers from SOC. We have been able to provide them with the tools and techniques required to successfully complete the work. This complex, cross-cultural joint venture, with PetroChina as the third partner, has really turned out to be a success.

As far as other OPEC Member Countries go, we also have very large investments and commitments in Angola. Deep water is a challenge, but those operations are running well and I hope we will find solutions to develop additional accumulations there.

In the United Arab Emirates (UAE), we also have longstanding relationships, dating back nearly 75 years. We are now working with the Abu Dhabi National Oil Company (ADNOC) in the marine areas there, with concessions coming up around 2017.

BP also continues to invest in Algeria, where it has two very large gas condensate projects, which will hopefully help increase capacity by the end of the year.

We also have exploration contracts both onshore and offshore in Libya and we are hopeful that the time will be right when we can go back and honour those contracts and explore those very large areas. There is no production there currently, but it is something to consider in the future. We remain committed, but the conditions have to be right.

In Indonesia, which is becoming a member of OPEC again, we have mainly large-scale gas production and LNG. We have been working in the country for many, many years.

I know you travel all the time and speak at many conferences and events. What do you think makes this event in Kuwait unique?

I think Kuwait has been one of the great OPEC Member Countries and great oil-producing regions. It is interesting that this is only the second time the show has been organized, which means that very, very quickly, it is growing in stature.

Even at a time of low oil prices, I heard that they are expecting around 3,500 people here attending from 27 countries. I think an event like this is vital because it helps market a country to the world and puts it on the map. Of course, Kuwait is already on the map, but it provides people with a different perspective when they come here. It is also great for the young talent, the engineers and geoscientists, who have the opportunity to give technical presentations to their peers, allowing them to build up their careers and credentials. So, I am very encouraged by what the organizers have done here in a very short period of time.

How has the IOC-NOC relationship evolved over the years?

The relationship between IOCs and NOCs has changed a lot over time. In many countries, the stewardship of natural resources has moved to the NOCs. In the meantime, the IOCs have continued to work all over the world and invest a lot in research and development and technology and they have the ability to do large, often cross-border projects that not too many other companies are capable of doing on such a large scale.

So that, combined with the wide variety of experience and learning gained from these international projects, provides the IOCs with a unique set of capabilities and offerings. Through our own experience in some of the great fields of the world, such as the Rumaila field in Iraq and even in Russia, we have been able to greatly increase production.

I believe that future relationships between IOCs and NOCs will be based on strong, balanced partnerships, drawing on the strengths of both sides to create enduring value.

SPE celebrates second successful KOGS

Looking to help industry through difficult period

The Society of Petroleum Engineers (SPE) is a non-profit professional association with 143,000 members in 147 countries worldwide who are engaged in the development and production of energy resources. SPE is a key resource for technical knowledge on the oil and gas industry and produces publications, events, training courses and online resources. For the second time now, SPE has successfully organized the Kuwait Oil and Gas Show and Conference (KOGS). To find out more about SPE and its role in the oil and gas industry, the OPEC Bulletin's *Scott Laury interviewed the organization's recently elected President for 2017, Janeen Judah (pictured left).*

You were recently selected to be President of the Society of Petroleum Engineers for 2017 and have just taken office as President-elect at the end of September. What are your plans during your tenure as President and what unique aspects might you bring to this prestigious assignment?

The most important responsibility for me in my tenure will be to help SPE navigate the rough waters of this downturn, while still providing our excellent services to our members. Like everyone else, SPE is evaluating its portfolio of meetings and services and we will adjust this accordingly.

For unique aspects, I do have special obligations as a woman President of a more than 90 per cent male organization. I am the first woman President in 11 years, so the younger engineers hired in this last upturn have never seen a woman in the position. I know that women look to me as a role model, so I make a special effort to remain visible to them, both in person and through social media.

SPE organizes many programmes throughout the year. What, in your opinion, makes the KOGS event unique?

KOGS provides a unique focus on the Kuwait market and on the suppliers and needs for Gulf producers. And the event has now risen in status to become the largest oil and gas industry event in the country, which is an important development for Kuwait as a leading Gulf producer.

What do you see as the main outcomes or take-aways from this year's event?

Personally, I saw more optimism and taking of a long-term view in Kuwait than I usually see in Houston. But that is also the difference between a national oil company and the approach taken by the stockholders or equity owners as is usually the case in the United States.

What are some of the other important SPE events, programmes or initiatives being held in OPEC Member Countries?

We have several major events coming up in OPEC Member Countries. In Latin America, we held the Latin America and Caribbean Petroleum Engineering Conference in Quito, Ecuador, on November 18–20, 2015.

We also have several events in the Gulf region at the end of this year and throughout next year. They include the International Petroleum Technology Conference, which will be held in Doha, Qatar, on December 6–9, 2015.

There will be two events in the UAE, which are the Middle East Drilling Technology Conference and Exhibition to be held in

Abu Dhabi, on January 26-28, 2016, and the Annual Technical Conference and Exhibition, which is usually held in the United States, but next year will be hosted in Dubai, on September 26-28 2016.

And finally, in Saudi Arabia, we will organize the Saudi Arabia Annual Technical Conference and Exhibition in Dhahran, on April 25-28, 2016.

How do you see the current challenging oil market developing in the short and long terms?

I am not an economist or an oil forecaster, but a consensus is developing around "lower for longer", at least for the short term. I cannot predict whether the upturn will happen in 2016 or 2017, but the oil price will turn up — it always has. In the long term, developing economies still want energy to supply their growing middle classes.

What are the ramifications for oil-producing countries and how could the industry best respond to this challenging period?

Two things come to mind.

First, with revenue cut in half, operators have no choice but to look very hard at both capex and opex and get efficient to weather this down cycle. It has been several years since we have had a downturn, so our younger engineers have never experienced one.

Second, we can use this time of not madly chasing rigs to stop, analyze and evaluate what we have done in the last ten years. That is where the SPE can help — with lessons learned and technology from elsewhere.

How is SPE, through its various programmes and services, contributing to help restore stability to the oil market?

SPE does not participate in financial markets, but we do often provide neutral territory, through our meetings and conferences, to discuss technical challenges.

SPE does provide services that are helpful during the downturn, including competency development tools, an international job board and dues waivers for those who might be out of work, as well as potential discounts at some of our larger conferences around the world.

How do you see the outlook for tight oil and shale gas developing in the short and long terms?

New projects with high operating costs, such as many of the tight oil and shale gas projects, are not economic at current prices. We have seen a shutdown of those development programmes in North America and an exiting in new basins.

Ensuring adequate levels of qualified labour for the oil and gas industry is now at the top of the energy agenda and was a main topic of discussion at KOGS 2015. Does SPE have programmes addressing this issue? What needs to be done to ensure the industry has enough talent to meet future energy needs?

The oil business is cyclical, just like almost every other business. As leaders, we need to encourage our employers to take a longer-term view and use this downtime in investment to increase analysis of our fields.

SPE's main mission is technology transfer and helping our individual members to become better engineers. We do this through meetings, conferences and direct training, but also through online resources such as technical papers and webinars.

We should remember that we did not bring new people into the industry, especially in the United States, for about 15 ;years from the mid-1980s until about 2000. With the 'Big Crew Change' underway due to the baby boomer generation reaching retirement age, we are paying for that now.

In the current market, innovation and technology are becoming even more crucial for the industry to remain competitive and profitable. Indeed, this was the theme of KOGS 2015. What role will innovation and technology play in helping restore balance to the market and help the industry through this turbulent time?

If the past is a predictor of the future, then we have seen innovation come out of hard times because we are forced to.

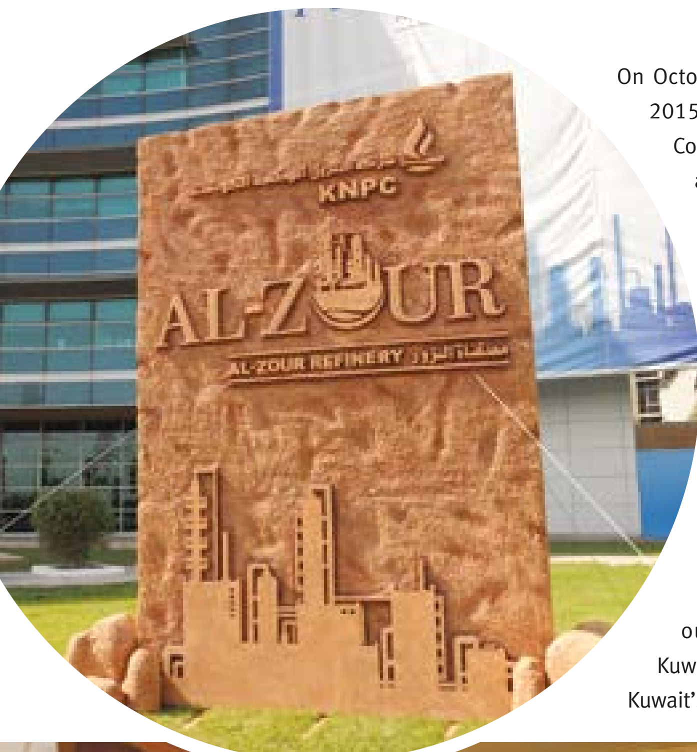
The US shale revolution has its roots in the hard times of the late 1990s — hydraulic fracturing in shales was developed out of necessity, not out of excess.

Step-change innovations in the oil industry have usually been developed during down cycles, and I look forward to seeing what will come out of this one.

SPE 2017 President, Janeen Judah, has served in several management positions at Chevron, including General Manager for the Southern Africa business unit; President of its Environmental Management Company; and General Manager of Reservoir and Production Engineering for its Energy Technology Company. Before joining Chevron, she worked for Texaco and ARCO in various upstream petroleum engineering positions. She holds BS and MS degrees in Petroleum Engineering from Texas A&M University, an MBA from The University of Texas of the Permian Basin and a JD from the University of Houston Law Centre.

Kuwait signs contracts for Al-Zour mega-refinery

As part of its coverage of KOGS 2015, the OPEC Bulletin team attended the contract signing ceremony for Kuwait's $13 billion Al-Zour refinery project. Scott Laury reports.



On October 13, the second day of KOGS 2015, the Kuwait National Petroleum Company (KNPC) made the headlines as it signed contracts with international companies that will build Kuwait's largest development project—the Al-Zour refinery.

When completed in 2019, the facility is expected to produce 615,000 barrels/day of low-sulphur crude oil for local power generation and high-quality products for export to international markets.

The signing ceremony was held in an elegantly retrofitted tent outside KNPC's Headquarters in Kuwait City. The event was attended by Kuwait's main oil and gas industry leaders, as well as international executives, diplomats and invited guests.

Attending on behalf of OPEC was Hasan Hafidh, Head of OPEC's Public Relations and Information Department, who was welcomed along with other invited officials before the event by Kuwait's Minister of Oil, Dr Ali Saleh Al-Omair, Nizar M Al-Adsani, Chief Executive Officer of the Kuwait Petroleum Corporation, and Mohammad Al-Mutairi, Chief Executive Officer of KNPC.

Dr Ali Saleh Al-Omair (r), Kuwait's Minister of Oil, welcomes Hasan Hafidh (l), Head of OPEC's Public Relations and Information Department, to the contract signing ceremony.

Historic milestone

After welcoming all in attendance to the historical contract signing event, Al-Mutairi delivered his remarks in which he described the magnitude of the project and what it means for Kuwait's oil and gas industry.

"I am privileged and honoured to welcome you all to this august and historical occasion of the signing of the Al-Zour Refinery EPC contracts by which the project will enter its execution phase," he stated.

"The contract signing today will be a milestone not only in KNPC's history, but also for KPC and the oil sector in general because the Al-Zour refinery, along with other ongoing mega-projects, will change the landscape of the oil refining industry in Kuwait," he maintained.

The project is expected to expand Kuwait's overall refining capacity from 936,000 b/d currently to 1.4m b/d to meet the growing demand for products, including low-sulphur diesel.

The facility will also produce an estimated 225,000 b/d of low-sulphur fuel oil with only one per cent sulphur content, which will be used to satisfy Kuwait's power generation needs, while helping meet the country's environmental goals of improving air quality by reducing emissions.

The Al-Zour refinery will also provide an economical

Left: Mohammad Al-Mutairi, Chief Executive Officer of KNPC, delivers his remarks at the Al-Zour contract signing ceremony.

Above: Mohammad Al-Mutairi shakes hands with Juan Liado, Vice President and Managing Director of Spanish industrial engineering group Tecnicas Reunidas, during the signing ceremony.

outlet for the processing of Kuwait's heavy crudes, such as KHC, Lower Fars and Eocene, while also producing 340,000 b/d of high-value light products for export that will meet the most stringent international specifications.

The local population will benefit from this venture as the facility will create employment opportunities for local workers and boost economic development around the country.

"Implementation of the Al-Zour refinery project will bring home the most advanced refining technologies that will be mastered by a competent and well-trained young generation of Kuwaiti nationals, leading to a generation of highly qualified human capital that we at KNPC value the most," Al-Mutairi proclaimed.

"This project is going to provide ample job opportunities to Kuwaitis and business opportunities to the private sector for overall economic development and prosperity for the country."

Al-Mutairi then congratulated the international consortium of companies that were selected to work on the project.

"I take this opportunity to congratulate the winning companies, our EPC partners and Kuwaiti contractors whom we trust for their ability and efficiency to successfully complete the Al-Zour refinery safely and in a timely fashion," he stated.

"This, in turn, shall translate into smooth and successful commissioning that we will look forward to celebrate with all of you."

KPC is also studying the feasibility of integrating this refinery with a petrochemical complex, which would provide a significant boost to Kuwait's downstream efforts.

"In addition to the new LNG import facilities, KPC is moving forward with the feasibility evaluation for the Al-Zour refinery's integration with a petrochemical complex, which will create a giant downstream industry," Al-Mutairi stated.

He concluded his remarks by personally thanking all those who had contributed to bringing the project to fruition.

"Finally, I take this moment of recognition and tribute to all who contributed to this project from the initial stage and overcame many obstacles in the way," he said.

"Further, I am thankful to all associated KNPC staff and in particular the Al-Zour refinery staff for their efforts in the progress of this major project."

Al-Mutairi closed with an apt and inspirational quote from the 17th century French playwright, director and actor, Jean-Baptiste Poquelin, more widely known as Molière: "The greater the obstacle, the more glory in overcoming it."

Shoppers stroll through the Al-Mubarakiya market in downtown Kuwait City.

The legacy of Mubarak the Great is alive and well in Kuwait

by Scott Laury

After a busy day covering the KOGS 2015 event, the *OPEC Bulletin* team took a couple of hours and used its last vestiges of energy to visit two of Kuwait's cultural treasures—the Souk Al-Mubarakiya and the Mubarak Kiosk.

Both sites are located next to each other in downtown Kuwait City and are named in honour of the Emirate's seventh ruler, Sheik Mubarak Al-Sabah, who is generally considered the founder of modern Kuwait and is often fondly referred to as Mubarak the Great.

Souk Al-Mubarakiya

We started with a tour of the souk, which is one of Kuwait's oldest and most traditional markets and trading posts dating back nearly 250 years.

After visiting a market in another neighborhood a couple of days earlier, we were left with the impression that we had not yet seen a genuinely historical market. But, the minute we arrived at this market, we knew this was the real thing.

The meandering alleys were filled with spectacular displays of typical foods, handcrafted goods, intricately woven oriental rugs, clothing and artwork, not to mention the tantalizing wafts of spices, perfumes and food being prepared at nearby taverns.

For those with higher budgets, there were, of course, opportunities to shop for precious gems, gold and pearls.

Vendors were happy to have us try their specialties, including an impressive assortment of dates, as well as olives, nuts and countless other delicacies we saw throughout our tour.

Along with the myriad shops and vendors, we noticed a seemingly endless row of currency exchangers replete with money from around the world.

This tradition goes way back in history and was a major element of Kuwait's economy and trade efforts in previous times as caravans and, later, ships from faraway lands would move in and out of the city to conduct trade.

After stopping to enjoy a typical Kuwaiti tea at a market stand, two colleagues purchased some traditional clothing of Kuwait, called dishdasha, consisting of a full-length robe and the customary headdress.

As we were told, traditionally, white is the colour worn in summer, due to the extremely hot temperatures, while

The Al-Mubarakiya market offers a wide range of local products, including dried fish, crushed red peppers, dates, nuts and a plethora of spices.

darker hues are used in the winter months. Our visit put us just in the middle of the two seasons, so both options were appropriate.

The headdress, called keffiyeh in Arabic, is usually plain white or an ornate red and white checkered pattern, which is thought to represent fishing nets or ears of grain. This is worn with a black ring to hold it in place.

The ancient, bustling market left a lasting impression on us all. As we left the souk, we happened upon a small, age-old two-storey house with traditional architecture. As we soon found out, this was not just any ordinary historical building.

The Mubarak Kiosk

The Mubarak Kiosk was the headquarters of Kuwait's seventh ruler, Sheik Mubarak Al-Sabah, and served as his administrative headquarters during his reign.

As we walked through the rustic structure, we saw many old photographs, portraits, letters, books, antique office furniture, pearl diving equipment and a large wood-crafted model of a pearling/trading ship, called a dhow, as well as other memorabilia documenting Sheikh Mubarak's various meetings and activities.

Built in 1897, a year after Sheik Mubarak came to power, the kiosk served as a government seat for the late ruler. The local dialect uses the word koshk or kiosk to describe a square building with two floors. The ground floor had shops and the top floor was where the Ruler's council would meet.

The council's meeting space had a separate entrance with an external staircase. The Ruler would meet there not only with local and regional tribal leaders, tradesmen and officials, but also with everyday citizens of the country to learn of their problems and provide assistance to them.

The customs administration was also housed in the building and imposed taxes on all goods imported into Kuwait. Caravans bringing goods to trade at the local markets would have to pay taxes before leaving the country.

After the Emir moved to the Seif Palace, the kiosk became the first court in Kuwait headed by Sheikh Abdullah Al-Jaber Al-Sabah in 1928, and then in 1934 served as the headquarters of the Sharia Court.

Before oil and when pearl diving was still a major industry for Kuwait, the ground floor of the kiosk served as a pearl divers' affairs office and the office of land registry.

Thereafter, the structure took on a variety of roles, including the municipal administration's headquarters, a pharmacy, a post office and the first branch of the public library.

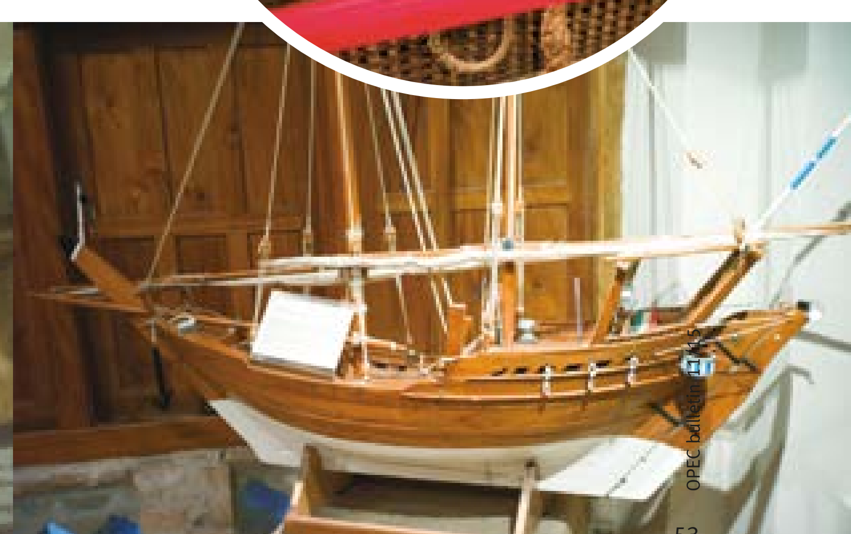
After falling into neglect for a period of time, the National Council for Culture, Arts and Letters acquired the kiosk in 2010 and renovated and restored it as a cultural landmark and a museum of Kuwaiti history documenting Sheik Mubarak's reign.

In 2011, the renovated building was inaugurated in the presence of His Highness the Emir of Kuwait, Sabah Al-Ahmad Al-Jaber Al-Sabah.

The Mubarak Kiosk and the Souk Al-Mubarakiya are essential sites for anyone interested in learning about Kuwait's rich history and fascinating culture. Indeed they are living testaments to the treasured legacy left by Mubarak the Great.

An ancient photograph of Sheik Mubarak Al-Sabah displayed inside the Mubarak Kiosk in downtown Kuwait City.

A variety of pearl diving equipment and a large wood-crafted model of a pearling/trading ship, called a dhow, on display at the Mubarak Kiosk.



Secretariat hosts JODI Technical Meeting

Dr Omar Abdul-Hamid (c), Director of OPEC's Research Division; Adedapo Odulaja (l), Head of OPEC's Data Services Department; and Dr Hossein Hassani (r), Statistical Systems Coordinator, Data Services Department.

Twenty delegates attended the two-day Joint Organizations Data Initiative (JODI) Technical Meeting held at the OPEC Secretariat in Vienna on October 14–15. It was the second time the Secretariat hosted the meeting; the first took place two years ago.

The main objective of the meeting was to address JODI-related technical issues within the scope of JODI oil and gas data submission. The meeting, which was successful and helpful for both the Secretariat and OPEC Member Countries, helped to foster knowledge transfer and thus further the exchange of technical views and opinions.

Vital role of accurate data

In his opening remarks, the Director of OPEC's Research Division, Dr Omar Abdul-Hamid, welcomed delegates from Member Countries and underlined the importance of JODI and the vital role that transparent, timely and accurate data has within the energy industry.

He added that OPEC continues to be one of the main partners of JODI — as it has been since its establishment — and that the Organization contributes substantially to oil data transparency and enhancing cooperation and dialogue with international partners.

The first day of the meeting covered the importance of JODI data in oil- and gas-related research and reviewed the quality of the JODI World oil and gas databases.

There was a demonstration of the JODI Oil and Gas databases and an overview of technical definitions in the JODI Oil and Gas Questionnaires.

During subsequent interactive sessions, these topics were addressed in greater detail, allowing for the elaboration and clarification of technical matters involved.

The second day focused mainly on further deepening technical knowledge of the optional extended JODI Oil Questionnaire.

Subsequently, a session was devoted to hands-on exercises using monthly oil data and allowing for an interactive exchange of information on different issues. The exercises aimed to clarify how to correctly fill out the questionnaire.

Delegates to the JODI Technical Meeting, held in Vienna.

Member Country representatives had the opportunity to present their data collection, processing and dissemination procedures, which provided the Secretariat with valuable insight into current data-gathering practices and offered an understanding of some of the challenges they face.

The meeting ended with concluding remarks by the Head of OPEC's Data Services Department, Adedapo Odulaja, in which he re-emphasized the importance of timely and consistent data.

Finally, it was agreed that such meetings should continue to be held bi-annually and that the next JODI Technical Meeting with Member Countries will take place in 2017.

Group photo of delegates who attended the meeting.

Saudi Aramco "leading by example" with first CCS pilot project

Ahmad O Al-Khowaiter, Chief Technology Officer, Saudi Aramco.

Carbon Capture and Storage (CCS) is an innovative technology that can capture up to 90 per cent of the carbon dioxide (CO_2) emissions produced in the burning of fossil fuels. And apart from acting as pure storage, the collected carbon can also be used for enhanced oil recovery (EOR) projects aimed at boosting recovery rates and ultimately prolonging the lives of oil and gas fields. Saudi Arabia is the world's leading exporter of crude oil and, as one would expect, fully endorses CCS technology. Saudi Aramco's pilot CCS project at the 'Uthmaniyah field and Hawiyah NGL facilities — the largest in the Middle East — is showing just how effective such a process can be in helping to safeguard the environment and enhance oil supplies for the future. The **OPEC Bulletin** ***spoke exclusively to Ahmad O Al-Khowaiter, Saudi Aramco's Chief Technology Officer, about the scheme and asked why it is so important to the Kingdom.***

What is the project and when was it launched?

In July this year, Saudi Aramco announced the launch of the Kingdom's first carbon capture and sequestration (CCS) enhanced oil recovery (EOR) project at its 'Uthmaniyah field and Hawiyah NGL facilities. The project is the largest CCS project in the Middle East. Although most of our oil fields are young and do not require CO_2 EOR, we took a proactive decision to pilot this technology at large-scale in our facilities to enhance our crude oil recovery and improve the scientific knowledge associated with this technology.

Why is CCS and EOR technology important?

The combined sequestration and EOR demonstration project highlights Saudi Aramco's initiative to lead by example through environmental stewardship. It will inject compressed, supercritical CO_2 into a flooded part of an oil reservoir as a mechanism for CO_2 storage; and will simultaneously enhance oil recovery. For these reasons, carbon capture and storage is considered a win-win technological solution.

How will the project impact CO_2 emissions' reduction?

The project will have a measurable impact on reducing overall CO_2 emissions. It will inject 800,000 tons of CO_2 every year.

What is the technical scope of the project?

The project will use 2,200 tons per day of CO_2 that will be captured and processed at the Hawiyah NGL recovery plant and piped 85 kilometers to the 'Uthmaniyah field for injection. The CO_2 is captured from a gas stream that was earlier vented to the atmosphere. It is dehydrated and compressed to a supercritical condition (dense phase) using a seven-stage internally geared compressor.

It is estimated that as much as 40 per cent of the injected CO_2 will be sequestered permanently in the reservoir. The project also aims to enhance oil recovery beyond the more common method of water-flooding. The main objectives of the demonstration project are to demonstrate storage through EOR, confirm the volume of CO_2 sequestered, develop and apply innovative CO_2 monitoring techniques, and assess the impact on oil recovery.

A total of ten wells have been drilled:

- four wells to inject the supercritical CO_2 and water;
- four wells to produce the oil being pushed by the CO_2 in the reservoir; and
- two additional 'observation' wells to monitor the CO_2 displacement in the reservoir.

An elaborate monitoring and surveillance programme has been designed, developed and is currently being deployed.

Why did Saudi Aramco embark on this important CCS project?

Environmental stewardship has long been a hallmark of Saudi Aramco's business with the company's environmental protection policy formally established in 1963. Carbon management is now an integral part of our business. Since the company established its Master Gas System in the 1970s, CO_2 emissions have been reduced significantly. Our carbon management technology road map includes many focus areas with a main goal of developing the required technologies to reduce CO_2 emissions.

Effective carbon management is one of the many strategies that Saudi Aramco employs to meet the goals of reliably supplying energy safely and responsibly. Reducing gas-flaring, introducing zero-discharge technologies at well sites, implementing a comprehensive water-conservation policy at all plants and communities and now the CCS project at 'Uthmaniyah are among the company's many environmental protection efforts.

What is unique about this project?

The main objectives of the programme include the monitoring of CO_2 within the reservoir, assessing key risks and uncertainties, understanding recovery mechanisms, identifying operational issues and building public confidence in the first CO_2 sequestration project, not just in the Kingdom, but throughout the Gulf Cooperation Council (GCC) region. An elaborate monitoring and surveillance programme has been developed for the demonstration project to obtain data and evaluate its performance. Monitoring will take place with a range of methods, including seismic monitoring, electromagnetic surveys, borehole and surface gravity, advanced logging techniques, fluid sampling and inter-well tracer tests.

The injectors and producers have been equipped with appropriate downhole sensors to provide a full suite of reservoir parameters that will be monitored throughout the duration of the project. The entire project is part of our intelligent field initiative to measure and record real time data.

The monitoring and surveillance programme also includes a number of geochemical and surface sampling techniques of produced fluids to monitor the migration of CO_2 and any surface or subsurface leaks. The two observation wells will also play an important role in our ability to monitor the project. These wells will be logged periodically to assess the arrival and changing concentrations of CO_2 in the reservoir.

How quickly do you plan to roll out other CCS projects after you finish monitoring the results of this one over the next few years?

Over the next three to five years, the pilot project will be closely monitored and evaluated by engineers in the field and at our upstream research centre. The results from the project will decide our future plans.

What has been the reaction to the launching of this pilot project?

News of the project has been very well received and captured in both the local and international media and within the oil and gas industry, given that the project is the largest such project in the region.

What carbon management issues should be on our radar but are not?

We are actively engaged with several international organizations to address carbon management issues, such as the United Nations Framework Convention on Climate Change, the Carbon Sequestration Leadership Forum and the Oil and Gas Climate Initiative, among others. Through these organizations, we progress ideas about how we can address CCS issues. One example that is low on many countries' agenda is detailed monitoring and surveillance for CO_2 once injected into deep reservoirs. This is mainly due to the high cost of such advanced technologies.

The 'Uthmaniyah field and Hawiyah NGL facility pilot project will reduce overall CO_2 emissions and inject 800,000 tons of CO_2 every year.


Shutterstock

What progress has Saudi Aramco made in reducing gas-flaring and introducing zero-discharge technologies at well sites?

We have reduced our CO_2 footprint six-fold over the last four decades and reduced gas flaring to below one per cent of our annual gas production. In 2014, we implemented zero-discharge technologies at 432 well sites, a four per cent increase compared to 2013. Implementation of the zero discharge technology made possible the recovery of 2.6 billion standard cubic feet of gas and more than 215,000 barrels of crude oil in 2014. This programme also helped in managing greenhouse gas (GHG) emissions in a major way.

Saudi Aramco

Saudi Aramco wins award for EOR at ‘Uthmaniyah

Saudi Aramco’s innovation has been recognized by an award for the enhanced oil recovery (EOR) element of the ‘Uthmaniyah CCS project.

In October, the company won EOR Project of the Year at the 2015 Oil & Gas Middle East: Refining & Petrochemicals Middle East awards ceremony in Abu Dhabi.

Utilizing some technologies for the first time in the world such as vertical compression technology for the CO_2 compressor and novel tracers for saturation monitoring, the project aims to enhance oil recovery by about ten per cent beyond water flooding and permanently sequester about 40 per cent of the injected CO_2.

Sunil Kokal, principal professional and the project lead said: “This project is a win-win: a win for the environment by storing CO_2 underground and a win for oil recovery by enhancing it beyond water flooding.”

Saudi Arabia’s efforts to lead in the CCS space also extend to it facilitating discussions between senior energy and environment officials in November on global efforts to provide cost-effective and efficient carbon sequestration and utilisation technologies as the host nation for the Carbon Sequestration Leadership Forum.

Khalid Abuleif, lead climate change negotiator for Saudi Arabia, said: “The CSLF strives to identify a common approach for all member nations to tackle the issue of climate change by ensuring efficient greenhouse gases management is central to achieving cleaner energy goals. It must be a unified effort.”

The CSLF is a voluntary climate initiative of developed and developing nations that account for 75 per cent of all man-made carbon dioxide emissions. The members engage in cooperative technology development aimed at enabling the early reduction and steady elimination of CO_2 emissions.

Forum "greatly encouraged" by progress made in CCS deployment

Carbon Sequestration Leadership Forum (CSLF) ministers have said they have been greatly encouraged by the progress made in the research, development, demonstration and global deployment of carbon capture and storage (CCS).

Members of the United States-based initiative agreed that since the forum last convened in 2013, research and development portfolios had grown, international collaboration had expanded, and the world's first large-scale CCS project in the power sector had commenced operation.

"There are now 22 large projects in operation or under construction, with several others in final design awaiting financial decision," said a *communiqué* issued at the end of the 6th Meeting of the CSLF, held in Riyadh, Saudi Arabia in early November.

It stressed: "The advances in CCS are noteworthy, but more needs to be done to bring CCS to the marketplace where it can achieve significant reductions in carbon dioxide (CO_2) emissions and help combat climate change."

Saudi Arabian Minister of Petroleum and Mineral Resources, Ali I Naimi, who gave the host-country address to the forum, said countries should capture and store carbon emissions if they want to continue using fossil fuels for power generation.

"We will continue using fossil fuels for the next 30 years or so because we have no other choice," he told delegates. The Kingdom currently has two CCS projects in the early testing phases.

Ali I Naimi, Saudi Arabian Minister of Petroleum and Mineral Resources.

The way forward

Naimi stressed that CCS was the way forward, stating that he believed there was enough technology to sequester CO_2 and take CO_2 out of the atmosphere.

However, Qatari Energy and Industry Minister, Dr Mohammed Bin Saleh Al-Sada, in his comments to the forum, warned that without adequate commercial incentives, CCS would face problems developing.

He observed that the high cost of the technology required and providing the infrastructure needed were obstacles to the further development of CCS projects in the Middle East, adding that the current low price of carbon was also not helpful.

"New financial mechanisms are needed to encourage CCS because without financial incentives CCS will fail," Al-Sada was quoted as saying in his speech.

Over 150 countries have lodged pledges to the United Nations ahead of the climate change negotiations in Paris at the end of November, which seeks to secure a global agreement to limit global warming to 2°C by the end of the century.

The CSLF said that, as noted by the Paris-based International Energy Agency (IEA), in a scenario in which global CO_2 emissions were constrained to levels consistent with a less than 2°C rise in global temperatures at the lowest cost, CCS could contribute about one-sixth of needed CO_2 emission reductions in 2050 and 13 per cent of the cumulative emissions reductions between 2015 and 2050 compared to a business-as-usual approach.

The cost without CCS

It pointed out that the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Synthesis Report (AR5) concluded that without CCS the costs of climate change mitigation would increase by 138 per cent — and without CCS, 2°C may not be possible.

"Considerable progress in the deployment of CCS has been made in the last two years and we have the opportunity to accelerate CCS deployment now and in the near future with strong global commitments and supportive government policies."

It maintained that such government policies would be built on existing national circumstances, priorities, and obligations.

The forum met to discuss and address the key remaining challenges facing CCS and especially to identify collective activities necessary to support and accelerate further deployment.

"Our common goal is to ensure that the conditions are right for all CCS projects currently under construction or in advanced stages of planning to be completed. We must increase the number of new large CCS demonstrations by 2020 and support the development of the next generation technology for full-scale demonstration in the 2020s."

"While it is clear that significant progress has been made on CCS, challenges remain that we must — and can — overcome," stated the *communiqué*.

The CSLF is the world's only Minister-level multinational CCS forum and this year celebrates its 12th year of operation.

The initiative is focused on the development of improved cost-effective technologies for the separation and capture of CO_2 for its transport and long-term safe storage.

The mission of the CSLF is to facilitate the development and deployment of such technologies via collaborative efforts that address key technical, economic, and environmental obstacles.

Dr Mohammed Bin Saleh Al-Sada, Qatari Energy and Industry Minister.

Promote awareness

It also promotes awareness and champions legal, regulatory, financial, and institutional environments conducive to such technologies.

The CSLF currently comprises 23 members, comprising 22 countries and the European Commission.

Its current member countries represent over 3.5 billion people, or approximately 60 per cent of the world's population.

Membership is open to national governmental entities that are significant producers or users of fossil fuels and that have a commitment to invest resources in research, development and demonstration activities in CO_2 capture and storage technologies.

The CSLF Charter, established in 2003, establishes a broad outline for cooperation with the purpose of facilitating the development of cost-effective techniques for the capture and safe long-term storage of CO_2, while making these technologies available internationally.

BP releases new Technology Outlook …

World is not running out of energy resources

> "Society's challenge is how to balance mitigating climate change, while at the same time providing the energy security and affordability that drives socio-economic development."

Despite earlier reports to the contrary, the world is not running out of resources for its energy needs. That is the view of oil major BP.

In its new *Technology Outlook* report, the company says fossil fuels of oil, gas and coal, along with uranium, are plentiful while the alternatives of renewable energies do not deplete by definition.

BP Group Chief Executive, Bob Dudley, states in the report that with existing and incremental technology advances, "we have abundant and technically accessible resources to meet foreseeable global primary energy demand out to 2050 and beyond."

He says the extent to which each fuel is used depends on many factors. These include technology and policy, but also capital.

"At the time of writing, an abundance of supply and a fall-off in demand growth have driven energy prices down and constrained the funds available for investment.

"Such price falls compel the industry to develop new technologies to reduce costs; however, the situation reminds us that energy is influenced by the interplay of many different factors."

Dudley maintains that technologies, such as enhanced oil recovery, advanced seismic imaging and digitization, will have a huge impact on which of the available fossil resources are developed, how, where and when.

"Innovation will not only help to sustain the supply of hydrocarbons, it will enable renewable resources — most notably solar and wind — to be more competitive, changing the merit order of investment and resource development."

Dudley states that in terms of energy's end use for transport, liquid fuels, including biofuels, are likely to continue as the major source of transport fuel for at least the next 30 years.

"They will be used more efficiently as vehicles and engines become lighter and smarter. In power generation, as well as increasing contributions from renewables, new opportunities such as a global shift towards natural gas, improved energy efficiency and, ultimately, carbon capture and storage (CCS) technology will help us to move towards a lower-carbon future."

Meanwhile, adds Dudley, further falls in the costs of renewables and developments in areas such as battery storage and smart energy systems will widen options in an already competitive market. "Society's challenge is how to balance mitigating climate change, while at the same time providing the energy security and affordability that drives socio-economic development."

Dudley points out that the energy industry can assist in the transition to a more sustainable economy if policy frameworks are developed to promote investment in lower-carbon technology.

The report makes it clear that energy resources are more than sufficient to meet future, long-term demand, with technology having great potential to increase the supply of both fossil and non-fossil fuels, while reducing their costs.

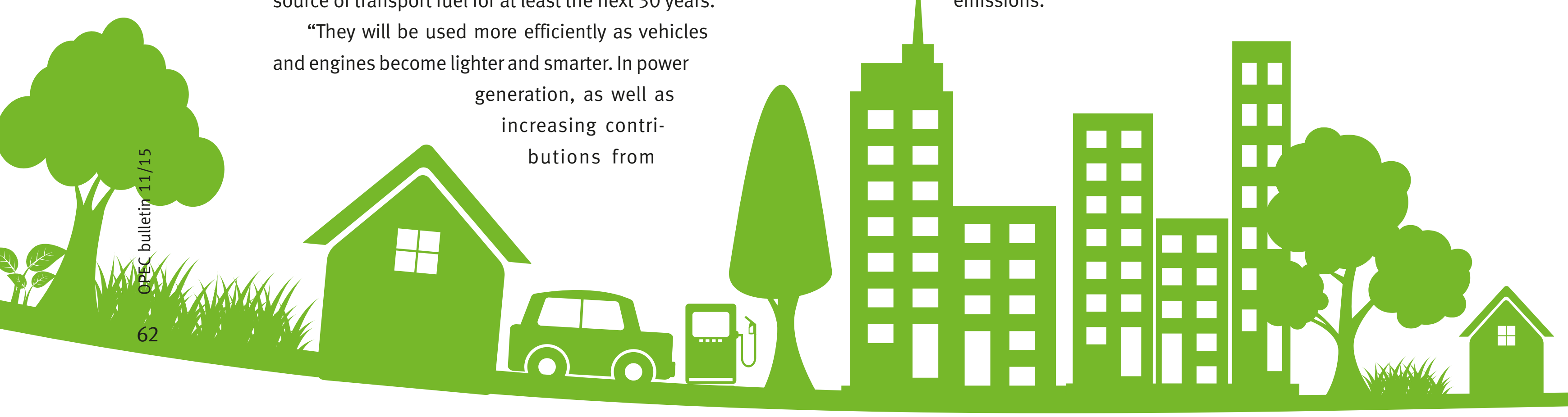
It contends that the questions for policymakers are about choosing which resources to prioritize in meeting demand, while limiting emissions and providing energy security.

The power sector, it says, offers the greatest scope for reducing emissions, while using technology to improve energy efficiency is often economic. Beyond this, there is an immediate cost to reducing emissions, and this is generally lower in power generation than in transportation.

BP says that, in many regions, a modest carbon price can make new-build natural gas more competitive than existing coal — and gas is cleaner.

At higher carbon prices, wind and solar become more competitive, providing there is backup power capacity. Capturing the carbon from burning gas for power can also become economically viable.

The report observes that transport is set to become more efficient. Continued improvement in the efficiency of internal combustion engines (ICE) and vehicles will reduce emissions.



The cost of supplying biofuels will fall, particularly second-generation biofuels made from grasses, wastes and other non-edible agricultural matter.

"Despite their high energy efficiency, electric vehicles or fuel-cell vehicles still need significant technological advances to compete with ICE vehicles on cost," the report states.

Increasing diversity and complexity

Looking at the long-term trends, the report professes that the global energy sector will show increasing diversity and complexity going forward.

"New resources are becoming available, led by shale oil and gas. Energy prices have returned to their traditional pattern of volatility. Policies and regulations on environmental issues vary from country to country and may develop in different ways."

It contends that within this complex and uncertain picture, two trends that will have a bearing on the entire framework are clear.

"Firstly, we will need to deliver more energy to more people at lower cost. Secondly, the growth in energy demand needs to be met while reducing greenhouse gas (GHG) emissions and making a transition to a lower-carbon energy system. The key metrics that will show how these trends evolve are the amount of energy used and the level of GHG emissions. Both are influenced by a series of factors."

The report notes that energy supply and demand are governed by factors such as economic and demographic growth and the capacity of technology to produce resources cost effectively.

"Emission levels are influenced by policy and regulation, for example, by the pricing of carbon through taxation or emissions trading, by subsidies and quotas for renewable energy, and by regulations such as building standards and tailpipe emission limits for cars.

"At first glance, the idea of using more energy with less environmental impact seems contradictory. Over time, however, it can be achieved: firstly, by using energy more efficiently and thus limiting the total volume consumed and, secondly, by switching the energy that is used towards lower-carbon forms of fuel and power.

"This includes replacing coal with gas in power stations, using CCS at power plants and other facilities, and using more renewable and nuclear energy."

BP says that, in the short term, one can expect a continued emphasis on technologies, such as seismic imaging and enhanced oil recovery (EOR), to find and produce fossil fuels as cost-effectively as possible while also continuing to enhance and reduce costs of lower-carbon energy.

"In the medium to longer term, we expect to see technology enable lower-carbon energy to mature and become deployed at increasing scale while the remaining hydrocarbons are used even more efficiently.

"In the early stages of the journey ahead, there will be a continuing need to discover more fossil-fuel resources as existing fields are depleted."

The report notes that technology is also transforming oil field recovery rates. "No longer is it routinely expected that around two-thirds of the oil in a given field will remain underground. Recovery rates well in excess of 50 per cent are now in prospect, thanks to EOR technologies.

"These new technologies that enhance oil and gas recovery from already discovered fields will be at least as important as those that help explorers find new ones."

At the same time, says BP, in periods when oil and gas prices are low and operators are seeking efficiencies, technologies that reduce costs of finding, producing and processing energy resources will be prized — putting greater emphasis on the need for effective research and development in areas such as digital technologies and advanced materials.

"No longer is it routinely expected that around two-thirds of the oil in a given field will remain underground. Recovery rates well in excess of 50 per cent are now in prospect, thanks to EOR technologies."

"Such developments in the conventional energy system are expected to be augmented by the progressive development of lower-carbon technologies, with government support.

"As and when governments act to constrain or mitigate emissions more strongly, we can expect a greater drive to invest in research, development and deployment of lower carbon technologies, including those that are nascent, such as CCS.

"Technologies that increase energy efficiency will become increasingly important as they help reduce energy costs and limit CO_2 emissions — a 'win–win' outcome. Technology will help provide the energy the world needs."

The report maintains that within an environment that supports innovation and encourages the private sector to invest, energy companies have a vital role to play in responding to the challenges ahead by developing and deploying the innovative technological and commercial solutions that meet society's needs and aspirations.

"The future is uncertain, but we know that technology will help provide the energy the world needs, and the means to use it more efficiently, with lower GHG emissions.

"Most of all, technology will give greater choice in how we meet future energy demand — safely, securely, affordably and sustainably."

Petroleum can be key lever in Iran-EU ties — Majlis Speaker

Iran's petroleum industry can be the main "lever" for expanding economic ties with the European Union (EU), according to Ali Larijani, Speaker of Iran's Majlis (parliament).

Ali Larijani, Speaker of Iran's Majlis (parliament).

In talks in the Iranian capital, Tehran, with Martin Schulz, President of the European Parliament, he pointed out that the European Parliament enjoyed a determining position in the EU and could help in reaching mutual understanding between Iran and the EU.

Vast hydrocarbon reserves

Quoted by Iran's *Fars News Agency*, he said: "Economic and trade ties with other countries are of utmost significance to us."

Pointing to Iran's vast hydrocarbon reserves, Larijani maintained that oil and gas could act as the lever of economic ties between Iran and the EU. The OPEC Member Country could also supply energy to other countries.

"A number of major construction projects are being carried out in Iran. And other interested countries can participate in their fulfillment," he stated.

Larijani told his guest that it was not just the petroleum sector that offered attractive investment in Iran. After oil and gas projects, there were schemes to expand the country's rail network, its air transportation and heavy metals industries.

Schulz visited Iran for meetings with senior Iranian officials aimed at reinforcing ties between the country and the EU.

During a joint press conference with Larijani, he said Iran and the EU, having seen the distance between them grow in the past, now had an opportunity to grow closer to one another.

Schulz pointed out that the EU was interested in expanding its ties with Iran in all areas.

His was the first visit by a head of the 751-seat European Parliament to Iran, which comes after Iran and the so-called P5+1 countries — the United States, Britain, France, China and Russia plus Germany — finalized text of an agreement over Tehran's nuclear programme.

According to the Joint Comprehensive Plan of Action (JCPOA), Iran will accept restrictions on its nuclear programme in return for the removal of economic and trade sanctions imposed on Tehran by the United States and the EU.

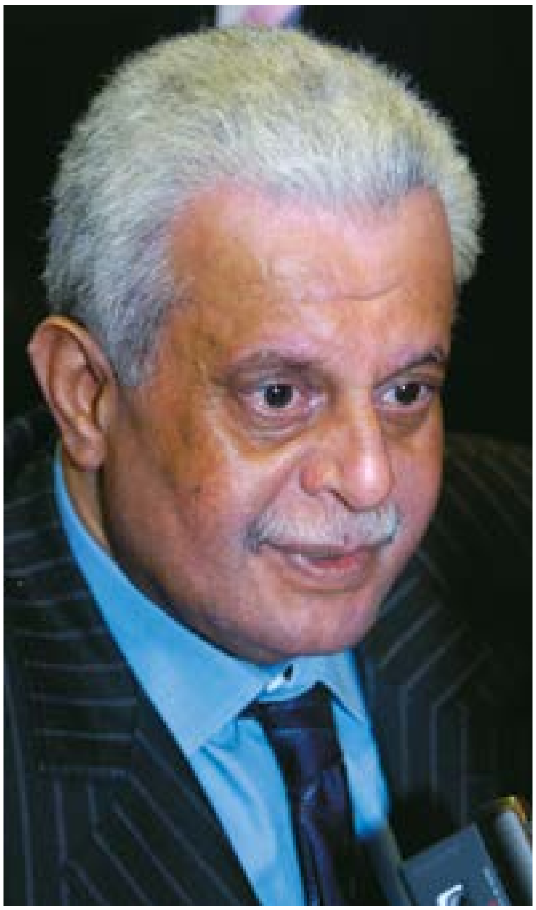
Two weeks after the accord was reached, EU Foreign Policy Head, Federica Mogherini, visited Iran, stating that the 28-nation bloc was seeking to revive relations with Iran in all areas.

In mid-October, the EU formally enacted the legislative framework for lifting all nuclear-related financial and economic measures against Iran.

Numerous international corporations, particularly European concerns, have also expressed a strong interest in establishing close cooperation with Iran, particularly in energy activities.

The revocation of the sanctions is expected to become effective early next year.

Al Attiyah urges oil producers to prepare for "post-oil era"



Abdullah Bin Hamad Al Attiyah, former Qatari Energy and Industry Minister.

Former longstanding Qatari Energy and Industry Minister, Abdullah Bin Hamad Al Attiyah, has urged global crude oil producers to ready themselves now for the time the precious resource starts to dwindle and eventually runs out.

The Chairman of the Abdullah Bin Hamad Al Attiyah Foundation for Energy and Sustainable Development has called on producers, especially those in the Middle East, to prepare for what he termed the "post-oil era".

He said that as an alternative to oil, they should look towards conducting more research on alternative sources of energy, especially solar power technology.

Addressing a forum in the Qatari capital, Doha on *'The Oil price drop: repercussions for oil exporters',* he was quoted as saying that oil and gas were natural resources that could be depleted — one day they would be gone, thus the need to prepare now.

Need to act now

"While it will take more than 100 years before these resources are exhausted, we need to act now for the benefit of the next generation," he maintained.

He told the forum, organized by the Arab Centre for Research and Policy Studies and held at the Ritz-Carlton, Doha, that oil producers should start planning what scenarios to take after oil and gas, especially in the fields of renewable energy.

"In other countries, they are utilizing alternative sources of energy, such as thermal, nuclear or wind," he observed.

Al Attiyah said that, obviously, for Gulf regional countries the best alternative energy source was solar energy.

"While I cannot guarantee you one day of rainfall in Qatar, I can assure you of 12 months of sunshine, which is why we have to keep looking for the best choice for us in terms of renewable energy. We do not want the next generation to blame us for not looking after their welfare," he stated.

The charismatic Al Attiyah, who, as Qatar's Energy and Industry Minister, spent 18 years working with OPEC, is recognized globally for his years of experience in the oil and gas sector and especially for having made a formidable contribution to the international energy industry over the course of many decades.

It is a career that has touched many people, companies and nations, producers and consumers, and most notably the development of his home State of Qatar's energy industry.

Now a senior adviser to the Emir of Qatar, he was a leading figure in OPEC affairs. He was President of the OPEC Conference on no fewer than four occasions.

In fact, he has the honour of being the third-longest serving Oil and Energy Minister in OPEC's 55 years of existence.

Global oil shipping industry reducing carbon footprint

Shutterstock

The oil and maritime industries are inextricably linked: bunker fuel powers ships and 63 per cent of the world's oil production is transported by sea. With fuel representing the largest portion of a ship's operating costs the* OPEC Bulletin *examines how shipping is cutting carbon emissions as the world's leaders meet in Paris to negotiate a pact to minimize climate change.

Shipping is the lifeblood of global markets and the petroleum industry and enables the transportation of 90 per cent of world trade. Although environmentalists claim shipping is a heavy greenhouse gas (GHG) emitter, it emits less carbon dioxide (CO_2) per ton/mile of cargo than planes, diesel trains and trucks.

Consequently, shipping is part of the solution to tackling climate change: today it represents 2.2 per cent of the world's total CO_2 emissions, whereas in 2007 the figure stood at 2.8 per cent.

"The industry has a long-established goal to reduce ships' CO_2 by 20 per cent by 2020. In 2015, this will be achieved ahead of schedule," according to the International Chamber of Shipping (ICS).

New environmental rules

Despite its reduced carbon footprint, very low freight rates, tonnage oversupply and the global recession curbing trade have shrunk revenues for ship owners.

Implementing new environmental rules for air emissions and ballast water treatment is expected to cost over $500 billion for the global shipping industry over the next decade.

Increasing environmental legislation has prompted operational reviews and investments in technology that are difficult to do under financial restraint. With regulators still developing enforcement policies in this shifting landscape, ship owners are worried about whether environmental compliance will put them at an economic disadvantage.

"A lot of new technical solutions and equipment are expensive and unproven and the first-mover advantage is often uncertain," explained Catrine Vestereng, Tanker Segment Director at DNV GL.

Described as a "traditional industry", ship owners sometimes demonstrate "scepticism when we talk about future scenarios with alternative fuels and more autonomous ships," said a spokesman for Rolls Royce which designs and supplies power and propulsion systems.

Shipping involves registries of different nations, international port calls, and generating emissions on the ocean outside any nation's jurisdiction, making it difficult to introduce carbon market mechanisms.

Furthermore, there has been a split between developed and developing nations over how to allocate responsibility on curbing emissions. The same arguments have also prevented the finalization of a comprehensive international climate deal to date. But if a market mechanism is introduced, the industry's preference is for a global fuel levy, said ICS.

Forgoing market mechanisms, regulator, the International Maritime Organization (IMO), instead garnered agreement on increasingly stringent energy efficiency levels for new vessels under the Energy Efficiency Design Index (EEDI) and best practices for ships in service under the Ship Energy Efficiency Management Plan (SEEMP).

OPEC Member States have introduced some cutting edge technologies to minimise their carbon footprint. — Kamar Zaman, Drewry.

Both aim to reduce carbon emissions, making the IMO the only international organization to have adopted global legislation to significantly reduce CO_2 emissions.

The EEDI was controversial for OPEC Member Countries Saudi Arabia and Venezuela as it undermined the climate policy principle of "common but differentiated responsibilities" — as in the developing world should have to do less to reduce emissions than developed countries.

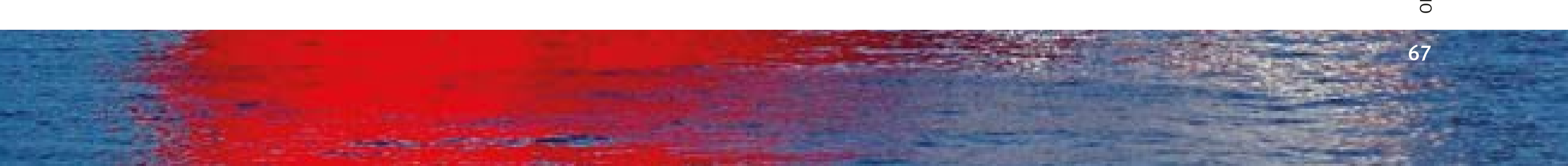
Analysis from the ICCT suggests that the EEDI could save between 141 and 263 mt of CO_2 annually by 2030.

Environmental strategies

With fuel representing 60–70 per cent of a ship's operating costs, ship owners are economically compelled to cut their CO_2 emissions. Nevertheless, fuel efficiency across existing fleets has been exercised through speed management.

More efficient ship and propeller designs and adjusting a ship's trim have also optimised fuel efficiency using modern technology. However, the hull of tankers cannot be significantly modified without losing freight (earning) capacity.

The power of 'Big Data' to introduce greater efficiencies, especially with fuel consumption, has enabled ship owners "to search out positive and negative trends, which will allow operational changes based on real life conditions," explained Jan Kragh



Michelsen, VP Maritime Business Development at Cobham SATCOM, the marine satellite provider.

Interest in liquefied natural gas (LNG) as a marine fuel was primarily driven by high oil prices in recent years and discharging fewer pollutants.

"The low oil price is also in contrast with the development of LNG as a fuel, since presently there's no more economic advantages of LNG compared with marine diesel oil in protected areas. The lack of global suppliers and logistics, harmonized regulations and procedures for the bunkering of LNG-fuelled ships make the situation even worse," Michele Francioni, CEO of ship classification society RINA Services told the *OPEC Bulletin*.

With fuel representing 60–70 per cent of a ship's operating costs, ship owners are economically compelled to cut their CO_2 emissions.

OPEC Member States have "introduced some cutting edge technologies to minimise their carbon footprint," commented Kamar Zaman, Director of Technical Services at maritime consultancy Drewry. "They are not cost-constrained."

In June this year, maritime satellite communications provider Marlink finished rolling out Very Small Aperture Terminal (VSAT) connectivity across 26 tankers for the Kuwait Oil Tanker Company (KOTC). The VSAT services transmit data back to the shore office where it is analysed to improve operations.

"With easier and more cost-effective access to data and voice communication through Marlink's Sealink VSAT services, the company is now able to enhance its global logistics operations — improving arrival and departure estimates and securing the safety of vessels, cargo and crew," observed Tore Morten Olsen, Head of Maritime at Airbus Defence and Space, the parent company of Marlink. "This will support KOTC to introduce fuel efficiencies, which in turn will enable it to reduce emissions," he added.

The National Iranian Tanker Company has set a target of cutting the energy consumption of its fleet by 28 per cent.

In the United Arab Emirates (UAE), national shipping companies ADNATCO and NGSCO aim to achieve a 21 per cent reduction in fuel consumption, which is equivalent to 450,000 tons of CO_2 a year.

Energy savings were achieved on voyage performance, ship performance, fuel management, main and auxiliary engines, energy consumers and management of the companies.

Now in the third phase of the Al Daffah energy efficiency project, the companies have installed ship performance monitoring systems, coriolis mass fuel flow metres, torque metres, and KWh metres to identify areas of improvement and response, accordingly. We will "reduce the operational cost by several million dollars," said ADNATCO.

Qatargas and Nakilat, the Qatari gas transport company, are using the Eniram Engine software, which enables engine and fuel efficiency optimization. After analysing data from onboard fuel flow metres with generator loads, power produced and Specific Fuel Consumption, the software suggests optimal engine combination and fuel type.

Foul coatings applied to the hulls of the Saudi Arabia shipping company's VLCCs, which reduce water resistance, have resulted in fuel savings of more than six per cent and prevented over 20,000 mt of CO_2 being emitted.

Holding the world's largest tanker fleet, the National Iranian Tanker Company (NITC) has set a target of cutting energy consumption by 28 per cent through voluntary speed reduction (ten per cent saving); reducing hull roughness (five per cent); reducing propeller roughness (three per cent) and propeller vortex loss recovery (three per cent); speed optimisation (five per cent); and main engine fine tuning (two per cent).

EU CO_2 emissions

Effective from January 1, 2018, the EU's Monitoring, Reporting, and Verification of CO_2 emissions rules will compel ship owners and operators to produce annual carbon emissions reports on vessels equal to or larger than 5,000 GT that travel to, from and between any EU port.

Dubbed as a first step towards a global system to reduce GHG emissions and increase energy efficiency, ship owners have raised concerns about the different monitoring methods which have high administrative or investment costs and that poor equipment, processes, and inadequately trained staff could result in the failure to measure fuel consumption properly.

However, shipping faces a curious conundrum with the decarbonization agenda as the world's leaders hold the COP21 talks in November/December to broker a climate change pact.

As the global economy grows, so too will demand for shipping — with the IMO's scenarios projecting an increase of 50–250 per cent in carbon emissions up to 2050.

Addressing the COP21 forum, Koji Sekimizu, Secretary-General of the IMO, emphasized that the regulator should determine future emission control measures due to shipping's complexity.

It remains to be seen whether the global political dialogue on cutting carbon emissions will achieve a decisive result. But ship owners who take decisive action on operational performance will have "a competitive advantage from a compliance perspective and support long-term operational and business planning strategies," said Jan de Kat, Director of Energy Efficiency and Vessel Performance, Operational and Environmental Performance, at ABS.

DNV GL

DNV GL unveils state-of-the-art ship designs

Over the past five years, 'eco ships' — with fuel savings of up to 30 per cent compared to previous generation vessels — emerged as a hot issue when bunker fuel prices were at record highs.

Since 2011, an estimated 670 tankers (>30,000 dwt) have been ordered at shipyards worldwide, the vast majority of which can be assumed to be of the eco type, according to shipping consultancy Poten & Partners.

As eco ships are sold at a premium unlike non-eco ships, due to their sophisticated engineering solutions, debates surround whether eco new builds provide any material financial advantage over good quality existing fleets when weighing up market conditions, low fuel oil prices, fuel regulatory changes, crew experience and docking time.

Shipping classification society DNV GL has produced tanker and LNG carrier designs with lower environmental footprints to stimulate industry dialogue about what is possible with existing technologies that are technically robust, tested and economically feasible.

In July, DNV GL industry partners GTT, Hyundai Heavy Industries, and GasLog presented the LNGreen carrier concept, described as being "state-of-the-art" after studying LNG vessels' operational conditions and trading routes which influence speed, propulsion, electrical and heat demand.

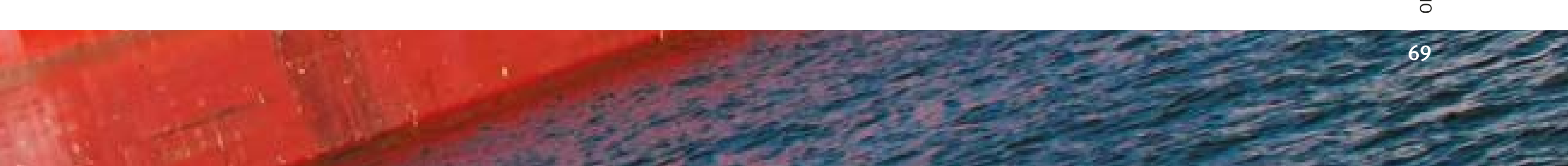
Using sophisticated computational fluid dynamics calculations, the group determined the best hydrodynamics, machinery and system configuration to meet future trading patterns.

The vessel design is approximately eight per cent more energy efficient and increased cargo volume capacity by five per cent.

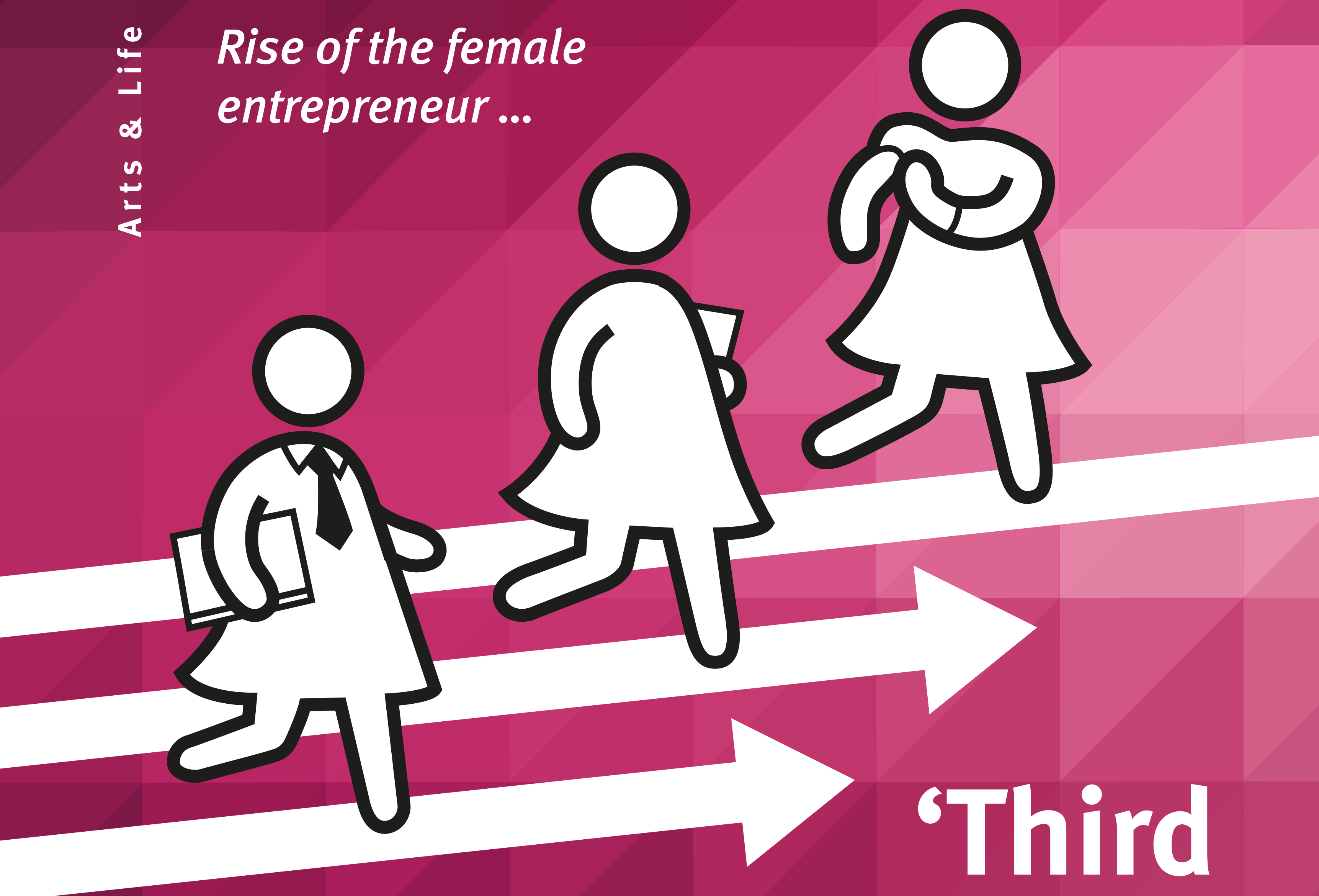
The consortium said the concept "could be ordered today" and was compliant with the new dimensions of the Panama Canal, as well as offering speed-range flexibility, hull form and boil-off rate.

Five years ago, DNV GL presented the LNG fuelled Triality tanker concept that is still rousing interest today. Triality's V-shaped hull removes the need for ballast water and eliminates almost all local air pollution.

Although it has not been developed further, parts of the concept have been embraced by the industry. Emitting 34 per cent less CO_2 and using 25 per cent less energy, Triality demonstrates that the "technologies are not part of the long-term future — they are here already. It is just a matter of actually doing it," said Ole Vidar Nilsen, head of product marketing at DNV GL.



Rise of the female entrepreneur …



‘Third billion’ force gains momentum

Women are considerably significant for societies and economies across the planet. In making up roughly 50 per cent of the global population, they are perceived by some economists as the ‘beating heart’ of local economies — an important instrument for economic growth and a driving force for economic development, progress and prosperity. To have a better comprehension of the phenomenon in hand, Ayman Almusallam, an intern in OPEC’s Public Relations and Information Department, brings OPEC Bulletin readers a step closer to the main actors of the movement by interviewing businesswomen from the Organization’s Member Countries.

In a report carried by Global Entrepreneurship Monitor, it indicates that 126 million women are presently operating businesses worldwide, while an additional 98 million females are currently in the process of establishing operations of some kind.

However, despite this considerable number, businesswomen still tend to be underestimated globally. In fact, male and female entrepreneurs are seen to be treated equally in only seven countries across the globe, according to a report carried by *The Economist*.

Businesswomen accross the globe

On the other hand, businesses are generally deemed risky and challenging, which imposes a key hindrance in their pursuit and establishment considering the lack of finance support that businesswomen are experiencing.

Fortunately, the recent technological revolution has contributed notably in eliminating a great number of barriers and obstacles. Additionally, it has provided women with numerous opportunities to expand their businesses, promote their products on a larger scale and enhance their potential reach. Furthermore, new technologies have facilitated accessibility, communication and deal conclusions among trade parties from across the world.

In the United States, female entrepreneurs contribute $3 trillion to the national economy, creating more than 23 million jobs, according to the World Bank.

Another study on female entrepreneurship, conducted by the Kauffman Foundation, points to the fact that the number of women joining the general labour force is elevating rapidly worldwide.

However, this differs massively in the sector of entrepreneurship. The graph below illustrates the discrepancy among men and women in practising entrepreneurship.

The World Bank estimates that the number of small and medium-sized enterprises (SMEs) owned and operated by females in developing countries has reached ten million, an impressive number that is expected to increase appreciably in the near future, regardless of the challenges individuals will invariably have to confront and overcome on a daily basis, such as social constraints, cultural barriers and limited time. Moreover, it is crucial and influential in the development of human capital.

Education of empowerment

Hence, a leading global initiative — the 'Third Billion Campaign' — has been launched to tap into women's economic potential as employees, entrepreneurs, producers and consumers. The initiative, unveiled in New York City in 2012, seeks to encourage females from all countries, particularly developing nations, to overcome underleverage and the poor conditions they experience through educating them and expanding self-awareness of their capabilities and potential.

Education and empowerment have been set as key instruments to achieve the initiative's objective. Women that direct their life circumstances, take decisions and actively participate in world affairs, are the sought outcome.

In an interview carried by *Inc.* magazine with Rania Anderson, who writes frequently about successful female entrepreneurs, she emphasises on the fact that although men have been practising entrepreneurship for a longer time in comparison to women, they can indeed learn two critical traits that are necessary to succeed in entrepreneurship from them — resilience and tenacity.

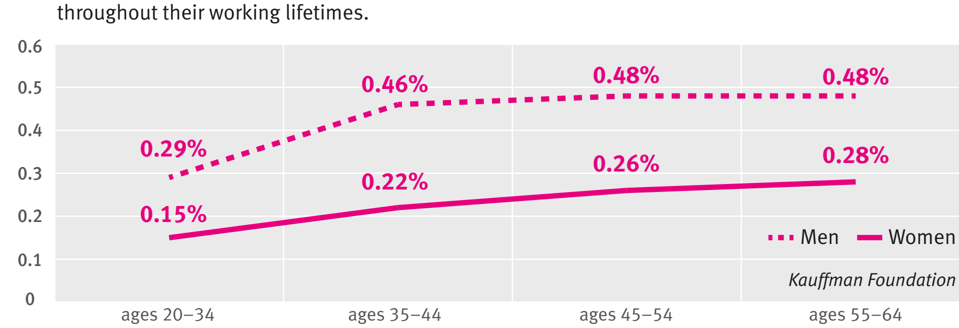
In OPEC Member Countries, the number of established businesses that are either owned or operated by women, has expanded rapidly and significantly over the years. In fact, they now represent a critical component of national economies and are notable job creators.

To have a deeper understanding of the phenomenon and its implications, the *OPEC Bulletin* interviewed a few businesswomen from OPEC Member Countries.

The variation among women and men in practising entrepreneurship

RATE OF ENTREPRENEURSHIP *by gender and age*

As women reach the peak age of entrepreneurship (35–44), they fail to see the explosive gains that their male counterparts see and this effect widens the gap between men and women entrepreneurs throughout their working lifetimes.



Source: 2015 Kauffman Index Startup Activity. Ewing Marion Kauffman Foundation.

Layla Almostafa

Age:	36
Nationality:	Saudi Arabian
Industry:	Beauty and special treatments
Company:	Lavender Beauty Centre
Position:	Director, Treatment Specialist
Experience:	15+ years
Qualifications:	Diploma, and several certifications by international beauty centres and firms

Layla Almostafa*, a Saudi businesswoman, is owner and director of a centre specialized in beauty and special treatments for women. Although she is just 36 years old, she possesses 15-plus years of work experience, in addition to a diploma in beauty and special treatments and several certifications accredited by international beauty centres and firms.*

What has triggered your interest for pursuing entrepreneurship? At what age did you become aware this was the direction you wanted to go in?

Looking at the local market, I have noticed it is very rare to find Saudis working in the beauty sector. Furthermore, it is uncommon to see Saudi women occupying such jobs. I started to observe the local market and nurtured my interest in pursuing entrepreneurship during my twenties.

Was becoming an entrepreneur a coincidence or an intended action?

It was an intended action that required a lot of hard work.

Is there a particular factor/driving force that you consider crucial to achieving success as an entrepreneur?

The endless support by my family, persistence and determination are the most important success factors.

During the initiation stage, have you confronted any financial barriers as a female entrepreneur? If yes, then which? Did you get encouragement from any particular quarter?

Naturally, new projects and businesses are prone to confronting problems and obstacles. However, they can be overcome through hard work and constant support. Moreover, working as one team is an important foundation for success and solving issues.

Additionally, it is important that your friends and beloved ones believe in you and in the path you have chosen, besides providing assistance and support. In my case, my cousin, Dr Ghayda Al-Yahya, has been my greatest supporter throughout my professional career.

How have you managed to maintain your motivation over time as a female entrepreneur? Do you experience any demotivation by your surroundings?

Taking a break from time-to-time is necessary! One of the most significant reasons to cause demotivation is the fact that there are no local specialized education centres. Furthermore, the currently existing institutions are below standard. Therefore, we are forced to travel abroad in order to participate in academic courses and development programmes.

How do you manage to balance between your private life and work?

Being an entrepreneur permits you to allocate your time freely depending on your private and professional obligations that you need to attend throughout the year, a flexibility that only businessmen and businesswomen can relish. Hence the time division among family and work requirements is not an issue — yet family comes first.

What reception do you get among your male colleagues?
When you are raised in an environment that ensures equality among sex gender, then it is highly unlikely to experience any problems or complications related to this issue.

Do you consider yourself a role model for other young girls that may consider such a career choice? What advice would you give them?
I would love to be a role model for the young girls, yet I am still at the beginning of the path. But I would advise them to be persistent, devoted and love their work.

Finally, is there any special event/moment that has brought you to where you are today, regardless if it is encouraging or discouraging, that you would like to share with us?
I cannot recall a particular event at the moment. Nonetheless, I think that the reason for being at the place I am today is my determination to be independent and self-assured. I like to prove myself as an independent woman — that I can make my own decisions, direct my own life in according to my needs and desires, and, in the process, help to improve the society I am working in.

Nazanin Daneshvar, *an Iranian national, has led the female entrepreneurial revolution in the country's technology sector and was happy to talk to us about her successful journey. She is 31-years-of-age and in charge of running and managing the company she founded — Takhfifan.*

What has triggered your interest for pursuing entrepreneurship? At what age did you become aware this was the direction you wanted to head in?
Through living abroad, I always had this feeling that I have to do something for my country. Hence, I established my first start-up at the age of 24, which unfortunately failed. I then attempted, at the age of 26, to create a second opportunity, while moving back to Iran at that age.

Was becoming an entrepreneur a coincidence or an intended action?
I think, it is all about passion! I have always wanted to change the world and make it a better place. I always had this mission in my mind to create a better working environment for women in the technology sector. Additionally, I have always wanted to bring well-known and quality tech firms to my home country, IR Iran.

Nazanin Daneshvar

Age:	31
Nationality:	Iranian
Industry:	Technology
Company:	Takhfifan
Position:	CEO
Experience:	12+ years
Qualifications:	Master's in IT Engineering

Is there a particular factor/driving force that you consider crucial to achieving success as an entrepreneur?

Keep on trying, even when initially failing, until you eventually succeed! Success is a process — when you fail then you should know that you are in the process of being successful.

During the initiation stage, have you confronted any financial barriers, as a female entrepreneur? If yes, then which? Did you get encouragement from any particular quarter?

Takhfifan, my enterprise, is a fully organically grown company! So, financial barriers were always there and we have had to make sure that we spend the money we have on the right things to get the best returns. Furthermore, I always had great support from my family.

How have you managed to maintain your motivation over time as a female entrepreneur? Do you experience any demotivation by your surrounding?

No one wanted to believe me — that I am the founder of Takhififan, particularly in the beginning. Being young and female made things very complicated, so I had to take my dad to lots of official meetings and introduce him as the manager of the company, just so they would listen.

As we became more popular, things started to get easier and smoother. Being chosen as the best entrepreneur of the year helped a lot.

How do you manage to balance between your private life and work?

It is really difficult and it is an everyday challenge to really balance it. I am not sure how successful I am, but people around me really understand my situation.

What reception do you get among your male colleagues?

In IR Iran, Takhififan is the largest firm that is founded by a female operating in the tech sector and pretty much the only one. Moreover, I always get great support from most of my colleagues, which is really motivating.

Do you consider yourself a role model for other young girls that may consider such a career choice? What advice would you give them?

Lots of them say they look at my life and they want to follow my path. But I always tell them that they just see the positive side of my story, which I allow people to see. They do not really see the challenges. Yet, I completely advise them to follow the entrepreneurial path. Moreover, they need to be aware of all the ups and downs — then decide. Things are not as beautiful as we see them from the outside and there are lots of challenges and issues that you may face when you are at work.

Finally, is there any special event/moment that has brought you to where you are today, regardless if it is encouraging or discouraging, that you would like to share with us?

Basically, when we started and recognized the interest of people in our firm, this was a super encouraging moment to carry on and keep moving forward. Additionally, all the support we received from friends, family and the media had a great impact on the realisation of our dream at Takhififan.

Banke Kuku*, an award-winning Nigerian businesswoman, commenced her entrepreneurial journey at the young age of 22. Currently, she holds the position of creative director at Banke Kuku Textiles after she attained a Bachelor's degree in Textiles Design.*

What has triggered your interest for pursuing entrepreneurship? At what age did you become aware this was the direction you wanted to head in?

I was inspired by the idea of having creative freedom. I believed I had a design ascetic that was unique, beautiful and that was not in the market yet. Additionally, there was a lot of demand for it. I was 22 years old at the time and I did not want my designs to be labelled with someone else's name.

Was becoming an entrepreneur a coincidence or an intended action?

Becoming an entrepreneur is something I fell into. I never planned for it, but I knew that I did not feel comfortable having my designs labelled as someone else's.

I was working at a fashion house called Jasmine Di Milo, which was owned by Jasmine Al-Fayed. I freelanced for several designers at the same time, creating my own line — Aso Oke (a traditional Nigerian fabric custom of the Yoruba tribe), which was inspired by scarves, hand-woven and made of silk and cashmere.

The line of scarves took off, hence my freelance work became more demanding. It was hard to balance. At this point, I decided to bring all my freelance work and personal collections under one roof, which I called Banke Kuku Textiles.

Is there a particular factor/driving force that you consider crucial to achieving success as an entrepreneur?

Yes, the ability to be flexible in your ideas. Being an entrepreneur today can be tricky with trends and markets changing all the time. As your market changes, you have to keep up with it! There is huge competition!

During the initiation stage, have you confronted any financial barriers, as a female entrepreneur? If yes, then which? Did you get encouragement from any particular quarter?

I have not tried to raise money for my business yet. It is something that I look to do in the near future. I am aware of the struggles that female entrepreneurs have in raising finance. There are several groups in Africa that are helping women overcome these barriers, such as She Leads Africa and WIMBIZ.

How have you managed to maintain your motivation over time as a female entrepreneur? Do you experience any demotivation by your surrounding?

I like the idea of a woman having something for herself, no matter how big or small it may be. I believe it holds the woman together. It enriches her confidence. This idea has motivated me throughout my time as an entrepreneur.

How do you manage to balance between your private life and work?

I make sure that I make time for myself. When I first started, I struggled with the balance. Everything was work-focused, which became overwhelming and exhausting. As time went by, I started to understand the importance of giving myself time to refresh my mind.

My business is very important to me. But for me to be the best business owner and designer — there needs to be a balance and enough room for other aspects of my life to keep developing.

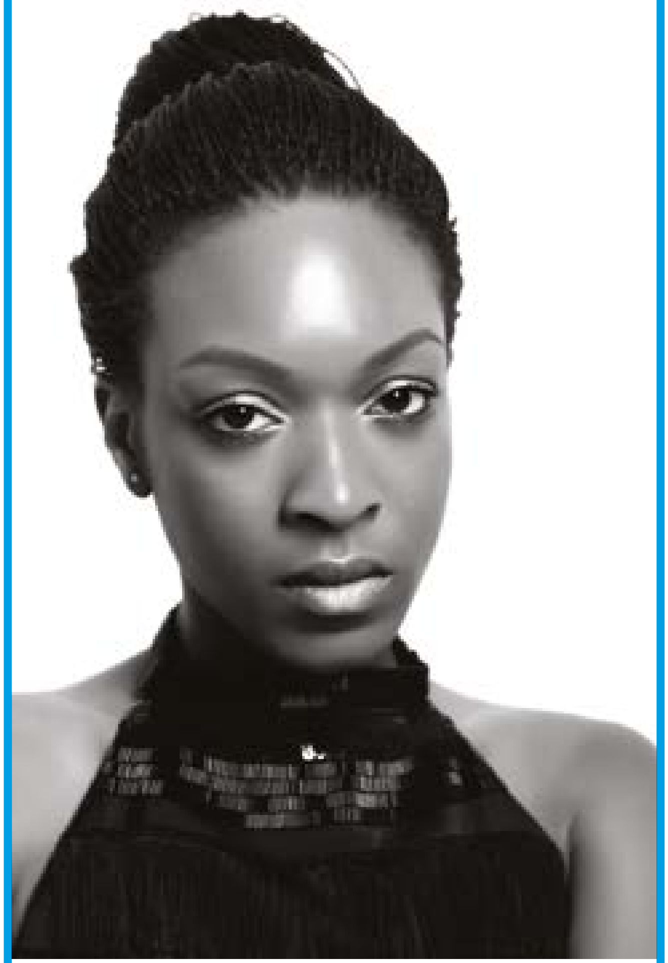
What reception do you get among your male colleagues?

Most male colleagues respect what I do.

Do you consider yourself a role model for other young girls that may consider such a career choice? What advice would you give them?

For those who see me as a role model, I would advise them to be patient and to persevere. Good work takes time.

Finally, is there any special event/moment that has brought you to where you are today, regardless if it is



Banke Kuku

Age:	28
Nationality:	Nigerian
Industry:	Textiles
Company:	Banke Kuku Textiles
Position:	Creative Director
Experience:	5+ years
Qualifications:	BA in Textiles Design (Hons)

encoding or discouraging, that you would like to share with us?

The 'Women in Making' competition is an annual competition run by Triumph International, a global lingerie brand with sales of more than $1 billion. Their annual competition celebrates creativity and designs delivered by women and gets thousands of applicants. Winning the competition in 2014 has been a great boost for me. I have been able to develop the business by working closely with Triumph on a number of exciting new initiatives. They also invested a small amount of money in the business as a bursary.

Winning the competition opened my business to more distribution channels. My products are now stocked in 36 stores across 13 countries, such as Japan, the United States and several European countries. I established contacts with a bunch of super-smart, successful and creative females to act as official mentors and advisers to my business. These include Sophia Webster, who has become a global sensation as a shoe designer, and Roksanda Illinic, who is a very successful British fashion designer.

Enas Al-Hashani*, a Saudi national, aged 50, commenced her entrepreneurial journey as a young female 23 years ago, yet she remains hungry for opportunities and looks forward to new challenges. A graduate of the Business Administration College, she has established a Jeddah-based firm, specialized in media and publishing.*

What has triggered your interest for pursuing entrepreneurship? At what age did you become aware this was the direction you wanted to head in?

At the age of 27, I started my first venture in retail, as an entrepreneur. The trigger was that I always wanted to make a difference and fill gaps in my community.

Was becoming an entrepreneur a coincidence or an intended action?

It was an intended action.

Is there a particular factor/driving force that you consider crucial to achieving success as an entrepreneur?

Believing in what you are doing and hard work.

During the initiation stage, have you confronted any financial barriers, as a female entrepreneur? If yes, then which? Did you get encouragement from any particular quarter?

In my first two ventures, I did not face any financial obstacles as they did not require high investments. But I faced a huge financial issue with my last and current venture as the initial investment was high. Additionally, the nature and the model of the business do not have a quick return on investment. Family and friends helped initially and later I got an investment.

How have you managed to maintain your motivation over time as a female entrepreneur? Do you experience any demotivation by your surrounding?

I personally believe that an entrepreneur is an entrepreneur regardless of gender. They both face the same challenges and issues. As a matter of fact, I believe it is easier for women in our society as we are not obligated to support our families. Therefore, we have the luxury of taking more risks than a person who is the sole provider for his family. This is just my humble opinion.

How do you manage to balance between your private life and work?

It was a struggle at the beginning, but with compromises, collaboration and the appreciation of my husband, my kids and extended family and friends for my work, I have come to a stage where I am satisfied with the balance I have in my life. Furthermore, they have all shown me the proper respect.

What reception do you get among your male colleagues?

A very respectful one. They are encouraging and appreciative of my work.

Do you consider yourself a role model for other young girls that may consider such a career choice? What advice would you give them?

My advice to everyone — not only to young girls — is to believe in themselves and follow their dreams.

Finally, is there any special event/moment that has brought you to where you are today, regardless if it is encouraging or discouraging, that you would like to share with us?

I have had a couple of moments that I believe were a huge factor to getting me where I am today. The first one is a very painful and disturbing moment. It was when the initial investor of my venture decided to pull out his financial support and former contributions, after only six months of establishing my business. He informed me, he wanted to pull out because he believed I was not capable of managing the venture properly and that I acted according to my emotions. Basically, at that point in time, I did hit rock bottom and I felt like I was left alone in the middle of the ocean. So, I felt I would either drown or find a way to make it to the shore. It was one of the worst times in my career!

I cried myself all the way back to my office with the decision that I would close shop. However, when I arrived at the office and saw my staff, my heart sank thinking of what they would do and how I would live with myself, if I did not fight hard enough for them to keep their jobs and for me, personally, giving up on my dream. So, the next morning I came in all fired up with a new strategy and worked harder than I ever did before.

The second incident I want to refer to ironically relates to the first and was just 18 months after the first incident when we were nominated for the 100 Saudi Fast Growth Companies forum. We attended the forum hoping that we would make it to the list of the hundred companies. As they started announcing the companies that made it on to the list and as they were reaching the last 20 companies, we were embarrassed that we did not even make it to the list.

So when they reached the number one fastest-growing start-up company, we were laughing at ourselves for not even making it to the list. Yet the big surprise was that my name was called. And for seconds, I sat frozen in my chair, not believing what I was hearing.

The percentage of women running companies in the competition did not exceed ten per cent and the attendance was dominantly male. I would say not more than five per cent of the attendance was female. So, one can only imagine the pride and honour that I felt that day. As I was walking to the stage, I received a standing ovation from the crowd; I could see in their eyes how proud they were of me.

That very day changed my life forever. It gave me the motivation to continue my journey and to believe in myself. The ironic part of the story is that the initial investor who pulled out his support and investments from my venture was nominated as well — but he was somewhere in the bottom 20.

In all the pictures, you can see me in the front and he is somewhere at the back, barely seen. The funny thing is that he then came up to me, saying that I owed him for my success. I calmly replied — of course — because most likely we would not have been there if he had still been a part of my team!

Enas Al-Hashani

Age:	50
Nationality:	Saudi Arabian
Industry:	Media and publishing
Company:	Rumman Company
Position:	CEO
Experience:	23+ years
Qualifications:	Bachelor’s in Business Administration

In the course of his official duties, OPEC Secretary General, Abdalla Salem El-Badri, visits, receives and holds talks with numerous dignitaries.
This section is dedicated to capturing those visits in pictures.

October 19

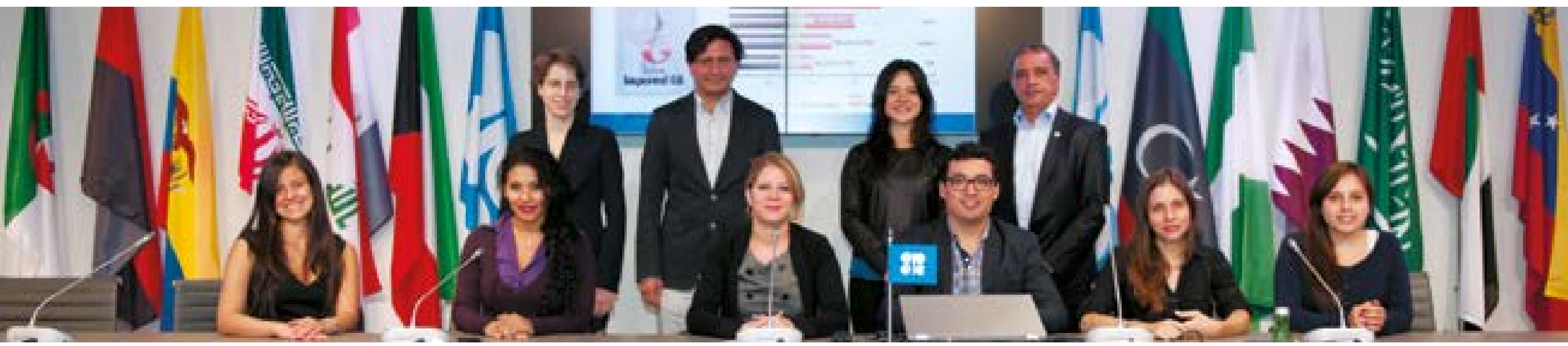
Ambassador Didier Lenoir (l), Head of the EU Delegation to the International Organisations in Vienna, visited Abdalla Salem El-Badri, OPEC Secretary General.

October 27

An environmental team headed by Philippe Lacoste *(third right),* Ambassador-at-large and Deputy Special Representative for COP 21; visited Abdalla Salem El-Badri *(fourth right),* OPEC Secretary General. Also pictured (l–r): Dr Mohammad Taeb, Environmental Coordinator in OPEC's Environmental Matters Unit; Abdullah Al-Shameri, Office of the Secretary General; Odette Tomescu-Hatto, Head of the Climate Change Unit, French Ministry of Foreign Affairs and International Development; Marion Paradas, Ambassador, Permanent Representative of France to the United Nations Office and other International Organizations in Vienna; Oswaldo Tapia, Head of OPEC's Energy Studies Department; Sylvain Fournel, First Secretary, Permanent Mission of France to the United Nations Office and other International Organizations in Vienna.

Students and professional groups wanting to know more about OPEC visit the Secretariat regularly, in order to receive briefings from the Public Relations and Information Department (PRID). PRID also visits schools under the Secretariat's outreach programme to give them presentations on the Organization and the oil industry. Here we feature some snapshots of such visits.

Visits to the Secretariat



October 2 Students from Latinomics.

October 8 Visitors from the Nigerian Bar Association, Abuja, Nigeria.

October 9 Students from the World Petroleum Congress Youth.

Building a future in Kenya – one girl at a time

By Maureen MacNeill

Dr Kakenya Ntaiya.

From a difficult childhood of poverty and violence in rural Kenya, Dr Kakenya Ntaiya has risen to become a shining beacon to girls throughout her country.

"I knew the only escape was to get an education."

Not only has she become an example for a better life through education, but she is behind the Kakenya Centre for Excellence (KCE), which was established in 2009 and received the OPEC Fund for International Development (OFID) *Annual Award for Development in 2014*.

OFID held a charity exhibition of paintings made by the girls from the Kakenya Centre at its headquarters on October 19, this year.

The centre has been spending its time since 2009 empowering and motivating young girls through education to become agents of change and to break the cycle of destructive cultural practices in Kenya.

"This centre is one story of woe and trial," said Ambassador and Permanent Representative of Kenya, Michael A O Oyugi, at the event.

"It has brought together girls facing all kinds of horrors and challenges in this community … it gave them tools to enable them to realize their full potential so they can contribute to their community as full participants."

When the school started, it had 22 girls — now there are 183 and the following year there will be 200. Three representatives of OFID visited the project in March this year, taking with them Gerald Wirth, Director of the Vienna Boys Choir, who brought some young performers to the October event to play music, in part based on Kenyan rhythms.

Wirth, who believes music can have a transformative effect on kids' development by improving their self-esteem and learning, undertook to perform with the girls at their school while in Kenya.

His hands-on session with some of the 150 students at KCE focused on musical improvisation and appreciation, as well as how the mind and body interconnect. Students picked up traditional Austrian songs with ease and taught Wirth and the OFID team several Masai songs.

Said Wirth: "What I saw in this school was something amazing to me. After a few hours on a dirt road, we came to a school where the girls only want to learn."

Empowering experience

"They have dreams and these can be achieved," said Dr Ntaiya, who is now in her 30s and married with children. She managed to get a PhD in Education in the US through a scholarship. "... they can become a lawyer, a teacher, a pilot. Thank you for giving us this possibility."

She said her own experience has been very empowering for all the girls in Enoosaen, the village she grew up in and where the school — the first primary school for girls in the country — is based.

Since then, the school has reached new highs; the eighth graders at the school achieved first-place ranking in the country on national exams and all KCE graduates were accepted into high school.

Meanwhile, Dr Ntaiya has been named one of Newsweek's '150 women who shake the world' and a Top 10 CNN hero.

"If you never see someone educated, you cannot see what can result from going to school. I grew up in the same community, was engaged at five, I was supposed to be married at 12. I changed this and decided to go to school. People have seen what I can do; I changed that story. Each one of them is my daughter."

Both the mothers and fathers of the girls at the centre are supportive of their education, said Dr Ntaiya. "To see that is happening is amazing!"

When she first approached the village elders to support the school she met with strong resistance. But she persisted and the number of girls applying has since tripled. Girls come from all parts of the region, many brought by their fathers and grandfathers.

In 2006, the chief of the village declared: "Girls are for marriage, so there is no need to educate them." Today, he is a member of the KCE board.

"One hundred per cent of our girls have avoided (genital) mutilation, early marriage and early childbirth as a result of our programme and signed agreements with parents," noted Dr Ntaiya. "I want this school not only to empower Kenya's girls, but also their mothers, fathers and entire villages!"

KCE still has many ambitious plans and is still a work in progress. The campus has been built on land donated by community elders. Future goals include building a multi-purpose dining hall and a safe, hygienic kitchen, along with adding more classrooms and dormitories for the girls, a library and sports facilities.

"They (the girls) inspire me — make me know the world can be a better place. I want to live to impact peoples' lives. If I speak today and make an impact, that is my contribution to society," she stated.

"In my community, men show bravery by killing a lion. For women, the pen is a spear that kills poverty."

Left to right: Li Yong, Director General, UNIDO; Suleiman J Al-Herbish, Director-General, OFID; Michael A O Oyugi, Ambassador/Permanent Representative of Kenya to Austria; Dr Kakenya Ntaiya, Founder of Kakenya Centre for Excellence (KCE); and Mrs Oyugi.

Forthcoming events

Operational excellence in oil, gas and petrochemicals, December 6–8, 2015, Abu Dhabi, UAE. Details: Euro Petroleum Consultants Ltd, 44 Oxford Drive, Bermondsey Street, London SE1 2FB, UK. Tel: +44 207 357 8394; fax: +44 207 357 8395; e-mail: enquiries@europetro.com; website: www.europetro.com/en/opex_mena15.

10th annual North Africa oil and gas summit, December 7–9, 2015, Algiers, Algeria. Details: The Exchange Ltd, 5th Floor, 86 Hatton Garden, London EC1N 8QQ, UK. Tel: +44 207 067 1800; fax: +44 207 242 2673; e-mail: marketing@theenergyexchange.co.uk; website: www.northafricasummit.com.

Saudi Transtec 2015, December 8–10, 2015, Dammam, Saudi Arabia. Details: International Exhibition Services Srl, Via Anton Giulio Bragaglia 33, Rome 00123, Italy. Tel: +39 06 30 88 30 30; fax: +39 06 30 88 30 40; e-mail: exhibition@saoge.org; website: www.sauditranstec.com.

Bottom of the barrel technology conference Middle East and Africa 2015, December 9–10, 2015, Abu Dhabi, UAE. Details: Euro Petroleum Consultants Ltd, 44 Oxford Drive, Bermondsey Street, London SE1 2FB, UK. Tel: +44 207 357 8394; fax: +44 207 357 8395; e-mail: enquiries@europetro.com; website: www.europetro.com/en/bbtc_mea_2015.

Iran oil and gas post sanctions: preparing for the new era, December 14–16, 2015, London, UK. Details: CWC Associates Ltd, Regent House, Oyster Wharf, 16–18 Lombard Road, London SW11 3RF, UK. Tel: +44 207 978 000; fax: +44 207 978 0099; e-mail: sshelton@thecwcgroup.com; website: www.iranoilgas-summit.com.

14th gas storage outlook, January 11–12, 2016, Houston, TX, USA. Details: Platts, 20 Canada Square, Canary Wharf, London E14 5LH, UK. Tel: +44 207 1766142; fax: +44 207 176 8512; e-mail: cynthia_rugg@platts.com; website: www.platts.com/events/americas/gas-storage/index.

Middle East gas conference, January 11–13, 2016, Dubai, UAE. Details: The Exchange Ltd, 5th Floor, 86 Hatton Garden, London EC1N 8QQ, UK. Tel: +44 207 067 1800; fax: +44 207 242 2673; e-mail: marketing@theenergyexchange.co.uk; website: http://megc.theenergyexchange.co.uk.

Energy efficiency conference, January 13, 2016, London, UK. Details: Energy Institute, 61 New Cavendish Street, London W1G 7AR, UK. Tel: +44 207 46 77 194; fax: +44 207 580 2230; e-mail: fferrari@energyinst.org; website: www.energyinst.org/events/view/4621.

The future of aromatics, January 13–14, 2016, Amsterdam, The Netherlands. Details: Active Communications International, 5-13 Great Suffolk Street, 4th Floor, London SE1 ONS, UK. Tel: +44 207 981 98 00; fax: +44 207 593 00 71; e-mail: claire@acieu.net; website: www.wplgroup.com/aci/event/future-aromatic-conference.

9th European oil storage conference, January 18–19, 2016, Amsterdam, The Netherlands. Details: Platts, 20 Canada Square, Canary Wharf, London E14 5LH, UK. Tel: +44 207 1766142; fax: +44 207 176 8512; e-mail: cynthia_rugg@platts.com; website: www.platts.com/events/emea/european-oil-storage/index.#

The world future energy summit, January 18–21, 2016, Abu Dhabi, UAE. Details: Reed Exhibitions, Gateway House, 28 The Quadrant, Richmond, Surrey TW9 1DN, UK. Tel: +44 208 271 2134; fax: +44 208 910 7823; e-mail: rxinfo@reedexpo.co.uk; website: www.worldfutureenergysummit.com.

European gas conference, January 19–21, 2016, Vienna, Austria. Details: The Exchange Ltd, 5th Floor, 86 Hatton Garden, London EC1N 8QQ, UK. Tel: +44 207 067 1800; fax: +44 207 242 2673; e-mail: marketing@theenergyexchange.co.uk; website: www.europeangasconference.com.

Process safety in oil and gas conference, January 20–21, 2016, Houston, TX, USA. Details: Energy Conference Network, 440 Cobia Dr. suite 2004, Katy, TX 77494, USA. Tel: +1 855 86 94 260; website: http://energyconferencenetwork.com/ps.

2nd annual cyber security for oil and gas Canada summit, January 25–27, 2016, Calgary, Canada. Details: IQPC Ltd, Anchor House, 15–19 Britten Street, London SW3 3QL, UK. Tel: +44 207 368 9300; fax: +44 207 368 9301; e-mail: enquire@iqpc.co.uk; website: www.cybersecurityoilgas.com.

6th Middle distillates conference, January 26–27, 2016, Antwerp, Belgium. Details: Platts, 20 Canada Square, Canary Wharf, London E14 5LH, UK. Tel: +44 207 1766142; fax: +44 207 176 8512; e-mail: cynthia_rugg@platts.com; website: www.platts.com/events/emea/Middle-Distillates/index.

LNG bunkering summit, January 26–28, 2016, Amsterdam, The Netherlands. Details: IQPC Ltd, Anchor House, 15–19 Britten Street, London SW3 3QL, UK. Tel: +44 207 368 9300; fax: +44 207 368 9301; e-mail: enquire@iqpc.co.uk; website: www.lngbunkeringsummit.com.

Offshore West Africa, January 26–28, 2016, Lagos, Nigeria. Details: PennWell, 1421 S Sheridan Road, Tulsa, Oklahoma 74112, USA. Tel: +1 918 835 3161; fax: +1 918 831 9497; e-mail: sneighbors@pennwell.com; website: www.offshorewestafrica.com.

Oil and gas intellectual property 2016, January 26–28, 2016, tba, UK. Details: IQPC Ltd, Anchor House, 15–19 Britten Street, London SW3 3QL, UK. Tel: +44 207 368 9300; fax: +44 207 368 9301; e-mail: enquire@iqpc.co.uk; website: www.oilandgasip.com.

SPE/IADC Middle East drilling technology conference and exhibition, January 26–28, 2016, Abu Dhabi, UAE. Details: Society of Petroleum Engineers, Dubai Knowledge Village, Block 17, Offices S07-S09, PO Box 502217, Dubai, UAE. Tel: +971 4 390 3540; fax: +971 4 366 4648; e-mail: spedub@spe.org; website: www.spe.org/events/medt/2015.

12th vessel efficiency and fuel management summit, January 27–28, 2016, London, UK. Details: Active Communications International, 5–13 Great Suffolk Street, 4th Floor, London SE1 ONS, UK. Tel +44 207 98 19 800; fax: +44 207 59 30 071; e-mail: claire@acieu.net; website: www.wplgroup.com/aci/event/vessel-efficiency-fuel-management-summit-europe.

6th Myanmar oil and gas exhibition, January 28–29, 2016, Myanmar, Yangon. Details: Oliver Kinross Asia Pacific, 25th Floor, 71–77 Wing Lok Street, Sheung Wan, Hong Kong, PR of China. Tel: +852 39 75 57 10; e-mail: info@oliverkinross.com; website: www.myanmaroilexhibition.com.

Cold weather, higher economic activity could help oil prices recover

***November* 2015**

A colder-than-normal winter coupled with improved economic activity could lend a hand in helping international crude oil prices recover going into next year.

According to *OPEC's Monthly Oil Market Report (MOMR)* for November, the recent decline in oil prices had encouraged additional oil demand.

It had also provided a challenging market environment for some higher-cost crude oil production, which, it said, had already shown a slowdown.

Moreover, strategic oil reserves were seen to have grown as some countries — including China and India — had taken advantage of lower prices to add to their reserves, a trend that was likely to continue.

"In addition, a colder- or longer-than-expected winter, as well as better-than-projected economic activities, could support incremental demand. This would help alleviate the current (supply) overhang and support a recovery of crude oil prices in the coming months," said a feature article in the report.

Looking at developments in global oil inventories, the *MOMR* said stocks consisted of three major components. The first was a combination of total OECD commercial oil stocks and strategic petroleum reserves (SPR), which together represented more than 60 per cent of global oil inventories.

It noted that OECD commercial stocks typically served as a key indicator of the status of the oil market, as seasonal variations were linked to oil demand through an inverse relationship.

"In contrast, OECD SPR has little impact on the market as its volume has not dramatically changed over the last years."

The report said the second component referred to non-OECD inventories, which had become more important in recent years as non-OECD oil demand had increased, requiring more stockpiling.

Oil-at-sea, the third component, consisted of both floating storage and oil-in-transit. The latter provided an important operational link between exporter and consumer countries, but played a negligible role in the market as the volume fluctuated in a narrow range.

In contrast, observed the *MOMR*, the level of floating storage fluctuated depending on the forward price structure, with a strong contango providing an incentive to hold stocks, while deep backwardation would lead to a release of inventories.

It said that for the first three quarters of 2015, estimated global inventories saw a strong build of around 285 million barrels or 1.0m b/d, the bulk of which came from a 205m b increase in OECD commercial stocks and an 80m b rise in non-OECD inventories.

Oil-at-sea remained broadly unchanged during the same period as fluctuations in floating storage were offset by changes in oil-in-transit.

"The build in global inventories is mainly the result of the increase in total supply outpacing growth in world oil demand over the first nine months of this year," the report maintained.

It said that over the first three quarters of the year, global oil supply rose by 2.5m b/d y-o-y, while world oil demand increased by 1.6m b/d y-o-y. This would imply a stock-build of 900,000 b/d, which roughly corresponded to the build observed in global inventories over this period.

The *MOMR* pointed out that the overhang in total OECD commercial inventories started to emerge in the third quarter of last year when total commercial stocks were still in line with the five-year average.

"Since then, inventories have gradually increased and the overhang with the five-year average is currently at around 210m b."

The report said that the bulk of this overhang had come from crude, with a surplus of 170m b, while product stocks witnessed a gain of 40m b.

Within components, the excess in crude inventories started in May 2014, while for products, the surplus began around a year later, driven mainly by higher refinery outputs due to increased refinery utilization rates, especially in Europe and the United States.

The *MOMR* contended that middle distillates accounted for most of the total global surplus, while gasoline stocks had started to improve, ending September at around the five-year average.

It noted that the difference between current OECD inventory levels and the latest five-year average was usually used as an indication of whether the oil market was tight or well supplied.

"Over the last ten years, there have been two periods when the difference with the five-year average has surpassed an excessive level of 150m b.

"The first period occurred amid the deterioration in world oil demand following the 2008 financial crisis, when the surplus in total commercial OECD inventories reached 180m b in the first quarter of 2009.

"The second period corresponds to the current market situation, which has been driven by higher global supply. This has led to a surplus of OECD commercial inventories. In both cases, crude oil prices dropped to multi-year lows," the report stated.

MOMR … oil market highlights

November 2015

The **OPEC Reference Basket** rose by 19¢ to average $45.02/b in October, the third month in a row around this level. Crude oil futures increased at a faster pace with ICE Brent increasing by 75¢ to $49.29/b and Nymex WTI gaining 82¢ to stand at $46.29/b. Speculator net length declined as short positions increased. The Brent-WTI spread narrowed to average close to $3/b in October.

World economic growth remains modest at 3.1 per cent in 2015, mainly due to a continued slowdown in emerging and developing economies, as well as low US growth in the third quarter. Global economic growth is expected to improve to 3.4 per cent in 2016. US growth has been revised to 2.4 per cent in 2015 and 2.5 per cent in 2016, while total OECD growth remains at 2.0 per cent for 2015 and 2.1 per cent for 2016. Figures for China and India remain unchanged at 6.8 per cent and 6.4 per cent, and 7.4 per cent and 7.6 per cent, respectively.

World oil demand is expected to grow by 1.50 million barrels/day in 2015 to average 92.86m b/d, unchanged from the previous report. In 2016, world oil demand growth is seen reaching 1.25m b/d, in line with the previous month's assessment, to average 94.14m b/d.

Non-OPEC oil supply is estimated to average 57.24m b/d in 2015, an increase of 720,000 b/d, unchanged from the previous month's estimation. The forecast for 2016 non-OPEC oil supply remains unchanged, showing a contraction of 130,000 b/d to average 57.11m b/d. Output of OPEC NGLs in 2016 is forecast to increase by 170,000 b/d to average 6.18m b/d. In October, OPEC crude oil production according to secondary sources, dropped by around 256,000 b/d to average 31.38m b/d.

Despite the peak maintenance season seen in October with more than 8m b/d of capacity offline worldwide, refinery margins fell across the globe due to high inventories and expectations of a mild winter. **Product markets** in the Atlantic Basin continued to weaken even with healthy US gasoline demand, pressured by oversupply. Asian margins lost some momentum amid a narrowing of gasoline and gasoil crack spreads which outweighed the positive performance of naphtha and fuel oil.

A general improved sentiment was seen in the dirty **tanker market**, on the back of strong tonnage demand and delays seen in several ports. On average, spot freight rates rose by 19 per cent over the previous month. Clean tanker freight rates declined both East and West of Suez as clean tanker demand was limited. OPEC sailings and fixtures were higher than the month before, while sailings declined in all reported regions, except in European ports.

OECD commercial oil stocks remained almost unchanged in September to stand at 2,942m b. At this level, inventories were around 210m b higher than the latest five-year average, with crude and products indicating surpluses of around 170m b and 40m b, respectively. In terms of days of forward cover, OECD commercial stocks stood at 63.0 days in September, around 4.5 days above the five-year average.

Estimated **demand for OPEC crude** in 2015 remains at 29.6m b/d, an increase of 600,000 b/d over the previous year. In 2016, demand for OPEC crude is forecast at 30.8m b/d, around 1.2m b/d higher than in the current year and unchanged from the previous report.

The feature article and oil market highlights are taken from OPEC's Monthly Oil Market Report (MOMR) for November 2015. Published by the Secretariat's Petroleum Studies Department, the publication may be downloaded in PDF format from our Website (www.opec.org), provided OPEC is credited as the source for any usage. The additional graphs and tables on the following pages reflect the latest data on OPEC Reference Basket and crude and oil product prices in general.

Table 1: OPEC Reference Basket crude oil prices $/b

	2014			2015										Weeks 40–44/2015 (week ending)				
Crude/Member Country	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Oct 2**	**Oct 9**	**Oct 16**	**Oct 23**	**Oct 30**
Arab Light – Saudi Arabia	85.93	76.07	60.13	44.47	53.78	52.20	57.73	62.62	60.94	54.95	46.52	45.56	45.37	44.28	47.51	46.41	44.34	43.54
Basrah Light – Iraq	83.57	73.94	57.94	42.58	51.82	50.53	55.61	60.40	58.63	53.10	44.32	43.41	43.50	42.29	45.75	44.50	42.32	41.79
Bonny Light – Nigeria	88.51	80.10	63.81	48.51	58.46	56.75	60.65	65.31	62.19	56.77	47.07	48.01	49.16	47.61	51.76	49.78	47.55	48.13
Es Sider – Libya	86.31	78.90	61.53	46.76	56.83	54.78	58.40	63.22	60.79	55.54	45.82	46.71	47.56	46.19	50.16	48.18	45.95	46.53
Girassol – Angola	86.78	78.68	61.83	47.98	58.27	56.86	61.12	65.51	63.28	56.46	47.42	48.01	48.45	47.18	50.95	48.93	47.08	47.38
Iran Heavy – IR Iran	84.61	74.46	58.99	42.84	53.26	51.27	56.26	61.38	59.86	54.86	46.25	44.62	44.55	43.45	46.85	45.73	43.41	42.41
Kuwait Export – Kuwait	83.99	74.04	58.25	42.31	52.25	50.52	55.96	60.92	59.29	53.85	45.28	43.96	43.61	42.61	45.81	44.75	42.55	41.62
Marine – Qatar	86.14	75.43	59.48	45.51	55.38	54.27	58.51	63.26	61.79	55.36	46.98	45.88	45.89	44.51	48.16	47.06	44.65	43.81
Merey* – Venezuela	76.17	68.42	51.17	37.96	48.41	45.79	49.49	55.09	51.74	44.43	35.26	34.13	35.48	33.54	37.39	36.13	34.45	34.29
Murban – UAE	89.10	77.85	62.27	48.41	58.56	57.41	61.66	66.18	64.59	57.58	48.83	48.88	49.48	48.29	51.33	50.73	48.46	47.67
Oriente – Ecuador	76.84	69.52	53.86	42.26	47.00	45.79	52.73	58.04	56.71	47.78	39.75	41.03	39.91	38.70	42.40	40.66	38.58	38.38
Saharan Blend – Algeria	87.61	79.60	62.93	47.91	58.18	56.93	59.75	64.12	61.69	56.34	47.17	48.36	49.51	47.96	52.11	50.13	47.90	48.48
OPEC Reference Basket	**85.06**	**75.57**	**59.46**	**44.38**	**54.06**	**52.46**	**57.30**	**62.16**	**60.21**	**54.19**	**45.46**	**44.83**	**45.02**	**43.79**	**47.23**	**45.99**	**43.87**	**43.35**

Table 2: Selected OPEC and non-OPEC spot crude oil prices $/b

	2014			2015										Weeks 40–44/2015 (week ending)				
Crude/Member Country	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Oct 2**	**Oct 9**	**Oct 16**	**Oct 23**	**Oct 30**
Minas – Indonesia[1]	84.46	75.92	59.95	46.37	55.90	54.11	58.55	62.98	60.09	51.86	42.46	42.05	42.13	40.86	43.79	43.29	41.30	40.56
Arab Heavy – Saudi Arabia	82.45	72.18	56.65	40.25	51.07	49.34	54.26	59.42	58.01	53.55	44.82	43.37	43.01	42.05	45.33	44.27	41.85	40.76
Brega – Libya	86.26	79.10	62.43	47.71	57.73	55.68	59.20	63.97	61.24	56.04	46.32	47.25	48.21	46.78	50.81	48.83	46.60	47.18
Brent – North Sea	87.41	78.90	62.53	47.86	58.13	55.93	59.50	64.32	61.69	56.54	46.72	47.61	48.56	47.13	51.16	49.18	46.95	47.53
Dubai – UAE	86.73	76.33	60.25	45.57	55.85	54.66	58.55	63.54	61.76	56.15	47.87	45.38	45.84	44.32	48.17	47.10	44.63	43.61
Ekofisk – North Sea	87.87	79.27	63.15	48.48	59.22	57.18	60.51	64.86	62.21	57.02	47.53	48.24	49.23	47.70	51.81	49.86	47.75	48.11
Iran Light – IR Iran	84.90	76.88	61.32	47.42	55.97	54.79	59.34	63.97	62.28	55.76	45.74	46.16	47.05	45.80	49.57	47.58	45.60	45.96
Isthmus – Mexico	85.40	79.04	59.74	45.52	52.68	51.41	59.10	63.78	63.48	55.62	46.56	47.71	46.90	46.55	49.56	47.55	45.31	45.45
Oman – Oman	86.77	77.81	61.16	46.61	56.58	55.12	58.66	63.60	61.77	56.23	47.87	45.65	46.07	44.71	48.38	47.33	44.97	43.80
Suez Mix – Egypt	83.91	75.58	58.72	44.07	54.70	52.05	57.07	61.32	59.36	53.00	43.30	44.53	44.65	43.32	47.33	45.39	43.21	43.19
Urals – Russia	86.63	78.92	61.53	47.03	57.81	55.07	59.70	64.33	62.52	55.84	46.22	47.19	47.49	45.94	50.12	48.23	46.10	46.13
WTI – North America	84.43	76.04	59.50	47.29	50.76	47.77	54.43	59.28	59.81	51.17	42.77	45.48	46.26	45.12	48.40	46.91	45.09	45.00

Note: As per the decision of the 109th ECB (held in February 2008), the OPEC Reference Basket (ORB) has been recalculated including the Ecuadorian crude Oriente retroactive as of October 19, 2007. As per the decision of the 108th ECB, the ORB has been recalculated including the Angolan crude Girassol, retroactive January 2007. As of January 2006, monthly averages are based on daily quotations (as approved by the 105th Meeting of the Economic Commission Board). As of June 16, 2005 (ie 3W June), the ORB has been calculated according to the new methodology as agreed by the 136th (Extraordinary) Meeting of the Conference. As of January 2009, the ORB excludes Minas (Indonesia).

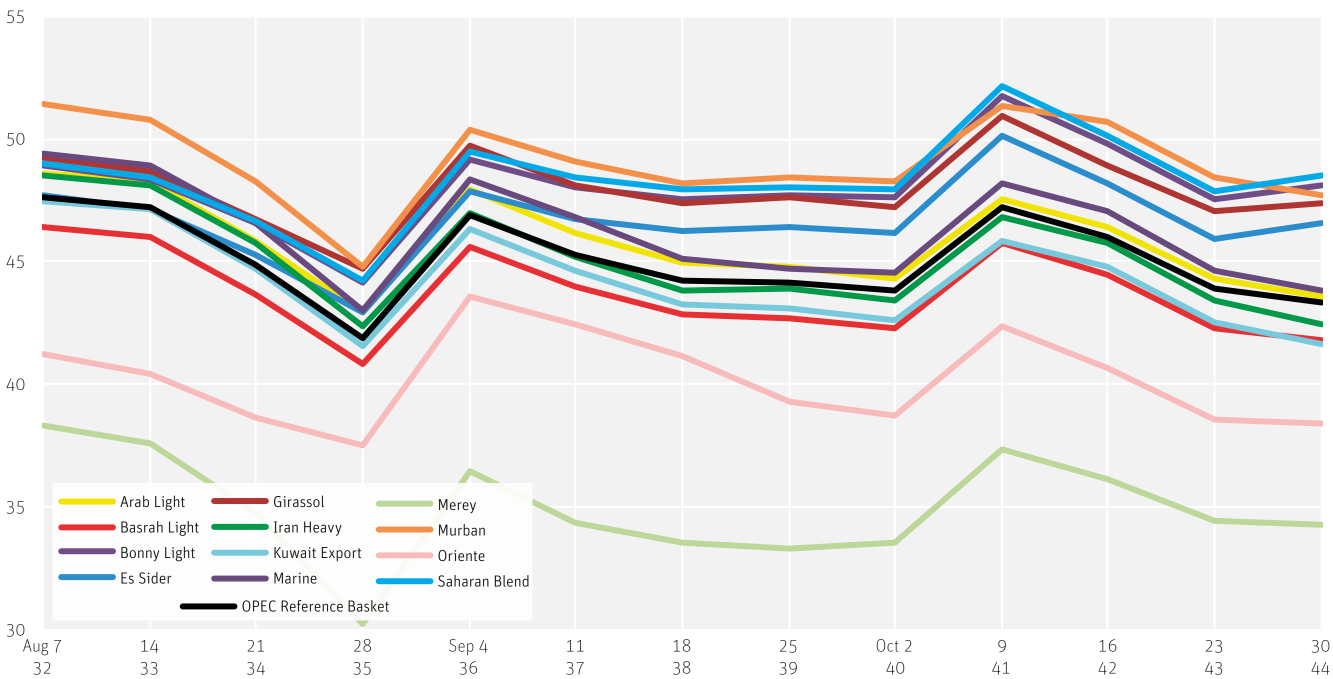
* *Upon the request of Venezuela, and as per the approval of the 111th ECB, BCF-17 has been replaced by Merey as of January 2009. The ORB has been revised as of this date.*

1. *Indonesia suspended its OPEC Membership on December 31, 2008.*

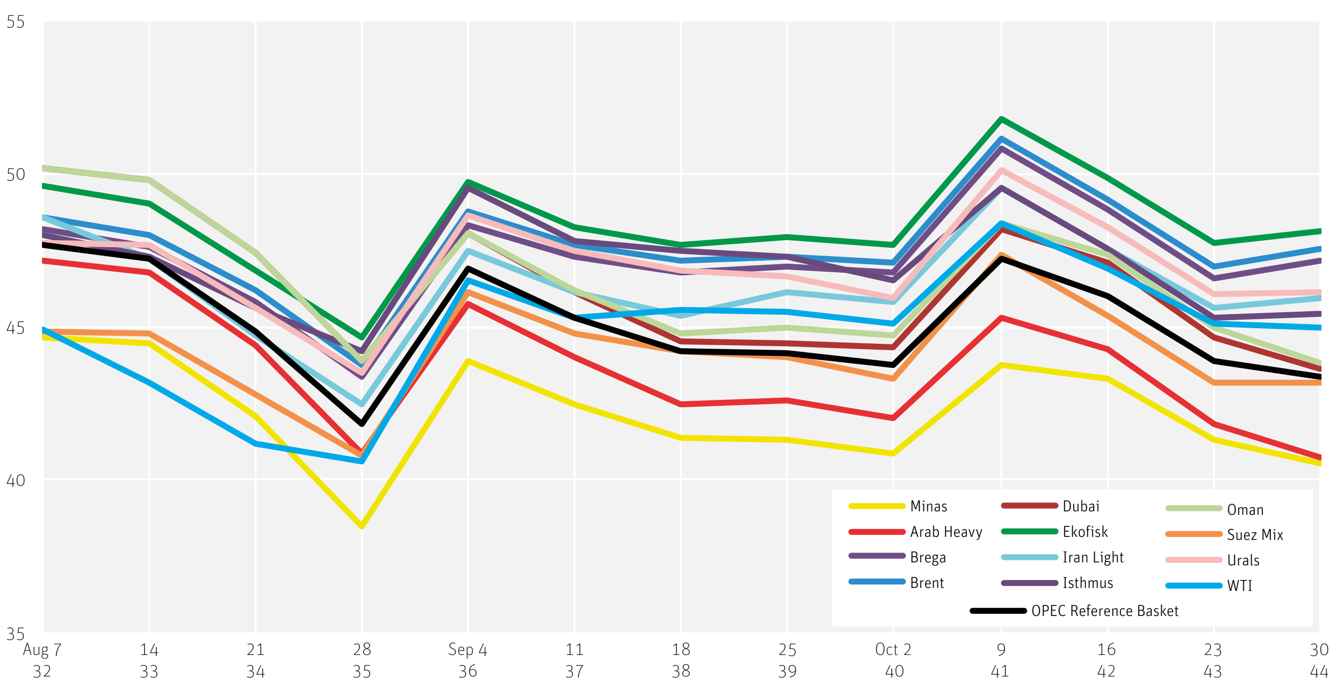
Brent for dated cargoes; Urals cif Mediterranean. All others fob loading port.

Sources: The netback values for TJL price calculations are taken from RVM; Platt's; Secretariat's assessments.

Graph 1: Evolution of the OPEC Reference Basket crudes, 2015 $/b



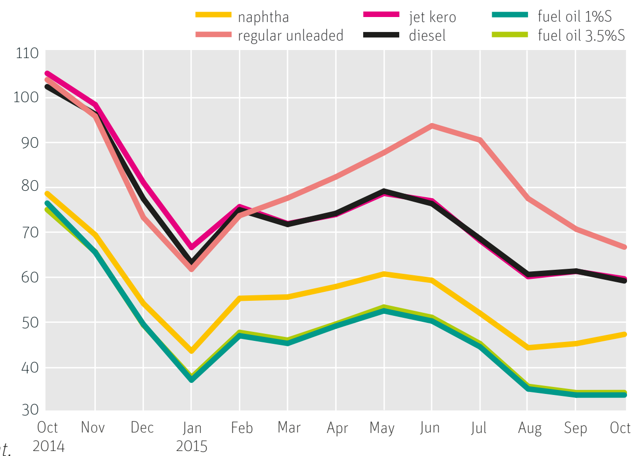
Graph 2: Evolution of spot prices for selected non-OPEC crudes, 2015 $/b



Note: As per the decision of the 109th ECB (held in February 2008), the OPEC Reference Basket (ORB) has been recalculated including the Ecuadorian crude Oriente retroactive as of October 19, 2007. As per the decision of the 108th ECB, the basket has been recalculated including the Angolan crude Girassol, retroactive January 2007. As of January 2006, monthly averages are based on daily quotations (as approved by the 105th Meeting of the Economic Commission Board). As of June 16, 2005 (ie 3W June), the ORB has been calculated according to the new methodology as agreed by the 136th (Extraordinary) Meeting of the Conference. As of January 2009, the ORB excludes Minas (Indonesia).
Upon the request of Venezuela, and as per the approval of the 111th ECB, BCF-17 has been replaced by Merey as of January 2009. The ORB has been revised as of this date.

Table and Graph 3: North European market — spot barges, fob Rotterdam $/b

		naphtha	regular gasoline unleaded	diesel ultra light	jet kero	fuel oil 1 per cent S	fuel oil 3.5 per cent S
2014	October	78.61	103.90	102.35	105.32	76.50	75.06
	November	69.44	95.79	96.25	98.35	65.55	65.66
	December	54.22	73.31	77.45	81.09	49.59	49.44
2015	January	43.66	61.80	63.24	66.67	37.20	37.79
	February	55.35	73.71	75.02	75.70	47.05	47.79
	March	55.65	77.62	71.77	71.93	45.35	46.07
	April	57.96	82.31	74.21	73.97	49.20	49.64
	May	60.76	87.70	79.16	78.67	52.57	53.41
	June	59.34	93.68	76.37	76.99	50.32	51.12
	July	52.04	90.50	68.59	68.18	44.59	45.30
	August	44.38	77.52	60.66	60.18	35.24	35.80
	September	45.30	70.72	61.41	61.35	33.88	34.41
	October	47.36	66.73	59.23	59.68	33.89	34.43



Note: Prices of premium gasoline and diesel from January 1, 2008, are with 10 ppm sulphur content.

Table and Graph 4: South European market — spot cargoes, fob Italy $/b

		naphtha	premium gasoline 50ppm	diesel ultra light	fuel oil 1 per cent S	fuel oil 3.5 per cent S
2014	October	75.96	99.57	101.58	76.56	75.70
	November	66.15	91.37	95.41	66.33	65.65
	December	50.28	68.70	77.48	50.62	48.88
2015	January	39.92	56.54	64.39	39.43	38.01
	February	52.53	68.31	76.34	49.07	46.78
	March	52.55	73.37	73.42	47.87	46.03
	April	54.42	78.27	75.84	51.02	49.58
	May	58.37	82.87	80.99	54.19	52.79
	June	56.05	86.19	78.19	51.87	51.46
	July	48.48	83.94	70.34	45.57	44.77
	August	42.33	70.26	62.21	36.31	35.76
	September	43.00	63.02	63.34	34.49	34.26
	October	45.25	58.98	61.26	36.20	34.97

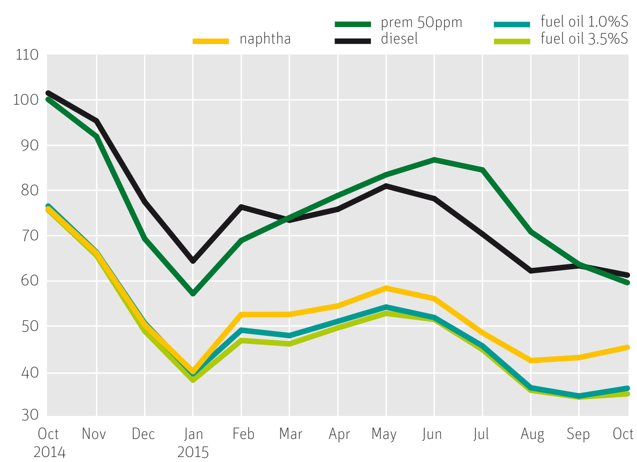
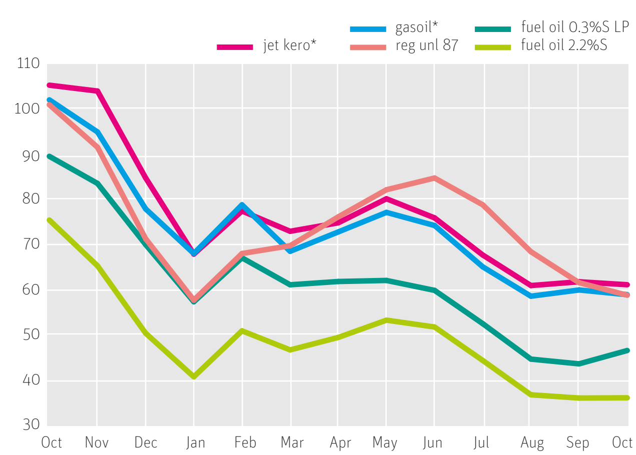


Table and Graph 5: US East Coast market — spot cargoes, New York $/b, duties and fees included

		regular gasoline unleaded 87	gasoil*	jet kero*	fuel oil 0.3 per cent S	fuel oil 2.2 per cent S
2014	October	100.85	101.93	105.18	89.41	75.28
	November	91.42	94.81	103.88	83.40	65.14
	December	71.13	77.75	84.62	69.84	50.19
2015	January	57.53	67.86	67.73	57.16	40.53
	February	67.86	78.66	77.29	66.91	50.72
	March	69.59	68.35	72.79	60.93	46.49
	April	75.99	72.65	74.67	61.66	49.26
	May	82.00	76.98	80.00	61.89	53.09
	June	84.60	74.07	75.76	59.69	51.57
	July	78.66	64.91	67.53	52.31	44.15
	August	68.26	58.40	60.76	44.45	36.54
	September	61.40	59.78	61.60	43.40	35.82
	October	58.62	58.73	60.94	46.36	35.87



* *FOB barge spot prices.*
Source: Platts. Prices are average of available days.

Table and Graph 6: Caribbean market — spot cargoes, fob $/b

		naphtha	gasoil	jet kero	fuel oil 2 per cent S	fuel oil 2.8 per cent S
2014	October	83.11	103.02	105.12	71.56	66.56
	November	74.99	94.66	98.86	62.68	57.68
	December	53.81	73.83	77.19	47.07	42.07
2015	January	53.64	65.94	64.93	36.49	31.49
	February	64.50	74.63	74.74	47.16	42.16
	March	63.59	69.97	70.21	44.71	39.71
	April	64.91	73.26	73.41	47.16	42.16
	May	71.07	78.66	79.51	49.93	44.93
	June	70.93	73.62	74.61	48.31	43.31
	July	55.93	65.93	66.69	40.69	35.69
	August	48.73	59.16	60.13	31.43	26.43
	September	50.30	59.47	60.21	30.65	25.65
	October	50.81	59.42	60.35	30.89	25.89

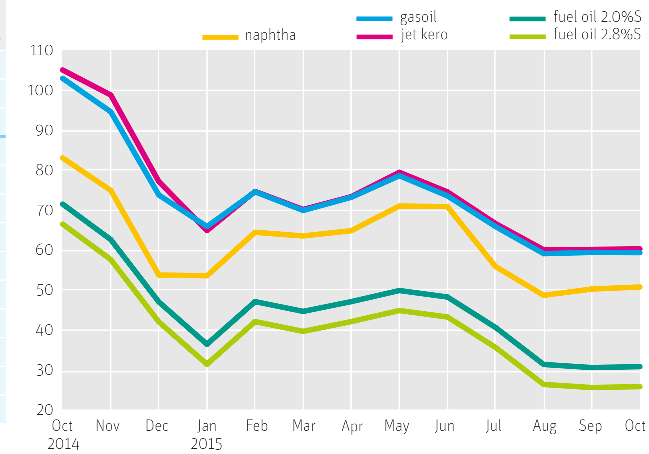


Table and Graph 7: Singapore market — spot cargoes, fob $/b

		naphtha	premium gasoline unl 95	premium gasoline unl 92	gasoil	jet kero	fuel oil 180 Cst	fuel oil 380 Cst
2014	October	79.79	101.17	98.19	100.22	101.56	79.24	77.41
	November	71.86	90.44	87.94	93.85	96.41	71.68	70.38
	December	56.33	71.91	69.58	77.10	78.36	55.52	54.60
2015	January	45.23	57.42	54.66	62.67	63.66	43.99	42.59
	February	57.39	70.46	67.06	71.14	73.25	54.93	52.24
	March	57.38	73.84	70.34	70.75	70.01	51.54	49.42
	April	59.56	75.55	73.07	72.37	72.08	54.82	52.45
	May	62.04	83.73	81.10	78.02	77.69	61.28	58.22
	June	60.89	83.97	81.02	74.73	74.56	57.08	55.73
	July	53.15	75.95	72.52	65.07	65.81	48.71	47.49
	August	45.76	66.00	61.95	57.12	57.08	39.04	37.36
	September	46.81	65.24	61.59	59.48	58.99	37.37	36.58
	October	48.92	63.39	60.55	59.13	59.28	38.32	36.99

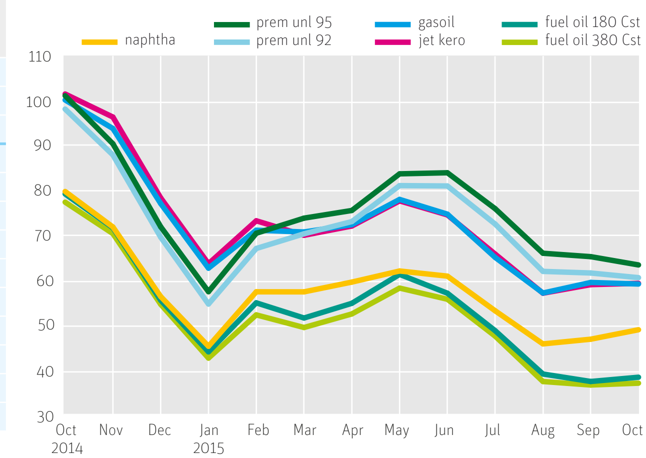
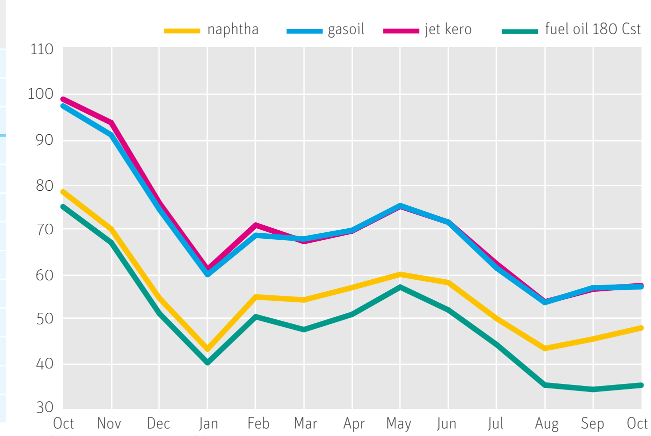


Table and Graph 8: Middle East Gulf market — spot cargoes, fob $/b

		naphtha	gasoil	jet kero	fuel oil 180 Cst
2014	October	78.20	97.26	98.76	74.90
	November	69.94	90.82	93.55	66.95
	December	54.62	74.32	75.73	51.21
2015	January	43.32	59.82	60.98	40.28
	February	54.88	68.55	70.81	50.49
	March	54.22	67.74	67.18	47.63
	April	56.96	69.66	69.51	51.01
	May	59.89	75.15	74.98	57.06
	June	58.06	71.44	71.45	51.98
	July	50.09	61.29	62.23	44.31
	August	43.45	53.64	53.79	35.34
	September	45.55	56.93	56.60	34.36
	October	48.00	57.13	57.40	35.30

Source: Platts. Prices are average of available days.



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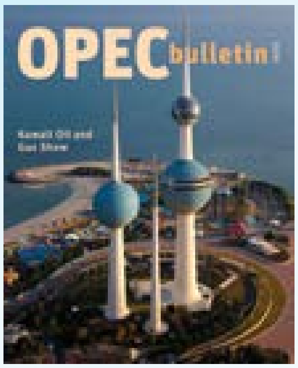

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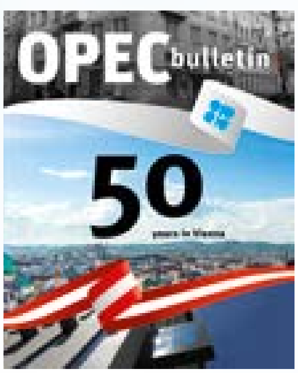

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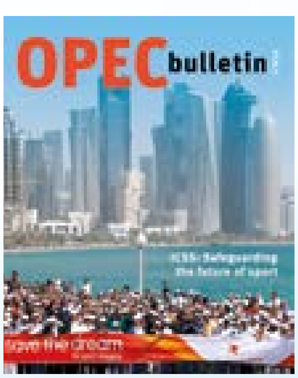

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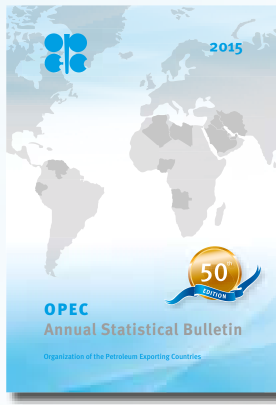

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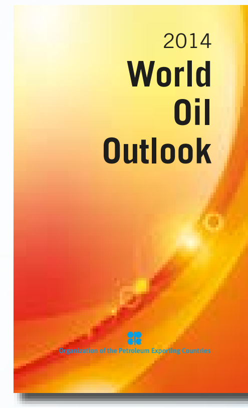

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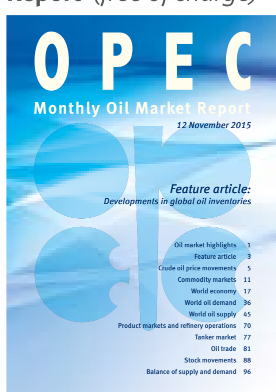

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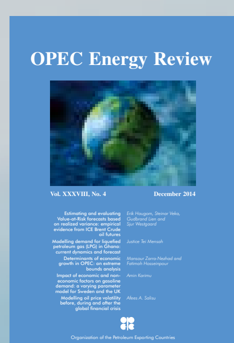

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