OPEC bulletin

Colour of the Carnival
Commentary

Solidarity: key to a lasting solution

With the onset of spring in the northern hemisphere, one can already detect the inevitable change of mood in people as each day brings fresh reminders that the winter is fast drawing to a close. The days become lighter and longer, the weather milder and more settled with thoughts inevitably turning towards planning for the summer holidays. In keeping with this good feeling, there are also reasons to be optimistic about the future of the international oil market. And not before time. After many months of depression and uncertainty the sector could do with some encouraging news.

This has come in the form of data showing that the global economy is improving and forecast to remain fairly resilient, while, importantly, crude supplies, especially the high-cost oil from non-OPEC countries, are slated to markedly decline over the next two years. With demand expected to stay at acceptable levels, especially from the world’s top non-OECD importers, industry experts and analysts are confident prices, which fell below $30/barrel earlier this year after standing at over $100/b in 2014, will steadily climb to more reasonable levels. OPEC Secretary General, Abdalla Salem El-Badri, has also expressed confidence that the market will recover. He has repeatedly referred to the current downturn as “another cycle”.

The fact is, no one stands to gain from a sustained period of low crude oil prices. Each and every oil industry stakeholder is affected, either directly or indirectly, to varying degrees. The casualties are many and the costs high. For example, in such a low-price environment, expensive oil rigs became idle, associated infrastructure is shut down or dismantled, support services mothballed, whilst once thriving companies are forced into drastic retrenchment, leaving many thousands of valued employees redundant. And at the other end of the spectrum, these same firms have little choice other than to make serious cutbacks in investment in essential production capacity, threatening future security of supply for the consumers, in addition to price spikes.

“Investment is being cut tremendously,” El-Badri, told delegates at the CERAWeek conference in Houston in February. “This is really a seed for a very high oil price in the future,” he warned.

By now, everyone knows the reasons for today’s low oil prices. They are primarily because of excess crude supplies in the market that have come mostly as a result of the tight oil explosion in the United States. And, as always, speculators are playing their part in the volatility in trying to manipulate prices on the various world energy exchanges, exacerbating an already fragile situation.

The one positive in all this is demand, which remains reasonably strong, although lower than in 2015. However, recent figures show energy-hungry China and India both stepping up their crude oil imports, in China’s case to successive record levels.

But this brings the next problem. A lot of the extra oil being supplied around the world is not being consumed. Because of the low price, importers are buying up large volumes of crude while it is cheap and putting into whatever storage they can find. It has resulted in global inventories of crude standing at all-time record levels. In the OECD region alone, there is an excess of around 300 million barrels of crude in stocks. This is way above the considered norm. El-Badri has said that this represents a continuing and worrying trend that needs to be addressed if crude prices are to recover in an orderly fashion.

The good news is the oil producers — both OPEC and non-OPEC — are talking together about the current situation, particularly the oversupply and the stock overhang.

They plan to meet in the Qatari capital, Doha, in April to discuss taking joint action to freeze oil production to January levels.

El-Badri alluded to this in Houston, stating that OPEC and non-OPEC producers had held recent technical meetings to mull over action that would allow the market to rebalance itself. “This is a first step, to see what we can achieve … and if this is successful, we can maybe take other steps in the future,” he said.

These meetings represent a cautious, yet significant step and one that will be explored further at the Doha round of talks.

OPEC has long expounded the importance of OPEC and non-OPEC cooperation for helping to bring stability back to the market in times of need. But there are two sides to this coin and the Organization cannot do it alone.

As El-Badri has often repeated, OPEC wants to cooperate, it wants to find a solution to the current problems, and it is willing to “talk to anyone” to achieve its goal of securing an orderly and efficient oil market with fair and reasonable prices for all.

Let us hope then that solidarity, common sense, and understanding prevail and that it is not just the spring weather than turns out to be sunny in April.
OPEC Membership and aims

OPEC is a permanent, intergovernmental Organization, established in Baghdad, on September 10–14, 1960, by 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, suspended its Membership on December 31, 2008, and reactivated it again on January 1, 2016.

OPEC Bulletin
Vol XLVII, No 2, March 2016, ISSN 0474—6279

Forum
4 IHS CERAWeek 2016
7 Saudi Petroleum Minister addresses CERAWeek 2016

Symposium
10 IEA-IEF-OPEC Symposium on Energy Outlooks

Spotlight
14 Shale pioneer Mark Papa addresses OPEC
20 The advent of shale oil and what the future holds

Training Course
26 MTDC — OPEC training course explains market mechanisms

Newsl ine
36 Algeria’s Sonatrach to invest $3.2bn in gas pipeline capacity
38 With new investment on the horizon, Iran looks to establish solid growth
39 Iraq Oil Ministry records huge savings in oil expenditure
40 Saudi Arabia looking to establish world-leading downstream sector
41 China, India see oil imports grow, showing demand remains strong

Interview
42 A conversation with Jeffrey Sachs: Exploiting low-cost oil best option for global efficiency

OPEC Energy Review
48 A revamp for the next 40 years
**Contributions**

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.

**Editorial policy**

The OPEC Bulletin is published by the OPEC Secretariat (Public Relations and Information Department). The contents do not necessarily reflect the official views of OPEC or its Member Countries. Names and boundaries on any maps should not be regarded as authoritative. The OPEC Secretariat shall not be held liable for any losses or damages as a result of reliance on and/or use of the information contained in the OPEC Bulletin. Editorial material may be freely reproduced (unless copyrighted), crediting the OPEC Bulletin as the source. A copy to the Editor would be appreciated.

**Indexed and abstracted in PAIS International**
Houston greets visitors with signs telling them they are visiting ‘the energy capital of the world’. The reason for this tagline is clear on the journey from the airport to the Hilton Americas hotel in downtown Houston.

Advertising hoardings promote oil and gas businesses — the city says it is home to around 5,000 energy-related firms. Even the taxi driver has his opinions on the current oil market environment and the impact on his business.

A jovial character, originally from Mali, he says that he has seen a drop-off in the number of oil and gas people coming through the city over the past year or so, but, in general, for drivers it has been a boon in terms of lower pump prices.

It can appear that everyone in Houston has a view on the oil business, possibly due to the city’s long relationship with the industry. The city was among the greatest beneficiaries of the ‘Texas oil boom’ that occurred during the early 20th century following the discovery of a large petroleum reserve near Beaumont.

It led to the Houston area becoming home to the largest concentration of refineries and petrochemical plants in the world, and the city’s fortunes have been entwined with the oil industry ever since.

The week ahead (February 22–26) would also see much discussion and debate about the current global energy and oil market landscape, with participants from more than 50 countries gathering in Houston for the 35th IHS CERAWeek conference.

Under the theme, ‘Energy Transition: Strategies for a New World’, the conference brought together global energy industry heads, experts, government officials and policymakers, as well as leaders from the technology, financial, and industrial communities.

In helping to introduce the conference, Daniel Yergin, Vice Chairman of IHS, CERAWeek Conference Chairman, and author of the Pulitzer Prize winning ‘The Prize: the Epic Quest for Oil Money and Power’, said: “Our goal over the coming days is to help navigate and lead through the cycle and to identify the factors that will be critical to shaping the new business environment and assuring the world’s growing energy requirements.”
**Mexican President**

The conference began on Monday afternoon (February 22) with a special address from Enrique Peña Nieto, President of Mexico.

Peña Nieto underscored the country’s efforts to privatize its oil industry and stressed that even with the global downturn in energy prices, there was more to come.

“Despite low international oil prices, the world is trusting and investing in Mexico”, he said. “This is not the time to stop. This is the time to move forward.”

Peña Nieto went on to reveal two specific actions that Mexico would take this year. The first was to announce a fourth call for first round bids, corresponding to deepwater exploration fields in the Gulf of Mexico, which will be issued in the first days of December.

And the second was that from April 2016, any private company will be able to import gasoline and diesel, which, he said, should be reflected in better prices.

**OPEC and the IEA**

Following the Mexican President on stage was the plenary session of OPEC Secretary General, Abdalla Salem El-Badri, and the Executive Director of the International Energy Agency, Fatih Birol.

The session had the overarching theme: ‘Energy markets in turmoil: shape of things to come’, and was moderated by Yergin himself, who began by asking the short, but challenging question: “What is going on in the oil market?”

El-Badri began by saying that prior to the second half of 2014, the industry had for many years been “enjoying a high price of $100/barrel or more and it had become accustomed to this.”

However, he stressed that in looking at past cycles, one needed to recognize that high prices do not last — and that goes for low prices, too, making specific reference to the current market situation. He further stressed that OPEC has often said that extreme prices — whether too high or too low — are not in the interests of either producers or consumers.

El-Badri also emphasized that it was important to understand the current cycle, particularly how high oil prices had led to an excess of supply and where this additional supply had come from.

If one looks at the period 2013–15, he said, one can see “that non-OPEC supply increased by over five million barrels/day.” And although OPEC also saw an increase in production in 2015, on average, over these same three years, the Organization saw no growth.

This oversupply had led to a large build-in in inventories, he noted, with OECD stocks in early 2016 at around 310m b above their five-year average. He said that “more than 70 per cent (of this overhang) is in the US.”

If you look back through history, he added, “when the overhang is high and rising, then the price comes down. And when the overhang starts falling, we see prices rise.” With this in mind, he underlined the importance of seeing the overhang decline.

Birol’s comments on the current market situation followed a similar line. “What we see is that for three years in a row, we have had more supply than demand. There is lots of oil and lots of stocks. And as a result of this, we have the $30–35 oil price,” he said. It should be noted, he added, that this price level is not necessarily good news for consumers.

“Yes, it brings economic gain to consumers, but, at the same time, it is a major problem,” he said, citing initially the transition to more renewables and the more efficient use of energy.

But what worries him more, he added, is that the industry is seeing historical cuts in oil-related investments as a result of low prices. The industry is seeing “two consecutive years of decline in oil investments,” he said, before underscoring the importance of bearing in mind that not only must investments be made to meet the growth in demand, but also to replace the declines in existing fields.

El-Badri also spoke about investment issues, stating that global exploration and production investment had fallen by around 20 per cent in 2015 and was expected to further drop by 15 per cent this year. “Investment is being cut tremendously” across the world, he observed, and this is “really a seed for a very high price in the future.”

**Searching for balance**

Although supply and demand were expected to see more balance later in 2016, El-Badri said it was essential that “we find a way to solve the supply problem” and address the already mentioned stocks’ overhang.

In this regard, he stressed the important role of both OPEC and non-OPEC countries. This then led Yergin to ask about a term many industry watchers are now talking about: “a production freeze.”

Said El-Badri: “The OPEC Secretariat started talking to non-OPEC countries last year,” when it held two technical meetings to discuss the market outlook — and to “look for solutions” to help return balance to the market. These were followed up this year with several events at which a number of OPEC and non-OPEC countries sat down to discuss further practical steps that could be taken.

The result was that some countries decided to look at a possible ‘production freeze’. “This is a first step, to see what we can achieve … and if this is successful, we can maybe take other steps in the future,” said El-Badri, before adding: “We want to cooperate. We want to find a solution.”

The OPEC Secretary General was also asked about Iran and its return to the market after the lifting of sanctions. He said the country’s full return to the oil market is a welcome one, as Iran has vast hydrocarbons potential, excellent manpower, and its production and exports remain integral to the future stability of the oil market.
He added that he hoped Iran and international oil companies could reach agreements that satisfy all parties.

Birol said the IEA sees more balance in the market in 2017, with a price rebound in 2017 and 2018. By 2020, the IEA sees an oil price of around $80/b, one, he said, that would be good for producers and consumers.

He added that a contraction was expected in non-OPEC supply in 2016 and 2017, before returning to growth in the following years, which is when the IEA expects United States shale to expand again.

**The ‘Paris Agreement’**

Yergin also asked El-Badri and Birol about their thoughts on last year’s COP21 climate change meeting in France, which resulted in the ‘Paris Agreement’.

Birol began by lauding the fact that there were over 190 countries that made commitments — the so-called Intended Nationally Determined Contributions (INDCs) — at COP21, and this included all OPEC Member Countries.

He noted that these commitments were now driving two major policies. The first sought to increase renewable energies in the power generation sector, and the second would seek higher energy efficiency through stronger policies.

El-Badri said “OPEC welcomed the agreement in Paris”, with OPEC Member Countries committed to improving the environment. He added that he agreed with Birol about the importance of the agreement — but underlined that there was “a need to be realistic” about what could be achieved given current and projected circumstances.

He highlighted the fact that fossil fuels currently make up 80 per cent of the world’s energy needs, while the world’s population is expected to increase from around 7.2 billion to 9bn by 2040 and that billions of people continue to have no access to modern energy services.

While underlining the importance of further developing renewables and diversifying the energy mix, El-Badri lamented the call in some quarters to keep fossil fuels in the ground.

The use of fossil fuels and the desire for a cleaner environment should not be viewed as mutually exclusive, he said, citing the important role of technologies in this regard.

Birol was keen to stress that the future should not be about getting rid of fossil fuels entirely. In fact, he noted that the IEA sees fossil fuels still having a 60 per cent share of the energy mix, even in a world that holds the increase in the global average temperature to 2°C above pre-industrial levels.

He also picked up on El-Badri’s point about technology, specifically pointing to the future importance of carbon capture and storage (CCS).

When asked about how this technology was progressing, Birol said that some progress had been made, but more needs to be done.

**Cooperation**

Yergin was also keen to have the speakers explore the positive relationship that has developed over the past decade between OPEC and the IEA.

Both El-Badri and Birol were effusive in describing the relationship between the two organizations, with El-Badri stressing that “we really do cooperate today.”

He noted that regular meetings are held between the two organizations, as well as with the International Energy Forum (IEF).

“We compare our outlooks, we compare our figures,” he said, adding that there is a good understanding between their respective outlooks and the researchers working on them.

Birol said it was “normal for the Secretary General and me to agree on many points.” He also highlighted that, traditionally, the IEA has been known as the organization of consuming countries, and OPEC as the organization of producing countries.

But he said he believed this distinction was changing. He cited two numbers to illustrate his point. First, over the last five years, production growth in IEA countries was three times higher than OPEC Countries. And at the same time, over the same period, consumption growth in OPEC Countries was four times higher than in IEA countries.

El-Badri also stressed that OPEC not only continues to hold talks with the IEA and the IEF, but also with the European Union, Russia, China and India.

“In fact, we talk to almost everyone except the United States,” he said, before adding that the Organization is open to dialogue with everyone.

**Tough times, but industry resilient**

It was clear from both El-Badri and Birol that these are tough times for the industry. Nevertheless, both expressed optimism for the future.

In a press conference afterwards, El-Badri said that “any country that is producing oil is suffering” but noted that the industry has been through “many cycles in the past” and he was sure it would come through this one.

In this regard, he stressed the importance of OPEC and non-OPEC cooperation in helping bring balance back to the market.

Although IHS CERAWeek 2016 had to compete with the almost blanket news coverage of the US election primaries, the industry did manage to make its voice heard.

While there are still many uncertainties surrounding the question, ‘where is the market heading?’, the general feeling among participants at the event was that the industry continued to be resilient and that many opportunities remain.

Despite what challenges exist in the short-term, the global oil industry will continue to be central to supplying the world with its energy needs for many more decades to come.
Ali I Naimi (pictured), Saudi Arabia’s Minister of Petroleum and Mineral Resources, addressed CERAWeek 2016. In his remarks, he covered three main areas: the international oil market; the Kingdom’s oil policy in today’s challenging times; and the impact of climate change. He also spoke of the need for all involved in the oil sector to work together in order to achieve the common goal of continuing to supply energy for the betterment of the world and humankind.

The international oil business is cyclical and while the sector is currently in a painful downturn, the market will rebalance and demand will pick up.

That was the optimistic view put forward by Ali I Naimi, Saudi Arabia’s Minister of Petroleum and Mineral Resources, to CERAWeek 2016, in Houston, Texas, in the last week of February.

In a ministerial address to the five-day event, organized by IHS Energy, he told delegates that during his seven decades in the industry, he had seen crude oil priced at two ends of the spectrum — at under $2/barrel and at $147/b, with much volatility in between.

“'I have witnessed gluts and scarcity. I have seen multiple
booms and busts. I have even survived peak oil. I think I have a t-shirt somewhere with that on it!"

Naimi explained that these experiences had taught him that the oil business, and the commodity itself, like all commodities, were inevitably cyclical.

"Demand rises and falls. Supply rises and falls. Prices rise and fall," he observed.

The Minister stated that when crude oil was up at around $100/b, the price seemed reasonable. But, historically, it was very high.

"That price also unleashed a wave of investment around the world into what had been previously uneconomic oil fields. This went from the Arctic, to Canadian oil sands, to Venezuela’s Orinoco tar sands, to deep water frontiers.

“It also led to the development of shale oil resources in some parts of the United States. This resulted in robust global growth of conventional and unconventional oil supplies. And the price started to fall," he explained.

Naimi recalled that in November 2014 at the OPEC Conference in Vienna, there was a clamour by many for the Organization to cut its production to arrest the price fall.

“But the oil market is much bigger than just OPEC. We tried hard to bring everyone together, OPEC and non-OPEC, to seek consensus. But there was no appetite for sharing the burden.

Naimi said that anything they could do to make downward cycles shorter and less extreme was beneficial. This included seeking to allow markets to work with a minimum of meddling.

“We are hopeful that the nimbleness and responsiveness demonstrated by shale oil producers will continue. These supplies may be needed quickly once markets balance and tighten," he said.

Naimi said he was pleased to see that US producers were now able to freely export crude oil. “We believe it will also help improve the efficiency and flexibility of the global market. For that is what it is — global. We are all in it together.”

Every era different

The Saudi Minister stated that while the parallels with experiences in past cycles could be instructive, every era was different.

“This is not the 1980s. We are dealing with a challenging market that is much more sophisticated and complex. There are a lot of new players and financial instruments that simply did not exist 35 years ago,” he said, in reference to how long CERAWeek had been held.

He said each oil market cycle came with some uncharted territory. And even as the global oil market had become more efficient and dynamic over the past several decades, it continued to deliver surprises.

“Some are welcome, some are not. Volatility and overshooting — both at the top and bottom of the market — remain key challenges,” he declared.

Naimi stressed that if and when the market went awry, governments and industry needed to find ways to work together to help it rebalance.

“We should allow markets to work, but we must also remain vigilant. We must seek to better understand changing market dynamics, and be ready to act when market failures and extreme volatility occur.”

In giving a brief overview of Saudi Arabia’s oil policy in these challenging times, Naimi said that, firstly, he wanted to highlight
that the Kingdom remained committed to meeting the demands of its customers.

“Second, we invest vast sums to retain our vital spare capacity to help meet additional demand or address global supply disruptions should the need arise. We did it in the aftermath of Hurricane Katrina, for example.”

Third, said the Minister, Saudi Arabia sought stable oil markets. “As such, we continue to communicate with all major producers in an effort to lessen volatility. We seek consensus and remain open to cooperative action.”

Climate change “unites us all”

Lastly, he said, the Kingdom remained committed to supplying a large portion of the world’s energy demands on purely commercial terms. “We are not chasing a greater market share.”

Moving on to climate change, Naimi professed that this issue was one that should “unite us all, whether you are from Saudi Arabia, the US or anywhere else that produces energy derived from fossil fuels. In fact, it poses a much greater existential challenge than cyclical price movements.”

Saudi Arabia was involved in discussions from the start leading up to the COP21 climate change conference in Paris in December last year.

“For the record, we recognize the threat posed by climate change. As such, we and many others have invested time, money and brainpower into seeking technological solutions to the challenges posed by climate change, in particular with carbon capture and storage (CCS),” said Naimi, who attended the meeting.

“We are also investing in renewables and taking serious action to improve energy efficiency across our economy.”

But the Minister said the widely accepted narrative that emerged from COP21 was that fossil fuels were harmful and, ultimately, must be kept in the ground.

“Now, a disclaimer. I am Saudi oil minister, yes, and I am speaking to a room full of oil men and women, so of course I would say this. But I am also a realist. And I am pragmatic.

“Ladies and gentlemen, fossil fuels are good. And they are needed. They are an abundant natural resource. Over the past 250 years they have transformed our economies and our societies. Their mass production has resulted in mass consumption. They create and sustain economic growth and prosperity.

“Fossil fuels will continue to play a vital part of the overall energy mix, whether we like it or not, but do not misunderstand me. I am a big supporter of renewable energy, particularly wind and solar.”

Naimi pointed out that for Saudi Arabia and Texas, solar would be a great source of energy for future generations.

“But I believe a mix of sources is the best and most secure way forward.”

Naimi contended that the problem was not fossil fuels themselves — the problem was the harmful emissions one got from burning coal, oil and gas.

“The answer is not to leave the world’s greatest, most plentiful and economic energy resource in the ground,” he stressed. “The solution is to work on technology that minimizes and ultimately eradicates harmful emissions.

“Some do not accept this view, but I have faith in technology. It is already happening on a small scale and, over the decades, the world has made progress. But much more work and collaboration is required.”

Naimi said it was inconceivable that renewables alone could supply the growing global population with the critical energy it needed in the decades ahead. And it was simply not fair for advanced nations to dictate what developing nations could or could not do to meet their energy needs.

“Saudi Arabia, the US, Europe, and many other nations are built on energy from fossil fuels. The products derived from oil are essential parts of our daily lives. As an industry, we should be celebrating that fact, and better explaining the vital importance of these precious natural resources.

“We should not be apologizing. And we must not ignore the misguided campaign to ‘keep it in the ground’ and hope it will go away. For too long the oil industry has been portrayed as the ‘Dark Side’, but it is not. It is a force, yes, but a force for good,” he affirmed.

At the beginning of his address, Naimi said he was in Houston to “set out why we as an industry have more that unites us than divides us”, stating that he would highlight a challenge that “confronts us all in the coming years and decades.”

He concluded by saying: “I remain optimistic. We must continue to work together and we must stick together if we want to achieve our common goal of supplying energy for the betterment of the world and humankind.”
Symposium on Energy Outlooks

Positions & perspectives

L–r: Abdalla Salem El-Badri, Secretary General of OPEC; Dr Aldo Flores-Quiroga, Secretary General of the IEF; and Paul E Simons, Deputy Executive Director of the IEA.

Held at the headquarters of the International Energy Forum (IEF) in Riyadh, Saudi Arabia, the annual IEA-IEF-OPEC Symposium on Energy Outlooks brought together experts from the respective organizations, as well as a whole host of other industry organizations, companies and governments from around the world. The 6th edition, with the backdrop of the present challenging energy market environment, provided a platform for participants to compare outlooks and offer up their positions and perspectives on a variety of industry issues. The OPEC Bulletin reports on the day-long event.
Since the 5th Symposium on Energy Outlooks was held in March 2015, energy markets, particularly from the perspective of oil, have undergone much upheaval. In the last 12 months the industry has continued to readjust to the drop in prices that began in June 2014, and the fact that supply has continued to be greater than demand.

The past year or so has seen many investments deferred, and some cancelled, significant amounts of manpower laid off, and stocks have risen above their five-year average. The impacts of these developments on energy outlooks, in the short-, medium- and long-terms, and in terms of supply and demand, stability and growth, were much discussed. It was noted that long-term projections should not be unduly impacted by the current cycle the industry is going through, but given that the market is still searching for balance, the short- and medium-term outlooks presented a somewhat shifting global oil and energy market landscape.

Setting the scene

With over 100 experts from a broad range of stakeholders and Member Countries present, the Heads of delegation from the IEF, OPEC and the International Energy Agency (IEA) began by setting the scene for the day’s proceedings.

In his welcoming remarks, Dr Aldo Flores-Quiroga, Secretary General of the IEF, started by talking about the comparative analysis of the energy outlooks of OPEC and the IEA, one of the main reasons the Symposium was initially put together. He highlighted the significant improvements and achievements that have been witnessed in the joint works of the IEF, the IEA and OPEC over the past years.

In later comments, he cited a number of major accomplishments from the organizations at this event since it began in 2011, but underscored that there remained areas that needed be further analyzed and addressed.

In a similar vein, Abdalla Salem El-Badri, Secretary General of OPEC, acknowledged the value of the Symposium to furthering cooperation and dialogue. In particular, he said, what recent developments have shown is that “we are seeing changes to numbers, and shifts in sentiment, on a regular basis.” And this “underscores the importance of continually analyzing our energy outlooks, to better understand the data, the key trends, and areas where we might see some divergent opinions.”

In terms of the current market environment, he said that the industry will come through this cycle, and stressed that past cycles “have helped make the industry increasingly resilient and more efficient.”

He noted, however, that there remains a significant stock overhang in the market, and highlighted that there had been additional non-OPEC supply of more than six million barrels/day between 2008 and 2014, while OPEC supply had remained fairly stable. In 2015, he said, “non-OPEC grew by 1.3m b/d, and OPEC by around 1.1m b/d.”
Given this, he stated that "the overhang should be viewed as something OPEC and non-OPEC tackle together." He further added that "the market needs to see inventories come down to levels that allow prices to recover and investments to return."

El-Badri said he remained “optimistic for the future” and pointed to OPEC’s World Oil Outlook, where oil demand is seen increasing by around 17m b/d between now and 2040, with estimates of oil-related investment requirements around $10 trillion over this period. However, he imparted, “we believe the current environment is putting this future at risk. At current price levels, it is clear that not all of the necessary future investment is viable.”

Paul E Simons, Deputy Executive Director of the IEA, shared similar positive views on the importance of the tri-lateral programme, particularly at a time when markets continue to witness oversupply and given the potential implications of the current environment on investments.

Simons also made reference to the outcome of the COP21 climate change meeting in Paris last December, including compliance with the intended nationally determined contributions (INDCs) and their overall degree of sufficiency to meet set targets. He underlined how these would have a bearing on many of the future fundamental assumptions in various long-term scenario analyses.

**Comparing outlooks**

The first session saw both OPEC and the IEA present their most recent outlooks. OPEC’s presentations were made by Dr Hojatollah Ghanimi Fard, Head of the Petroleum Studies Department and Oswaldo Tapia, Head of the Energy Studies Department. For the IEA, presentations were made by Simons and Nathan Frisbee, Senior Analyst, Global Energy Economics.

The presentations were again complemented by a report — ‘A Comparison of Recent IEA and OPEC Outlooks’ — prepared by the IEF and the Duke University Energy Initiative, in consultation with the IEA and OPEC. Professor Richard G Newell, Director of the Duke University Energy Initiative, served as the Principal Researcher on the project.

The report concluded that the purpose of the comparison was “to enhance understanding of views and methodologies from two widely acknowledged information providers — the IEA and OPEC — by comparing the outlooks over corresponding time horizons.” It added that the objective of the comparison was “not to harmonize all assumptions or to eliminate differences in perspectives,” stressing that “the goal is to pursue higher-quality data and control for differences in convention, in order to better inform stakeholders worldwide.”

It was noted that progress has been made on a number of issues, but underlined a number of topics that warrant further discussion, including: bridging some historical data differences; understanding factors that underscore differences in medium- and long-term oil price assumptions; advancing efforts to standardize liquids fuel supply categories; adopting consistent...
approaches in classifying fuels at the regional and sectoral versus global levels; and standardizing unit conversion processes.

Some of these issues were discussed by experts from the IEA, the IEF and OPEC at a technical meeting the day after the Symposium.

**Further perspectives**

The second and third sessions provided an opportunity for other industry stakeholders to provide some additional perspectives. The second session centred on industry views on the short-, medium- and long-term energy outlooks. This was moderated by Adam Siemenski, Administrator at the US Energy Information Administration, and saw presentations from Chris Midgeley, Shell’s Chief Economist and Head of Oil Market Analysis; Joel Couse, Vice President, Market Analysis, Trading and Shipping, at Total SA; Alexey Gromov, Director of the Energy Department at the Institute for Energy and Finance in Russia; and Patrick Allman-Ward, Director and CEO of Dana Gas.

The third session then looked at the impacts of a low oil price environment on supply and demand, stability and growth. This was moderated by Paul Horsnell, Head of Commodities Research at Standard Chartered, and saw presentations from Amrita Sen, Chief Oil Analyst at Energy Aspects; Eugene McQuaid, Senior Economist at the Saudi Arabia General Investment Authority; Tatiana Mitrova, Head of the Oil and Gas Department, Energy Research Institute at the Russian Academy of Sciences; and Alexander Poegl, Head of Business Development at JBC Energy.

**Continuing dialogue**

In the closing remarks, the valuable contributions from, and interactions among the experts during the open discussions were commended. There was also general agreement that the Symposium had once again been a success and that work between the organizations on better harmonizing energy outlooks would continue in the coming year.

Looking ahead, the three organizations also have other joint events planned for 2016 — the 5th Workshop on Interactions between Physical and Financial Energy Markets and the 4th Symposium on Gas and Coal Market Outlooks.
Shale pioneer addresses OPEC

Mark Papa (pictured left), former head of EOG Resources and the leading force behind the shale revolution in the United States, was the latest luminary to visit the OPEC Secretariat in February as part of the Organization’s lecture series. Launched in early 2014, the initiative sets out to bring international experts to the Secretariat to share information and provide their perspectives on energy-related themes. In an insightful presentation, Papa, who is now a Partner with Riverstone Holdings LLC, offered his views on the US shale industry and later sat down with the OPEC Bulletin’s Scott Laury for an exclusive interview.

Mark Papa’s visit to the OPEC Secretariat came about quite by happenstance. Last autumn, OPEC’s Secretary General, Abdalla Salem El-Badri, was invited to speak at the Oil and Money conference in London, an annual event in which he regularly participates.

While waiting in the green room before the event, he was introduced to a fellow speaker named Mark Papa, who was there to talk about the US shale industry.

Though they had never met previously, both men proceeded to have a congenial and engaging conversation, sharing their respective outlooks and ideas on the global oil market and US shale production.

Papa alluded to this interesting impromptu conversation at the beginning of his presentation to the Secretariat.

“We had a little discussion there about the impact of US shale oil production on the global supply of oil,” he said. “And, as part of that discussion, we said that perhaps both parties would gain from an interchange of ideas about what is going on with the US shale industry. And so, one thing led to another and here I am in Vienna today.”

Transformational decisions

In his 14-year tenure as Chief Executive Officer of EOG Resources, Papa made several key decisions that directly led to what eventually ended up being called the shale revolution.

As a result, US oil production soared to such a point that it nearly reached the all-time high of just over ten million barrels/day of crude recorded in 1970.

EOG Resources was already firmly entrenched in natural gas production when Papa realized that there was going to be an over-supply of gas, and thus an eventual drop in prices.

So, he and his executive team made the game-changing decision to move into shale oil exploration at a time when nearly everyone else in the industry thought that was the wrong path to take.

That gutsy decision paid off royally for the company, as it went on to become the largest oil producer in the lower 48 US states.

“I guess I have a reputation in the US as somebody who has made some miraculous, accurate calls on what’s going to happen to natural gas supply and prices, and also what’s going to happen to crude oil supply,” he affirmed. “A lot of people would say I have a degree of expertise that is perhaps unsurpassed in the industry in making macro calls on supply and demand.”

His company was also reputed as the leading shale oil technology firm with its pioneering horizontal drilling and hydraulic fracturing techniques that allowed it to maximize recovery rates.

“As far as a reputation for shale oil technology, during the time I was there, EOG easily had a reputation as the leading technology company for the hydraulic fracturing technology to get the most oil out of the ground — and that reputation still exists today,” he explained.

An industry in crisis

In his detailed presentation to Secretariat officials and researchers, Papa began with a candid assessment of the current state of affairs in the US shale industry, explaining that the current low oil price environment, which started in mid-2014, had begun to take a toll on US production.
“At the current oil price that exists in the US, the domestic oil industry is in a state of near disaster,” he declared. “The $33 oil price is well below any kind of economics that make any sense for anyone to drill for any kind of oil plays anywhere in the US.”

The fallout from this situation is expected to include a decline in US production in 2016 for the first time in four years.

“The net result of all this in terms of the impact on US production is that total production is likely to decline this year by about 600,000 b/d year-on-year,” he said. “That is very significant in that this will be the first year out of the last four where we will not have significant year-on-year US production growth.”

By the end of the year, according to his estimates, total US production will be at around 8.3m b/d, with onshore production dropping by 750,000 b/d. Gulf of Mexico (GOM) output is, however, expected to offset these declines slightly with growth of 150,000 b/d, due to the long lead times on many of the offshore projects coming online there.

“The reason the GOM is growing is that the lead time for projects is longer, and the projects that are coming on line now are projects that were commissioned two, three, four, maybe five years ago,” he explained. “Most of them are deep-water projects that were started when the oil price was $90, $95/b. Those projects are just working their way through the system like the ‘pig through the python’. And that GOM production growth will continue for quite a while, whereas the shorter lead time projects — the shale plays — are going to fall harder.”

**Economics versus growth**

Papa believes that a minimum threshold price at which it is economically viable to begin production again should be at around $55/b West Texas Intermediate (WTI), the US benchmark crude.

This, however, would not preclude some of the more risk-oriented independent producers he described above from drilling again at a lower price than this.

“The bottom line is, and trust me, I know this because EOG developed all this technology and is the industry leader in this technology, that what you need today is around a $55 WTI price,” he stated. “If you said, I believe oil is going to be at $55 and it is going to be flat at that price for the next ten years, then at today’s service company costs, I could invest in drilling in the Eagle Ford or Bakken shales and I could get a 25 per cent or 30 per cent rate of return on my full-cycle costs, but not at $30 or $40, not even at $50/b.”

Despite the more restrained and rational approach of the majors and EOG Resources, Papa said he does expect independents to start drilling fairly quickly when prices rise again.

“Even if oil prices only go up a bit in late 2016 and 2017, you will still see production begin to turn around in the US from the 700,000 b/d decline in 2016 to only a 200,000 b/d decline in 2017 because these independent companies will start to drill,” he professed. “It won’t be the majors, it won’t be the EOGs — it will be the independents.”

**Balancing US and global supply**

Papa’s forecast for 2016 to 2018 is for a potential tightening of supply and demand in 2016, which would boost
prices up to an estimated $65/b in 2017, and by 2018, US production would start to grow again.

“I am assuming we have a tightening of supply and demand late this year and that prices will come up considerably in 2017,” he projected. “This is an assumption that OPEC may not agree with, but I am assuming that, and if it happens, then in 2017, the decline in US production would be less, only 200,000 b/d, instead of 600,000 b/d, and then by 2018, with a $65 oil price, US production is actually growing again.”

But, he cautions that if the price goes too high, it is foreseeable that US production would again flood the market, and the current low-price environment could happen all over again.

“What I think is that if a stabilized oil price in 2018 and later is greater than $75/b, then US production is likely to grow at a rate that is 1.2 to 1.4m b/d or greater,” he stated. “The US could do that for maybe another five to ten years. There is a resource base to do it at that rate. US production could probably get up to about 15m b/d of production if the market was there and the world demanded it. If the price went back up to say $90/b, then the US would begin to grow production again at a rate that is higher than global demand growth, and we would end up with a repeat situation of the one we have just gone through, so prices would collapse again.”

On the other hand, Papa pointed out that if the price were to remain too low, US production would not be sufficient to help meet future growth in global demand.

“If prices stayed below $55 or $60/b, I think US supply is not going to be able to meet that demand growth, and the rest of the world is not going to be able to meet it, and so prices probably can’t stay below $55 or $60/b for a sustained period,” he claimed.

Meeting in the middle

The answer to solving this puzzle is to achieve the right balance between OPEC and non-OPEC production, which, according to Papa, lies somewhere between the $60 and $70/b oil price range.

“In Mark’s simple world, there is a solution here of how US shale oil fits into the global picture,” he stated. “It fits at a price between $60 or $70/b, but it does not fit at a price lower or higher than that if you assume that global oil demand grows at about one million barrels per year.”

However, Papa warned that a prolonged period of prices at the current levels could incite increased volatility and lead to a spike in prices to levels that are too high.

“It is my belief that oil prices cannot stay at $30 or $35/b for the next two years,” he said. “I think you would see too much of a decline in production if that happened for the next two years. You would then probably end up with a price spike going back up to $100/b for year three.”

Self-adjusting system

As a seasoned oilman, Papa has seen many ups and downs in the oil market through the years.

As has occurred in earlier down cycles, he seemed confident that the system would again balance itself out in the coming months, but warned that a prolonged low-price market could be fatal to US production.

“My current belief is that the system is going to work itself out sometime in the next six to 24 months, assuming there are no changes in OPEC production levels,” he
Spotlight

claimed. “But, if oil prices were to stay at $30 to $35/b for say, the next two years, then I would say that the US industry would come close to being totally wrecked.”

Acquisitions and mergers

During the question and answer session that followed his presentation, Papa was asked about the potential for a restructuring of the US oil and gas industry due to the current crisis.

He responded by saying that there were currently no significant acquisitions or mergers taking place, but he did not rule it out as a possibility in the next few years if oil prices remain low.

“If oil prices stay at $35/b for another year or two, what we might see in the US is a restructuring of the company environment on the upstream,” he observed. “So far, we have not seen the ExxonMobil or the Chevrons restructure and acquire more shale oil assets. It is certainly possible that they might do that and become more powerful, and we might be sitting here in two years saying that the landscape has changed and the majors now control a higher portion of the shale oil assets in the US. If that were to be the case, then things would become different as regards OPEC, because the majors would respond much more rationally from an economic standpoint to investment and drilling decisions.”

However, Papa added that in previous years, some of the majors had been through money-losing ventures as relates to shale investments, and thus they might be somewhat wary of investing in shale again.

“It is fair to say that the experience that the majors have seen in the shale plays has been disastrously bad,” he noted. “Shell in earlier years bought into shale gas, primarily in Pennsylvania, and they had to write off $3 or $4 billion.

ExxonMobil bought XTO Energy about eight or nine years ago, and while they advertise that as a success, that was basically a shale gas acquisition and their stock got punished badly for it.

Chevron bought some shale gas assets in the Marcellus play that I am sure they wish they had not bought. So, their prior experience in buying into US shale has all been bad,” he said.

Role of government

When asked whether there might be any future government involvement in or support of the shale industry during this low oil price environment, Papa explained that in the US, all shale deposits are located on private land, and as such, there would be no interaction at all with any government entities.

The US shale industry, he added, was unique in that private landowners were the sole beneficiaries of royalties paid by oil companies for land acquisition.

“I would say that in the US, it is pretty unlikely that we would see any government sliding scale royalty or something like that, mainly because almost all of the shale oil is produced on private land,” he explained. “And so, the beneficiaries of these royalties are individual citizens, and not the federal or state governments.

“It is a totally different system than probably anywhere else in the world. For example, the whole Eagle Ford shale area in south Texas is all on private land, and so the federal and state governments have almost zero influence on the development of that huge oil asset.”

Global search for shale assets

Another question was raised as to the prospects for shale gas and oil discoveries outside the US.

Papa responded that EOG Resources, in the wake of the major shale oil discoveries at Eagle Ford, had grand visions of international expansion and spent significant sums of money carrying out exploration in several countries outside the US, including Poland, Germany, France, Tunisia, China, Argentina and Columbia.

“Once we had found shale oil in Eagle Ford, we were going to go looking worldwide for shale oil, and EOG was
going to become not only a dominant US company but a dominant world company," he exclaimed. “We had visions of sugar plums. We were going to become the next ExxonMobil or something like that, and we had the technology to do so.”

After all was said and done, however, they came up empty handed.

“The conclusion we came to was that, with the possible exception of Russia and OPEC Countries, there was just not likely to be any significant commercial discoveries of shale oil or gas in the next five to ten years outside North America. So far, that has been the fact.”

Papa added that the only geographical areas for which they did not have data were Russia and the OPEC Countries.

“I do not believe that if you do supply-demand at OPEC that you are going to be surprised that there is another big shale oil discovery coming from some other continent similar to the one in North America unless it comes from an OPEC Country.”

Deceiving DUCs

When questioned about the role of drilled but uncompleted wells (DUCs) in production and supply analysis, he responded that it was not as important as many in the industry would lead you to believe.

“I think the whole role of these DUCs is overstated,” he asserted. “It gives the impression that you have this large inventory of wells and all you have to do is go frack them. And then you have this immense wall of production that you can immediately bring on. I think that is something that appears from a distance to be there, but in the real world, it is not.”

Papa added that oil company CEOs will often use their earnings calls to plug the number of DUCs they have at their disposal to boost future supply.

“When you listen to their earnings calls, the two things that CEOs will always say are, no matter what the oil price or the gas price is, I have positive economics, and I have this vast inventory of drilled but uncompleted wells, and as soon as I see a positive uptick in hydrocarbon prices, I can immediately bring into production a wall of oil or gas, so you should buy the stock in my company.”

Lifting of US export ban

In December last year, the US Congress voted to put an end to the 40-year-old ban on domestic oil exports.

When asked whether this development would benefit the US oil industry and shale oil production, Papa said it would have no effect on US shale production in the near term, though if production rises in the future, it could prove to be an advantage.

“The export ban lifting will have no impact on US shale — it is a true non-event,” he said. “If oil would have stayed at $90/b and the export ban had stayed in place, we might have hit a refinery limitation to process sweet oil, and then it would have been important to remove the export ban.

“But, since US production has fallen, we have plenty of refinery capacity to do it. Maybe four or five years out, the lifting of the export ban will prove to be a good thing. But in the short-run, in the next three or four years, there is no effect whatsoever.”

Hands off approach

On the issue of what role the banks and the financial institutions might play in helping sustain US production, Papa’s opinion was that the banks will be hesitant to acquire the shale assets and will tend not to encourage struggling companies to enter into bankruptcy.

“The banks are likely to do everything they can to avoid taking over those assets themselves. In other words, the banks are likely to not force companies into bankruptcy,” he explained.

“This might be different than what would happen in Europe. The US banks, even though they are under stricter rules than in the past, so far have shown a tendency toward leniency, thinking that the last thing they want to do is end up owning oil and gas assets and then likely having to liquidate them in such a bad market today.”

Meeting energy needs

At the conclusion of Papa’s presentation and in reflecting upon his valuable insights and predications, it appears he is on the same page as OPEC — both believe that a stable oil market, absent of extremes, is the optimal solution for producers, for consumers and for global energy stakeholders.

Despite the current market situation, one thing is certain. The world needs more and more energy, which means it is going to need more and more oil. Producers, working together, can ensure that the world’s future energy needs will be met.
The advent of shale oil and what the future holds

During Mark Papa’s visit to the Secretariat, the OPEC Bulletin’s Scott Laury sat down with the shale pioneer to find out more about his successful career, how the shale industry is weathering the tough oil market and what the future looks like for United States oil producers.

During your highly successful tenure as CEO of EOG, the company transitioned from principally shale gas exploration and production to becoming the leading crude oil producer in the US. Can you share with us what was behind this game-changing strategic decision to switch course and what it meant for the company?

At the time, we were predominantly a shale gas oriented company, and when we looked at what was going on with other companies, we found that, not only was EOG very successful in finding vast amounts of shale gas, but a lot of our competitor companies were equally successful. So we looked at the situation regarding whether there would likely be an oversupply of gas in North America due to all this shale gas that had been found, and we concluded that even though the current price of gas in North America was about $8/thousand cubic feet at that time, it was quite likely that within a year or two, we would see an oversupply situation of natural gas versus demand. We really felt strongly about that, so we looked at some alternatives that we had.

To put a timeline on this, it was in about October 2007 when we had a strategy meeting at our company and said that even though North American gas prices at the time were very high, we predicted they were shortly going to tumble. And we said, let’s take a bet that we can be successful with this shale oil concept.

In April 2006, we had achieved some success at the Bakken oil shale play in North Dakota, but a lot of people at the time felt that Bakken shale was sort of a one-of-a-kind deal, and that because of the specific characteristics of that rock, it was really an unusual formation and could not be repeated in North America.

But, we just made a strategic decision and said that, for the long term, natural gas was going to be in an oversupply situation. We had indications of success in the Bakken formation with oil shale plays, and we were going to really redirect the entire company toward shale oil success. That was really a 180-degree change for the company.

Quite frankly, in the industry, at least in the US industry, we were, I would say, ridiculed by other companies for that strategic decision. People were saying that EOG is walking away from natural gas when gas is $8 per thousand cubic feet, an all-time high, and they are going into something that the rest of the industry feels is going to be just a very unsuccessful venture, which is trying to find horizontal oil shale plays in North America. This was thought to be a very unlikely path to success.

As it turns out, in January 2009 we had our first successful well in the Eagle Ford formation, which is in south Texas and that formation has turned out to be the largest oil discovery in the US since Prudhoe Bay in Alaska, which was in the late 1960s.

So, it turns out, obviously, that our strategy was more successful then we could have ever dreamed. The oil plays in South Texas, the Eagle Ford, and, of course, in West Texas, the Permian Basin, were very successful.

But, the genesis for our strategy was that we made a macro-call that there would be so much gas found in the shale formations in North America that the price of gas would drop from $8 down to the range of $2 to $3 and would likely stay there for 20 years, and that macro call has turned out to be correct. So, that is why we redirected the company.

In February 2013, the Harvard Business Review recognized you as one of the 100 best performing CEOs in the world and the best in the US energy industry. Additionally, Institutional Investor magazine has ranked you as the top independent exploration and production
(E&P) company CEO. What have been the key ingredients to your success?

The way we looked at things, there really was a willingness not to follow the conventional wisdom in the industry in several different ways.

The first thing that EOG did was, we were the first company to really apply horizontal drilling to shales, and that was in the gas shales.

The company that discovered shales could be producible was Mitchell Energy, and the gentleman that pioneered this was George Mitchell, but he limited his technology to developing shales with vertical wells.

It was around 2004 that EOG started experimenting with drilling horizontal wells in the Barnett shale, so we were the first company in the US to really utilize horizontal drilling to tap shales. And then, of course, we were the first company to embrace chasing the oil shales.

We were also the first company to really see the importance of hydraulic fracturing in the shale plays and really put a lot of technology into developing these shales.

Then, we took it another step and kind of impinged on the service companies’ business. Up until EOG got involved, the service companies delivered all the goods for hydraulic fracturing, providing the pumping and the sand, and when they began charging too much money for that, which would have been around 2011, we just said that we can do that ourselves in-house.

So, we bought our own sand mines and developed a railroad system to get the sand from mines in Wisconsin to the wellhead locations in Texas and North Dakota. We also developed our own in-house pumping system, and basically bypassed some of the service companies and developed an integrated system.

Another first that we did is when we made the big oil discovery in the Bakken shale formation in North Dakota. There was no pipeline system to get the oil to the refineries, and it was going to take two to three years to get a pipeline system built. We did not want to wait that long, so we met with Burlington Northern, a very large railroad company in the US, and developed a system to transport the crude oil by railroad tanker cars from North Dakota to the refineries in Oklahoma and Louisiana.

This was the first time that it had ever been done in the US. The only time it had been done before was by Chevron in Kazakhstan, but it was clearly a first in the US. That created a whole new business line for the railroads and a whole new trend today as a very large amount of crude oil is being transported by railcars.

So, we just stacked up a whole lot of firsts in the business.

Another thing we did was that we kept our debt levels very low, while a lot of our competitor companies were famous for running up very high levels of debt. As you know, the prices of oil go up and down, and when the price of oil is low, you want to have very low debt. So, we kept a very good financial situation at our company, where some of our competitors did not.

When you put all that together, during the timeframe that I ran the company, EOG was clearly the most innovative oil and gas company in the US and was thought of as the most technically advanced company, clearly more technically advanced as relates to shale plays than even the majors.

Those are some of the underpinnings as to why EOG was thought to be such a premier oil and gas company.

You left EOG at the end of 2013, when the company was still experiencing phenomenal growth and record profits. How has the company dealt with the oil price crash that occurred after your departure?
The oil and gas industry in the US has really suffered very significantly, particularly in the last six months, due to low oil prices.

Of all the companies, those that have suffered the least have been the major oil companies. The independent E&P companies, such as EOG, that have the least amount of debt have come through this the best, but the smaller E&P companies, particularly those that have high levels of debt, have suffered grievously, and many of them have already declared bankruptcy or very likely, in the next six months, will declare bankruptcy.

The best analogy I can give regarding this current downturn is that it is as severe as the downturn that occurred in 1986. We have not seen a downturn like this in the US industry for roughly 30 years.

Depending on how low oil prices go, we could see a massive restructuring of the industry such that a lot of companies that existed just two or three years ago just won’t exist two or three years from now.

Make no mistake about it, there is a large degree of severity in what is going on, and the US, which had been growing its oil production for the last four or five years due to the shale oil revolution, is going to suffer a significant decline in its year-on-year oil production in 2016 because the producers do not have any capital or cash flow to reinvest in order to continue the growth in oil production.

You have acknowledged that the US was one of the main drivers of the oversupplied market. Before the oil price downturn, do you think that US tight oil producers had an appreciation of their potential impact on the international oil market?

I would say unequivocally no. I think the mindset of the typical US producer was simply that oil was at $95/b, and it was likely to stay that way forever.

The goal of the average US producer was, in many cases, to effectively take 130 per cent of their cash flow using borrowed money and drill as many shale oil wells as possible and grow their production as fast as possible.

Very few people in the industry gave any thought to what the consequences of that unbridled production growth might mean to oil prices. And so, when global oil prices began to fall, dropping down to $80 or $70/b, I think most US producers felt like prices surely were not going to fall any lower than that. And people just continued to drill as many wells as possible.

I would say pretty much no one in the US industry expected to see prices as they are today, which are slightly lower than $30/b.

So, this has come as a total shock to the US industry, and only now are people beginning to appreciate the effect that the huge growth in US production had on global supply-demand mechanics.

In the event the oil price was to rise again to a profitable level, do you foresee shale producers going about their business in a different way? Was there a learning curve from this downturn?

I think the US industry definitely will be sobered up and will surely be more cautious when prices recover.

To predict what is going to happen with the future oil price, you would have to be a magician with a crystal ball to be accurate, but my expectation is that sometime in the next nine to 24 months, oil prices will recover back to a level of perhaps $60 to $70/b, not back to $90 or $100/b.

I do believe that the current oil price of $30/b is not a steady state price and is unsustainably low, and that, for example, prices cannot stay at $30 for the next five years. Too much supply would decline for that to be a steady state condition.

I think there is an equilibrium price where US production could grow for the next four or five years at a more modest pace than before and help meet global demand growth. That equilibrium price, in my mind, is $60 to $70/b. But, as I say, that is more of an educated guess than a firm, highly confident estimate.

When the market does pick up again, do you foresee shale producers returning to production right away or would there be some hesitation or delay on the part of investors to take a risk again?

The one difference between most OPEC producers and US production is that essentially 95 per cent of US production comes from public companies, which are funded by the stock market. They are not state-owned oil companies or private companies, they are public companies.

So, yes, I think public investors will be a lot more cautious about having expectations that oil prices will stay elevated. Even if oil prices do recover, they are going to be a lot more nervous and ask themselves, how do I know oil prices are going to stay at a high level and not go back down to $30/b in one or two years.

I think executives that run these oil companies will also be a lot more cautious and not want to assume large
levels of debt onto their balance sheets because they are always going to be looking over their shoulders and saying, what happens if two years from now, oil again falls to $30/b — I do not want to have this company on the verge of bankruptcy similar to companies that declared bankruptcy in 2016.

So, you will see a more cautious attitude among the average US producer even when oil prices recover.

**Do you anticipate US production ever reaching the high levels we saw in the period 2012-14 when annual production growth was above 1m b/d?**

I think US production will increase ultimately north of 10 or 11m b/d to new records as we get out to probably 2019 and 2020.

I believe there is a very good probability that, as we look out four or five years, the US will indeed be the largest oil producer in the world, surpassing what is today a near tie between Russia and Saudi Arabia.

So, I do see the US ultimately emerging as the dominant oil producer in the world, but I think the rate of growth, which was averaging about 1m b/d to 1.2m b/d year-on-year, might be more moderate. I would be very surprised if we see that high of an annual rate of growth in the next four or five years.

Remember this year, production is going to fall and, I would expect that, in 2017, production will decline year-on-year.

Whenever US production starts growing, perhaps starting in 2018, a more normal rate of growth might be something like 600,000 b/d year-on-year, if we have a more constructive price environment.

**Based on your knowledge of tight oil and shale gas reserves in the US, how far into the future would the US be able to produce oil and gas?**

I think we are going to continue to see increased efficiency improvements in terms of recovery factors from these shale oil reservoirs for the next five to ten years.

So, I think at least through 2025, we are likely to see the US as a global oil-producing powerhouse, but I do not think it is going to be a situation where the US is able to keep up that level of growth through 2040 or 2050.

I do not see shale reserves that are on the scale where we are going to have 40 or 50 years of reserves and where we are going to be able to be the number one producer for massive periods of time.

The limitation is that there are really only three largely significant shale oil fields in the US: the Eagle Ford in South Texas, the Bakken in North Dakota, and the Permian Basin area in West Texas and South-east New Mexico.

I do not think there will be any other large shale oil discoveries in the US over the next five or ten years.

**At the height of the boom in the US, there was talk of energy independence. Do you see this ever becoming a reality?**

No, I do not think the US will likely be oil independent. Even with the potential increases in oil production in the early 2020s, I do not visualize that the US will ever not need to import some oil to fulfil its domestic needs.

What is likely to happen is the US could become North American oil independent, such that US domestic production plus Canadian imports would meet US needs.

But, to be totally oil independent just from US production, I do not foresee that in the future.

**Do you see any other areas outside the US where shale production might be viable and would US companies be interested in investing in developing these resources?**

US companies, for the last five years, have been actively looking for both oil and gas shale plays around the world, and have essentially been unsuccessful.
And I do not expect to see any success in finding any economically successful oil shale or gas shale plays outside North America in the next five years, with the possible exception of OPEC Countries.

The reason I say with the exception of OPEC Countries is that in these countries, you have got the national oil companies that would fund any possible exploration for oil or gas shales. I am just not aware whether they have had any success or not within their countries.

What are the technical aspects that have made the shale oil and gas industry so efficient and nimble?

There are three or four different parameters that you look for to determine whether a shale will be productive or not.

Generally, you want to have a shale that has been deposited in an ocean environment, a marine shale, as opposed to a shale that has been deposited in a lake environment.

You also want a shale that has a very low clay content, versus one that has a very high clay content as far as mineralogy is concerned.

In addition, you usually want a shale that is in a quiet tectonic setting as opposed to one that is near, for example, a mountainous area or an earthquake zone.

What we have found are that a lot of the shales that contain hydrocarbons in Europe are in more active tectonic settings, which pretty much eliminates the European shales from working.

The shales in China seem to be mostly in lake deposits as opposed to marine deposits, which is not the optimum geologic setting.

So, you look around the world, and the place that seems to have the best combination of geologic settings so far appears to be the North American shales.

In addition to those parameters, do you see innovation continuing to make the process more efficient in the future?

In the US shale plays, before the oil price declined and before the gas price declined, we were seeing continual, very high rates of technology improvement.

As an engineer, I was amazed to see the learning curve continue to be very steep, and the rate of technology improvement was not levelling off. This was very impressive to me.

Now that the oil and gas prices in the US have plummeted, that...
technology improvement curve has pretty much just gone to zero as companies are just trying to survive, and they are not really applying new technology.

But I think if and when prices recover, I expect we are going to see continued bursts of technology improvement, which is going to make the whole shale extraction business even more efficient than it is today.

**Would this increased efficiency make it easier to operate in a low-price environment?**

It could make it easier in a low price environment, but I believe the true breakeven price to develop the oil shale plays in the US is somewhere around $50 to $60/b, so it is nowhere near the current $30/b.

**Have there been any learnings or benefits for producers coming out of this tough market? Is there a positive aspect to be gleaned from this?**

I think, as relates to the US industry, multiple years of $90 to $100/b oil prices have allowed the industry to get, if you will, a little bit lazy and inefficient.

And so, if there is anything positive to be gained by these low oil prices, it is that the inefficiencies are rapidly getting eliminated from the system. The inefficient companies are getting flushed out of the system, and those are the companies that are going bankrupt.

Whenever we see a price recovery, the surviving companies are going to be the ones that are efficient. It is kind of like Darwin’s survival of the fittest — the ones that deserve to survive will be the ones that actually do survive.

So, that is the benefit I see from this kind of cleansing of the system.

**Early in your career, you worked for Conoco in the United Arab Emirates and moved to Dubai for the job. The company was reportedly one of the first to develop oil there. Can you tell us about your experiences there?**

I worked in Dubai from 1972 to 1976 for the Dubai Petroleum Corporation, of which Conoco was the operator. I was Chief Production Engineer during that time. This was a few years after oil was discovered in Dubai, and we increased production from 50,000 to 500,000 b/d during the time I was there.

We also installed the Khazzans, which were large oil separation and oil storage tanks that set on the sea floor near our loading terminal, which was a first-in-the-world installation.

My wife and I look back on our Dubai experiences as one of the best times of our life, and we remember our experience with the local population as very warm and friendly.

---

**Mark Papa — architect of the shale revolution**

Mark Papa is currently a Partner at Riverstone Holdings LLC, a private equity firm based in Houston, Texas, that focuses on energy investments.

Prior to joining Riverstone in 2015, he was Chairman and Chief Executive Officer of EOG Resources from 1999 to 2013. During this time, he helped the company achieve exponential growth, rising from $2 billion to $60bn market capitalization.

At EOG Resources, Papa was the leading force behind the US shale oil revolution through the discovery of the South Texas Eagle Ford and North Dakota Bakken oil plays. These discoveries propelled the company to become the largest shale oil producer in the US and the largest oil producer in the lower 48 states.

Previous to this, he worked for Belco Petroleum Corporation, a predecessor of EOG Resources, and served for 13 years in various engineering and management positions at Conoco.

Papa has served on the Board of Directors for the oil field services company Oil States International since February 2001.

In February 2013, the Harvard Business Review recognized him as one of the 100 best performing CEOs in the world and ranked him as the best in the US energy industry. Additionally, *Institutional Investor* magazine has classified him as the top independent E&P CEO.

Papa received an MBA from the University of Houston and has a BS degree in Petroleum Engineering from the University of Pittsburgh.
Each year, the OPEC Secretariat in Vienna hosts a Multi-Disciplinary Training Course (MDTC). Usually held over five days, the course is designed to inform young professionals from the Organization’s Member Countries about the structures and functions of the various departments operating at the Secretariat. Attendees also gain valuable insight into the workings of the oil market, its current standing and some thoughts about the future. The OPEC Bulletin’s Maureen MacNeill reports on the 2016 event, which was held in February.
At the 16th Multi-Disciplinary Training Course (MDTC), held at OPEC Headquarters from February 22–26, 34 attendees from eight Member Countries were reminded that gathering good information and statistics is only one part of the equation to offering good advice to OPEC Members. The many years of knowledge the analysts and experts at the Secretariat have to offer are at least as important.

The participants of the annual MDTC learned about the world economic outlook, the determinants of oil supply and demand, product markets and refinery operations, energy and petroleum market modelling, transportation, oil price movements and stock movements and balance, to name a few topics. In addition, they received an overview of all the departments and units within the Secretariat and what services they provide.

“We don’t just repeat information. We have a sense of the market. We have to make a statement, the colleagues challenge each other; the Secretary General and OPEC Ministers have to be convinced,” commented the Head of the Petroleum Studies Department (PSD), which examines short-term market movements.

Stated Dr Hojatollah Ghanimi Fard: “The colleagues here have 270 years of experience together.”

He added that the Monthly Oil Market Report is one of the most-read OPEC publications, though there are also daily and weekly updates. Although PSD focuses on information-gathering, modelling and predicting in relation to the short-term oil market (6–18 months), there are many other tasks — such as workshops and meetings with other energy groups, including the International Energy Agency (IEA), the International Monetary Fund (IMF), the International Energy Forum (IEF), the World Bank, G20 energy initiatives and individual consuming and producing countries and regions, such as the European Union (EU), Russia, China and more recently India — which the department is involved in.

Forecasting short-term demand

In order to forecast demand, the global economic outlook by region must be captured, according to a senior economic analyst. In general, the economy, GDP and the oil market are related, he said, and one clear trend is the growing importance of the emerging and developing economies. Various economic influences are stronger at different times; for example, after 2008, fiscal policies became a driver in the global economy, such as the phasing out of fossil fuels.

Although it has been somewhat decoupled in some economies, energy demand is normally following economic growth. In addition, exchange rates can have a large effect, and in recent years so has the relationship between economy and assets (speculation). Policies are very important to demand, said the analyst, stating that OECD policies in the 1970s had a significant impact on demand, decreasing it by 51 per cent.

The current main aspects affecting short-term demand include GDP growth, including investments, government spending, household consumption, the trade balance and elements such as wages and business sentiment. In addition, information on global investment, tax revenues, manufacturing orders and the labour market must all be captured large and small to assess impact, he said.

The forecasting methodology includes monitoring factors such as GDP, weather (seasonal changes) and price elasticities (some regions react more than others — for example oil use in the United States rose along with the drop in price as more kilometres were driven).

“The correlation between GDP, price and demand differs largely,” said the expert. It is also important to estimate growth in products, such as gasoline, LPG and diesel, as well as car sales, which for example have grown rapidly in China.

“We go through all the economies one by one, especially the G7 and BRIC (Brazil, Russia, India and China), which together represent about 80 per cent of the global economy,” he said. “We also look at tiny economies to get GDP measurements.”

Although a modelling approach is used, the expert judgment supplied by OPEC’s analysts is indispensable. “This cannot be captured in a model.” It is also important which assumptions are used in a model, such as interest rate, oil price, etc.”

It is important to understand the bigger trends, he said. For example, the 2008 recession hit developed countries. In 2000, the OECD contributed 52 per cent to global growth, but in 2015 only 31 per cent. Meanwhile, China’s rate more than doubled to 39 per cent in 2015. Overall economic growth is expected to be slightly better in 2016 at 3.4 per cent as opposed to 3.1 per cent in 2015. Non-OECD demand is growing fastest, led by China, with India providing strong support, said one expert.

Information about demand is important in order to avoid market shocks and ensure there is enough supply to meet demand, said another OPEC expert. “In the short term, it leads to assessing OPEC production to balance the
market. In the long term, it is important because investment decisions for capacity production are needed."

Provision of supply

Basically, supply is provided by two groups — OPEC and non-OPEC producers — observed one presenter. Both produce crude oil, NGLs and non-conventional supplies, but non-OPEC is bigger.

“We use a bottom-up approach, with field-by-field studies of non-OPEC supply,” said the analyst. New startups are examined, ramp-ups in volume, maintenance and return from maintenance, as well as revisions to forecasts. “We use these to determine the ‘call on OPEC’.”

Capacity/production expansions are determined by new capital investment, plus stable politics, plus a suitable fiscal environment (reasonable production costs) and access to technology, said the speaker.

In the past, geographical structural anomalies were used to find oil. Today sophisticated tools help uncover and shed light on complicated underground structures and small traps. The peak for discoveries took place in the 1970s and has been declining since then, though production has been improving tremendously at the same time, said the analyst.

Technology has been very important, providing enhanced oil recovery (EOR), improved oil recovery (IOR), 3D imaging, etc, he said. Fiscal regimes, such as tax cuts by governments, can also be very important in keeping producers active.

In the past, there was a lot of unsuccessful exploration and dry wells. “Now main companies are looking to technology for unconventional resources,” said the expert. Deeper horizon offshore has been the ‘ wildcard’ for majors since the 1980s, with the cost depending on depth, he noted.

Fracking has since been used for shale rock, which has low or no permeability, with fluids used to migrate oil to the well. In addition, the oil sands in Canada joined the game, using mining or steam extraction, as conventional oil is declining there.

Pre-salt supply has been coming out of Brazil and may add a lot to growth, he continued. An unknown factor in US shale oil production is how quickly drilled but uncompleted (DUC) wells can be brought on line and how much they can produce. OPEC also has unconventional fuels in Qatar, Indonesia and Ecuador.

One participant observed that the low price has been driving marginal supply out, but when the price goes up again marginal producers will come back. The analyst stated: “We need to have cooperative conversations now.”

Crude oil pricing has gone through different phases since the early 1960s (posted price system, fixed pricing system, netback pricing and market-related
pricing formulae), stated one OPEC expert. Currently, two benchmark types of crude oil dominate crude oil futures trading today (Nymex WTI and ICE Brent); the OPEC Reference Basket is made up of 13 crudes (one for each Member Country).

Various fundamental and non-fundamental factors drive crude oil prices, including supply, demand and stock levels, spare capacity, microeconomic sentiment, the US dollar value versus other currencies, geopolitics, speculation and other factors.

Products and refineries

On the topic of products and refineries, participants learned that refiners must pay close attention to what their products are used for. For example, additives such as antifreeze and antistatic are needed in airplane fuels to prevent problems in the air. Generally, the US has more conversion capabilities in its refineries, according to the Nelson complexity index, thus their economics are better. Asia’s conversion capabilities are, in turn, lower than those of Europe.

“Most big companies have fully integrated refineries,” said the expert. “In the last decade, Asia has become a big player in the refinery business and products are not always consumed where they are produced.”

Most important in the downstream is following trends, said the expert. For example, the difference in price between crude and product, or crack spread, reflects demand. In the driving season (summer) gasoline use goes up; this year gasoil use was low because there was a mild winter worldwide.

In world demand patterns, middle distillates (including diesel) have become the highest contributor. Other major shifts include non-OECD capacity growing to meet demand. Changes in oil price do not necessary affect refinery margins directly, said the expert, as there are many other factors to consider — including freight costs, seasonality and maintenance — that disconnect the crack spread from oil.

Importance of stocks

When discussing the importance of stocks, one analyst said minimum stocks are required, for example, to keep oil in a pipeline and as a precaution against unexpected interruptions, as well as for speculative reasons.

The oil shock of 1973 initiated efforts among major OECD importing nations to build government-controlled stocks of oil — known as strategic petroleum reserves (SPR) — to act as a buffer against severe supply interruptions. IEA countries are committed to holding total oil stocks equivalent to 90 days of net oil imports of the previous year to ensure energy security.

Primary storage accounts for the oil produced, moved and stored from the wellhead site to refineries and from refineries moved and stored in large distribution terminals. Secondary storage includes mainly refined products moved and stored to small distribution stations for wholesale and retail distribution. Tertiary storage includes the oil held by industry and private consumers before its final use. Every single barrel of oil produced goes first into primary storage and every single barrel consumed comes from tertiary storage, he said.

Stocks and prices are linked through an inverse relationship. Low seasonal demand leads to a high stock build. Changes in total oil stocks should equal the difference between world oil supply and global oil demand, thereby indicating the status of the market.

Stocks can be used as a tool to check the supply/demand figures, according to the expert. Global oil stocks are estimated at around 7.6 billion barrels at the
end of 2015, consisting of crude and products, divided between commercial, SPR and oil at sea. Sixty per cent of this inventory is in OECD countries. However, some emerging economies have started to build commercial and SPR stocks.

Providing data services

The OPEC Secretariat’s Data Services Department (DSD) talked at the MDTC about the importance of data in decision-making.

“In everyday life we have to make decisions in order to make plans. We can’t make any decision without having data. We collect and analyse data, which gives us information, then we turn this into knowledge, and with this you can make decisions,” said the Head of the Department, Dr Adedapo Odulaja. “Data is the foundation of the house and you cannot have a good house without a good foundation.”

If a good decision is not made by a policymaker, a policy can then face failure, he added. OPEC’s founders realized that and created the Information Centre at its Headquarters in 1961, asking Member Countries to provide information at their disposal, which they still do today. A further decision in 1964 asked ‘Member Countries to submit the required data/information on oil-related matters.’

DSD provides timely, reliable and accurate oil and energy-related data, gathering, processing, analyzing and disseminating it for research, studies, reports, etc.

Energy data and global information are shared to support research internally and within Member Countries. The data is always checked and revised before going into the database and it comes from both OPEC and non-OPEC markets.

“Statistics is not complete without analysis; statistical studies are carried out by this team,” maintained Odulaja.

Not only data, but empirical evidence from the past is collected, according to one specialist. “Things repeat in the market; it helps reflect into the future.” OPEC has been a pioneer in data collection and today collects annual data and monthly data, which are made publicly available at no cost through its Annual Statistical Bulletin (started in 1965) and the Monthly Oil Market Report. Recently, an interactive version has been made available on the internet, which includes data dating back to 1980 for comparison.

In terms of transparency, oil is far ahead of other primary commodities, asserted one expert. Most other commodities only have annual data available with a time lag of two or three years. “Our main interest is oil, but we have other data too ...we collect all flows that relate to oil, also in other countries, and other commodities as well yearly, such as gold, coal, etc,” he said.

“To understand oil now, you need to understand gas.” Thus the importance of gas is increasing in the Secretariat’s database. Other relevant data, such as car sales, retail figures, wages, etc. are collected for major consumers.
For databases to be effective, experts have to check the data for internal consistencies and balances, which poses a great challenge because each country has its own methodologies. DSD contacts Member Countries when data seems to be outlying or implausible; plausibility indicators are also used. In addition, OPEC Member Countries meet annually at its Headquarters to discuss data collection, while the Organization is in touch throughout the year.

“Few organizations manage so much information and details like OPEC, therefore OPEC is not only important now, but will be for decades to come,” stated one participant after the presentations.

OPEC was also one of the founding members of the Joint Organizations Data Initiative (JODI), which started in 2000 with oil and has recently expanded to include gas. It gets its data directly from official sources. JODI technical meetings are held every two years under the IEF, which also holds workshops.

Medium and long-term issues

One day of the MDTC was dedicated to the OPEC Energy Studies Department (ESD), which examines medium- and long-term issues related to the oil market.

The key drivers of the global oil market in the long term are: technology, the world economy, policies, the environment, geopolitics and alternate sources of energy, according to Department Head, Dr Oswaldo Tapia.

“OPEC has been and will remain factual, objective and technical. We make no value judgment on any geopolitical issue in any country in the world. It is a mandate of OPEC to be neutral in politics,” he stated. In addition, OPEC does not set prices or make price recommendations, he added. “The only way we use prices is as a reference tool for the reference case in medium and long-term analysis.”

The Organization uses powerful tools to help carry out analysis and assessments, he continued. In terms of modelling, data collection is very important, according to another analyst, but equally important is ‘cooking’ the data, or transforming it to match other data.

The core model at OPEC is OWEM while another model, WORLD, is used for downstream modelling. In the last three years, ORTM was also developed for the road transport sector.

Said Tapia: “For us, this is the most important sector; 80 per cent of global oil demand growth in the next 25 years will come from this sector.”

The WORLD model, introduced in 1988, examines all elements of oil movement, including geographical restrictions (such as straits), pipeline logistics, which crudes should go to which refinery for processing, and so on. It uses linear programming with 30,000 variables and breaks the world down into 22 regions.

Energy policies — and all policies that may affect oil markets — are very important for outlooks, especially for those working on OWEM, according to one expert. Oil producing-countries have targets, while other countries face sanctions.
As it is hard to analyze every country in WORLD, analysts have to prioritize, said the speaker. For example, the results of the climate change talks are very important and the US remains a focus because it is still the most important consumer.

In relation to shale oil, it is important to recognize that in the US natural resource royalties often go to individuals, while in other countries resources are owned by the state.

“The tools provide us with an outcome once we work out fundamentals. That is 50 per cent of the work. The other 50 per cent is expert judgment. No model in the world will do the thinking and assessment for you,” professed one expert.

Dialogue with various entities is essential to the work of the Secretariat, and ESD is involved in the following: energy dialogues (the EU, Russia, India, China); the Annual Symposium on Energy Outlooks (IEA and IEF); and the organization of workshops (R&D Forum, IEA Greenhouse Gas Programme [IEA GHG], energy efficiency, the Asian energy outlook), etc.

OPEC also participates/observes in outside events, such as G20 meetings and UN climate change talks. In addition, there are technical meetings held exclusively with experts to deal with quantitative and methodological differences.

“The EU dialogue is the oldest, in its tenth year, and OPEC restarted the interesting and challenging ministerial dialogue with Russia. This year, for the first time, we have initiated dialogue with India; the country’s population will surpass that of China by 2026,” said an expert. “We firmly believe that there is no better way to get and keep the world working in an organized fashion than with dialogue.

“We exchange positions, projections, needs, expectations, views for the future ... we identify areas of mutual interest where we can work together to the benefit of both.”

ESD is also responsible for the OPEC flagship publication, the World Oil Outlook (WOO), which is an integrated report covering all aspects of energy and oil markets, with a long-term outlook to 2040. “None have an interactive oil outlook like the WOO,” said one analyst. “It was a big effort in the 2015 edition.”

Long-Term Strategy

The process undertaken for OPEC’s Long-Term Strategy (LTS) was discussed by one expert, who explained that although some core challenges have always remained, the LTS adjusts to changing circumstances as well.

“Climate policy is suddenly very important, it wasn’t before,” he said, adding other issues lose importance.

The first LTS was adopted in 2005 and included a recommendation that it be reviewed every five years. In 2010, Deputy OPEC Ministers agreed that the three objectives of the 1st LTS remain valid. In addition, they identified ten challenges that required further analysis by the OPEC Secretariat, in particular in regard to their potential to facilitate or hinder the attainment of the agreed objectives. Tight oil is not specifically accounted for in the LTS of October 2010, yet is related to the challenges identified.

The newest version of the LTS started development in 2015 and deliberations are continuing this year. “A big part of the LTS includes meetings over the year; delegations come and discuss the work of the Secretariat regarding the LTS,” said one expert. “One objective of the LTS is to help plan producer capacity ... we do not want too much capacity in production if it is better invested elsewhere, for example.” The OPEC Statute guides the objectives of the LTS and scenario analysis is very important.

Oil supply and demand outlook

When discussing the world oil supply and demand outlook, one of OPEC’s specialists said there has been a huge reduction in capital expenditure (capex) in 2015, accompanied by a lot of layoffs, which implies changes in supply and demand. In addition, the economic picture is gloomy, especially in some major non-OPEC economies, such as China, Russia and Brazil. The recent Conference of the Parties (COP21) talks and Paris Agreement also have to be taken into consideration.

The main driver of long-term growth for oil demand is the economy, according to another OPEC expert. In the three scenarios envisaged in the LTS, the impact of the economic growth assumption is the most important variable, he affirmed.

Some key assumptions OPEC makes when looking at future oil demand include: the economy will grow by about 3.6 per cent a year until 2020, then slightly less; demographic assumptions are in line with those of the UN, at nine billion people by 2040; the aging population is important to consider as is changes in demographic structure (ie urbanization). Young people use more oil and higher income per capita leads to greater oil use.
Today the world is less oil intense than in the past and elasticity is lower than it used to be. In 1950, one-third of people were living in urban areas; in 2012 it was 50 per cent. Oil use is higher in urban areas.

Assumptions about future policy include tighter fuel efficiency in transport, emissions-reduction measures (mainly in coal) and support for renewables. Overall, energy demand is seen to be growing by 1.5 per cent per annum to 2040 and oil demand should reach 110 million barrels/day by 2040, with most of the growth coming from developing countries, which will overtake the OECD by 2020.

For the next 20 years, oil will still remain the fuel with the highest share in the energy mix, but after that time gas will start to overtake and the fast growth of renewables is set to continue. Sectoral demand is expected to be greatest for road travel, petrochemicals and aviation.

Policies have an impact on oil demand; with COP21, for example, “coal will be the biggest loser, we don’t think oil will be that important, because it’s used very little in energy generation, where the focus has been,” according to the expert.

Even though today’s low oil price environment may benefit many consumer countries, producer countries are suffering so their demand drops. Even in consumer countries, oil and gas prices are often fixed by formulae, so consumers don’t benefit so much from the low price.

In the transportation sector, technology is important; for example 20 years ago nobody bought electric cars or hybrids, and now they are starting to slowly penetrate the market in Europe and the US. It is difficult to foresee or forecast technological breakthroughs.

“It is difficult to isolate the effect of each driver ... market dynamics are much more complex now than they were 10–15 years ago. We only provide information about how the market will behave, the Ministers have to make their own decisions,” said the expert.

Up and coming

Upstream technologies on the horizon include the success of carbon capture and storage (CCS) by combining it with EOR; commercial exploration of methane hydrates from the seabed (Japan); and hydraulic fracturing combined with horizontal drilling. Upcoming mid-stream technologies include: small-scale gas-to-liquid (GTL) and LNG plants (currently at the pre-commercial stage); and floating LNG (Australia) with a possible market breakthrough after 2025.

In power generation, a revival of nuclear energy is predicted, possibly using 232Th technology post-2040; large stationary fuel cells (highly efficient, can operate on natural gas or petroleum-based fuels in areas without natural gas supply); centralized power generation through the integration of refinery and power generation plants and third-generation biofuels, ethanol, diesel and...
kerosene-type fuels, which can be produced alongside animal feed, fresh water and food supplements.

In transportation, there may be: natural gas as a third fuel at gas stations (CNG for cars, LNG for long-haul trucks); electric hybridization of city cars (Japan with more than 30 per cent, but otherwise no significant global penetration); LNG as a new bunker fuel for ships (by 2040, LNG bunkers have the potential to make up to 20 per cent of bunkering fleets); incremental adoption of fuel-saving technologies (engine, frame); LNG in aircraft to replace kerosene (currently not feasible; Boeing study points at implementation towards 2050).

In petrochemicals, flat glass may be substituted by polycarbonate (huge demand potential for oil-based chemicals); greater use of plastics; synergies with renewables (wind rotors, translucent materials for PV cells); crude will grow as a feedstock in integrated refinery and petrochemical plants (ethylene from NGLs will require strategic positioning of oil-based petrochemicals towards propylene, C4 and aromatics).

Technology will play a dual role for oil demand: the share of oil will be reduced in well-established areas, but expanded in new markets and applications.

**Sustainable development**

The goal of sustainable development is to meet the needs of the present generation without compromising the ability of future generations to meet their own needs, stated a specialist from the OPEC Environmental Matters Unit (EMU). Two of the greatest global challenges and essential requirements for sustainable development are poverty eradication and environmental protection. Energy, being the engine for growth, plays a critical role in enabling sustainable development, she said.

Two important milestones in putting the world on a sustainable pathway took place in 2015: the adoption of 17 Sustainable Development Goals (SDGs) in September and the Paris Agreement, adopted at COP21 in December. SDG 7 for the first time specifically addresses energy poverty (“ensure access to affordable, reliable, sustainable and modern energy for all”), while other SDGs contain action areas on energy-related matters, such as the removal of fossil fuel subsidies where they exist. They are therefore high on the agenda of climate change actions, with a potential to influence energy policies.

The Paris Agreement seeks to stabilize global warming by 2100 at 2°C or 1.5°C above the mean atmospheric temperature of the pre-industrial period. While the Paris Agreement is legally binding, it is the Parties who decide on the extent of their ambitions and types of action they wish to take. Actions are inscribed in their Nationally Determined Contribution (NDC). The currently submitted NDCs are not ambitious enough to achieve the temperature target of the Paris Agreement, contended the expert.

OPEC’s EMU provides a focused insight into the broader field of climate change and its complex relationship with the energy mix, aids in understanding energy and environmental policies of key players in the climate change arena and generates policy-relevant information through research, which it submits to the relevant OPEC bodies and to Member Countries as an input for policy formulation or adoption of positions on matters of concern.

**Q&A**

MDTC participants had many questions about tight oil, the current price of oil and the future outlook. The experts said OPEC has reported on tight oil since it started and has very detailed data, but there is a lot of uncertainty because its history is short and nobody knows if wells will be able to produce much in the long term. In addition, nobody knows how banks will react to the current slowdown.

In a Q&A session after the main event, the Director
of the OPEC Research Division, Dr Omar S Abdul-Hamid, answered some questions, adding to the shale oil production issue: “As a group they are in a difficult situation ... how fast will operators jump in again after being burned?”

He was hopeful that talks about freezing production will prove fruitful in bringing up the price of oil. “We support all efforts to stabilize the market.” He added that over the past eight years OPEC as a group has only increased production by 770,000 b/d, while the US has upped its production by more than 6m b/d, and Canada, Russia and Brazil each by 1m b/d.

“We have a just case. Why should OPEC cut supply?” Abdul-Hamid warned participants to be careful when reading the news: “there is media interpretation; our information is anchored in robust analysis and data. I hope you apply robustness and objectivity.”

Cooperation is very important and it is essential to recognize that short-term and long-term horizons are different, he added.

About the future of OPEC, he projected optimism. “Like in any family, there are good times and bad. When times are tough, we give appropriate feedback to continue to prosper. We may need to adjust tactics, positions and opportunities to do that ... demand is growing, the share of OPEC continues to prosper. We should use our leverage, which is a low production price. The marginal barrel should be provided by someone other than OPEC ... the marginal barrel in the future may not be shale, it may be offshore or something else.

“I can assure you we will never become an organization in an ivory tower not serving its purpose. We should not produce studies that are not useful or called for, otherwise we do not add value. The governing bodies tell us if we are doing a good job or a bad job ... honestly.”
Algeria’s state energy company, Sonatrach, is planning to invest some $3.2 billion over the next four years to boost the OPEC Member Country’s pipeline capacity in line with increasing production of domestic natural gas from new and existing fields.

As with most oil and gas producers, Algeria has been struggling over the past couple of years to adapt its budget to lower oil prices. But the government remains determined to develop its oil and gas production capability to meet growing local demand and sustain exports.

“Sonatrach will invest $3.2bn from 2016 to 2020 to boost its transport capacity, including $530 million in 2016,” Arbi Bey Slimane, Sonatrach Vice President for Pipeline Transportation, was quoted as telling Reuters in an interview at Sonatrach’s Sidi Rezine office in the east of the capital, Algiers.

He stressed that Sonatrach was seeking to guarantee higher supplies to European customers, adding that the expanded pipeline capacity was required to transport more gas as new fields in the south-east and south-west of the country came online.

Transport output from new fields

“We will build 1,650 km of pipeline and six compression and pumping stations by 2020. Our goal is to transport output from new fields located in the south-east and south-west,” Slimane was quoted as saying.

He pointed out that Algeria would remain an important gas supplier for countries in Southern Europe.

“The volume exported in 2015 increased by 2m tonnes of oil equivalent to reach 99m toe. The (extra volume) was delivered to Southern Europe,” he said.

The report noted that the North African country was in discussions with the European Union as the regional bloc looked to diversify its energy sourcing away from Russia, which supplies around 30 per cent of the EU’s gas.

Amin Mazouzi, Sonatrach’s Chief Executive Officer, has called for a “sizeable increase in production” in 2016 as the country looks to develop its oil and gas operations. Algeria’s Prime Minister, Abdelmalek Sellal, has forecast a rise in global demand for clean energy in the coming years, “including Algeria’s natural gas”.

In 2015, the country managed to increase domestic natural gas output by 2.3 per cent, thanks to the efforts of Sonatrach.

However, according to national radio, Sellal said Algeria had to make more efforts for even higher gas
production, in order to meet growing demand in the emerging industrial economy that needed both huge funds and energy.

The Prime Minister earlier announced that the government intended reducing spending by some nine per cent in 2016, as a result of the decline in oil prices, which had reduced earnings.

However, despite the challenging times, the national energy company, Sonatrach, is proceeding with its five-year investment plan, aimed at boosting both oil and gas production.

The government has earmarked some $90bn in investment for the petroleum sector for the period 2015–19, with around $22bn budgeted for developing domestic natural gas fields.

Sonatrach is looking to boost its hydrocarbons output from the beginning of 2018 to reach 225m toe, compared to 195m toe in 2013.

According to official figures, in recent years, Algeria’s oil and gas reserves have risen by five per cent — from 4.2bn toe in 2010 to 4.4bn toe in 2014.

An article featured in Algeria’s in-house magazine, Algeria Energy, stated last year that the country is looking to arrest a decline in domestic oil and gas production which has impacted earnings from petroleum.

“Natural gas production will increase by over 13 per cent by 2019 to meet domestic demand and increase exports,” the article commented.

Meanwhile, Energy Intelligence has reported that BP and partners Statoil and Sonatrach have started gas output at the In Salah southern fields scheme in Algeria.

The project is the latest stage in the development of seven gas fields in central Algeria. The South Fields project involves the development of four dry gas fields — Gour Mahmoud, In Salah, Garet el-Befinat, and Hassi Moumene.

**Major gas supplier to Europe**

The In Salah Gas joint venture, comprising Sonatrach, with a 35 per cent share, BP (33.15 per cent) and Statoil (31.85 per cent), began output in 2004 from three northern fields — Krechba, Teguentour, and Reg.

In Salah Gas is said to have an estimated 159bn cu m of recoverable reserves.

Algeria, a major gas supplier to Europe, relies on energy revenues for around 60 per cent of its national budget.

According to OPEC’s 2015 Annual Statistical Bulletin (ASB), the country’s proven natural gas reserves in 2014 stood at around 4.5 trillion cu m.

Its gross natural gas production in 2014 amounted to 186.72bn cu m, compared with 179.49bn cu m in 2013, an increase of four per cent.

Its marketed production of natural gas in 2014, after taking into account flaring, reinjection and shrinkage, rose by 4.6 per cent — from 79.65bn to 83.29bn cu m.

Algeria’s natural gas exports in 2014 were 5.4 per cent lower than in the previous year, falling from 46.71bn cu m to 44.19bn cu m.

Meanwhile, according to the ASB, Algeria’s proven crude oil reserves in 2014 stood at 12.2bn barrels. Its oil production in 2014 stood at 1.19m b/d, down by 0.8 per cent from the 1.2m b/d recorded in 2013.
With new investment on the horizon, Iran looks to establish solid growth

With the longstanding sanctions against Iran now lifted, the OPEC Member Country is optimistic of securing positive growth going forward as it opens up its economy to new investment.

Up until the sanctions were removed on “implementation day” in mid-January this year, after a period of 12 years in force, the country was showing zero growth. But that is all set to change with forecasts of five per cent and even eight per cent growth said possible in the immediate future as the nation takes advantage of numerous trade and investment opportunities, which continue to grow with each passing month.

The country’s Central Bank Governor, Valiollah Seif, said he now expected economic growth of more than five per cent in 2016. “Iran’s economic growth slowed down in 2015, but domestic and international predictions both indicate that growth in 2016 would be beyond five per cent,” he was quoted by Reuters as saying.

For over a decade, Iran’s economy was effectively constrained under the broad range of international sanctions enforced by the United Nations, the European Union and the United States. They were introduced in dispute over Iran’s nuclear development which the country has always maintained has been purely for peaceful purposes.

As a result of the agreement, finalized in Vienna, Austria, after the International Atomic Energy Agency (IAEA) confirmed that it was satisfied Iran had complied with the nuclear terms set out by the West, the UN sanctions have been removed, as has the EU embargo on oil imports.

Iran has huge investment potential, primarily in its petroleum sector, but also in other non-oil areas, which can now be exploited to the full. A large jump in Tehran’s stock market in early February has clearly shown the confidence already generated in the country’s trading environment.

Iranian President, Hassan Rouhani, who has described the nuclear agreement as a “great victory” for the country and a “golden page” in its history, stressed that he now looked forward to an economic future less dependent on oil as the country emerged from the years of sanctions.

He was later quoted as saying that Iran required economic growth of around eight per cent in order to deal with domestic inflation and unemployment, both of which were above ten per cent.

Rouhani’s Chief of Staff, Mohammad Nahavandian, announced at this year’s World Economic Forum in Davos that he was confident the country’s economy will grow by an average of eight per cent annually over the next five years. “Iran may be one of the most promising emerging markets of the coming decades,” he affirmed. “After the lifting of the sanctions, eight per cent is feasible.”

He was quoted as saying in Davos: “There are so many companies that have expressed an interest in the Iranian energy sector, information and communications technology and transit.”

Nahavandian made it clear in his comments that Iran is now able to attract new investors, which in turn would enhance the regional economy by establishing new cost-effective transit routes. The end of the sanctions also means Iran will also be able to access an estimated $150 billion in assets abroad that were previously frozen.

“Iran can be one of the best sources of energy security, especially for Europe,” Nahavandian maintained.

Meanwhile, Iran’s Energy Minister, Hamid Chitchian, has also expressed optimism about eight per cent economic growth, which, he said, would be the central aim of a new development plan for the country.

And on a recent trip to Berlin, he was quoted by the Islamic Republic News Agency (IRNA) as saying that the removal of the sanctions created opportunities for cooperation with Germany. He told the first Iran-Germany Economic Commission that the two countries have a long record of economic, commercial and industrial relations.

Iran, he said, owes the development of its industry partially to cooperation with German companies and institutions. “German companies are respected in Iran,” he added.

Chitchian observed that over the past few years, due to the sanctions, a visible recession was observed in Iran-Germany relations and the role of Germany in Iranian foreign trade fell drastically.

He said, however, that the elimination of the nuclear dispute paved the way for future cooperation and the return of commercial and industrial relations to the former level. “All of us, either policymakers or government directors, banks, especially Iranian and German traders, can play an important role in developing economic cooperation,” he professed.
Iraq Oil Ministry records huge savings in oil expenditure

Against a background of lower crude oil prices and revenues, Iraq’s Oil Ministry has taken steps to considerably reduce its oil sector costs.

Oil Minister, Adil Abd Al-Mahdi, has announced that the Ministry’s projected 2016 oil sector expenditure had been cut “to a little more than $9 billion”, compared with $13.1bn in 2015.

“In 2016, the companies estimated costs at $23bn, but we entered into complex negotiations ... and were able to reduce them to a little more than $9bn, while maintaining production and development plans,” he was quoted as saying by Energy Intelligence during a visit to Japan.

Massive reduction in costs

Al-Mahdi noted that the 2016 oil budget represented a massive reduction in costs from those proposed by foreign investors.

He revealed that most companies working in the country had agreed to review and reduce plans.

Iraq is planning to boost its crude oil production capacity to more than seven million barrels/day over the next five years, with some 6m b/d of that volume expected to be exported.

The drastic reduction in oil costs follows the Minister’s appeal in January this year for state oil companies and their international oil partners to cut spending on oil field developments, while still aiming to meet the country’s production targets.

During a meeting of the oil fields’ joint management committees, which he chairs, Al-Mahdi stressed the need to “harness all possibilities and efforts to achieve the planned objectives to increase national production of crude oil,” according to a statement from the Oil Ministry and quoted by the Platts news service.

But at the same time, the Ministry hopes to cut spending at the fields operated by international oil companies.

The Oil Ministry has been in protracted discussions with its international oil company contractors over their 2016 budgets and work programmes.

In September last year, it asked the companies to submit their proposed budgets and plans, which would take into account lower steel, services and equipment costs, but also with instructions not to take on any new commitments in 2016.

The Platts report said Iraq’s 2016 budget assumes an average crude oil price of $45/b, a level that is forecast to bring revenue of around $59bn, which would represent some 85 per cent of the country’s total revenues.

Oil producers the world over have been adjusting to the fall in international crude oil prices, brought about primarily from excess supplies in the market.

The Iraqi Oil Ministry has called on all oil-producing countries to “save” the international oil market from “new disasters”, urging them to adopt a decision to decrease oil production.

Ministry spokesman, Asim Jihad, pointed out that all countries were feeling the effects of the oil price decline.

“All countries have a historical responsibility to save the oil market from new collapses,” he asserted.
Saudi Arabia’s state oil company, Saudi Aramco, is planning a major expansion of its total global refining capacity as it seeks to become a world leader in downstream oil operations.

The plan involves boosting its total refinery throughput to 8–10 million barrels/day, up from the current level of 5.4m b/d, as disclosed by the company’s Chief Executive Officer, Amin Nasser.

In delivering the keynote address at the 4th Saudi Downstream Forum, held in Jubail in March, he told delegates that Saudi Aramco was aiming to create a world-leading downstream industry.

He foresaw a new era for the Kingdom of industrial diversification, anchored by specialty chemicals and underpinned by a widespread and rapid in-Kingdom expansion of small to medium enterprises that produce high-value finished and semi-finished products in the petrochemicals conversion sector.

“This approach will unlock opportunities for the Kingdom’s economic diversification, job creation and innovation potential,” he maintained.

“To date, the Kingdom’s downstream economic growth has achieved global leadership in the manufacture and export of commodity products. While Saudi Arabia certainly needs its commodities production strength, we also need to radically alter the downstream equation to derive greater benefits in-Kingdom, through knowledge-based and innovation-driven small and medium sized enterprises.”

Nasser pointed out that Saudi Arabia is already a global leader in petroleum and petrochemical commodities, “but today we have a tremendous opportunity to also become a leader in downstream conversion.”

He noted that with most of the Kingdom’s petrochemicals presently being exported as commodities, major opportunities exist to add value by turning them into high-value, semi-finished and finished products.

“Diversification into specialty chemicals is expected to increase returns from the current level of about $500 per ton to about $2,000/ton by 2040,” he informed.

Nasser said Saudi Aramco’s vision for the creation of a world-leading downstream sector is built on four key drivers: maximizing value for the Kingdom’s crude oil production, including vertical and horizontal integration across the hydrocarbon chain; enabling the creation of conversion industries that produce semi-finished and finished goods to diversify the economy; developing advanced technologies and innovation; and enabling the Kingdom’s sustainable development.

“Saudi Aramco’s strategy is to strike a better balance between its unparalleled upstream capacity of 12.0m b/d of crude oil and its current refining capacity of 5.4m b/d in-Kingdom and worldwide.

“Saudi Aramco has an ambitious plan to raise the company’s total global refining capacity throughput to between 8.0 and 10.0m b/d,” disclosed Nasser.

He said Saudi Aramco is collaborating with the Ministry of Petroleum and Mineral Resources, the Royal Commission for Jubail and Yanbu, and the Saudi Arabian General Investment Authority to build value parks and locate service providers adjacent to petrochemical facilities, such as the Rabigh PlusTech Park at Petro Rabigh on the west coast and the PlasChem Park adjoining Sadara in Jubail Industrial City 2.

Nasser called on the industry to do much more to support the development of home-grown downstream technologies — an area in which the Kingdom can make major advances — such as breakthrough crude oil-to-chemicals technologies that will make oil a viable petrochemical feedstock.

Saudi Aramco is currently developing and testing highly advanced oil-to-chemicals technologies, he revealed.

The company used the biennial Downstream Forum to showcase the scale and technological strength of its downstream activities through an exhibition highlighting its refining and petrochemical operations.

The Forum is the Kingdom’s largest downstream event, combining a strategic conference and international exhibition.
China, India see oil imports grow, showing demand remains strong

Oil imports in two of the world’s largest consuming countries hit records in January and February, showing that despite the prevailing low crude oil prices, international oil demand remains strong.

China’s February crude oil imports soared by 20 per cent over the same month last year to record a new all-time daily record. The high import rate was spurred by the attraction of buying crude at low prices to be put into the nation’s burgeoning strategic inventories.

According to the General Administration of Customs, the country, currently the second-largest oil consumer in the world, imported 31.80 million tonnes of crude in the month, which translated into a record 8.0 million barrels/day.

The figures showed that February’s import total was also 27 per cent up from the previous month, when January imports amounted to 6.29m b/d.

SIA Energy, a Beijing-based consultancy, was quoted as saying that it now expects China’s crude imports to rise by 860,000 b/d in 2016, a gain of some 13 per cent, and again backed by the desire to swell local inventories.

Net crude oil imports rising

Things are going the way of forecasts made by the China National Petroleum Corporation (CNPC) which announced in January that the country’s net crude oil imports would rise by around 7.3 per cent in 2016.

The previous import record set by China was in December 2015 when it imported 7.82m b/d of crude oil. These were 21.4 per cent up on the month and 9.3 per cent on the year.

Customs data showed that for the whole of 2015, China’s total crude oil imports rose by 8.8 per cent from the previous year.

However, in January 2016, China’s crude oil imports were gauged at just 6.29m b/d.

Reuters announced that its calculations showed that China took advantage of the low global crude oil prices in 2015 to add a considerable 185m b of crude to its inventories.

As a result, Chinese authorities revealed that the country more than doubled the size of its strategic crude oil reserves between November 2014 and the middle of last year.

And industry experts have said the country could expand its crude oil imports in the months ahead, as new storage tanks become available.

In 2016, the country is planning to add four more storage facilities to the eight it already has in operation.

Reports state that China is following a programme to expand its strategic crude oil reserves to 100 days of supply.

Meanwhile, the world’s third-largest crude oil importer — India — is also showing keen demand figures.

The country’s annual crude oil imports exceeded the 4m b/d mark for the first time in 2015, again as low crude prices saw consumer demand rising. India’s crude oil imports in the year rose by 4.4 per cent over 2014 to 4.07m b/d, from 3.9m b/d a year earlier, according to the country’s Commerce Ministry.

Data shows that India’s reliance on crude oil imports, already high at 80 per cent, is forecast to rise to 90 per cent in the coming decade.

Notably for OPEC, India’s oil imports from Saudi Arabia and Iraq hit their highest levels in more than a decade in January.

Analysts said competitive prices and shorter shipping distances were giving the Middle East OPEC Members the advantage. Saudi Arabia was the top supplier to India in January, with deliveries increasing by 29 per cent from the same month a year ago to nearly 940,000 b/d, according to ship tracking data.

Iraq was the second-highest with deliveries to India amounting to 930,000 b/d, up by 52 per cent over January 2015 levels.

BP Group Chief Economist, Spencer Dale, has forecast India’s import dependence rising in the next two decades.

Quoted by the Press Trust of India, he said India is not just a bright spot in economic growth worldwide, but also in terms of energy demand.

According to BP’s Energy Outlook 2035, India’s energy production will rise by 117 per cent to 817 million tonnes of oil equivalent, while consumption will grow by 128 per cent.

Oil imports are set to rise by 161 per cent from the current level of 190m t and account for 61 per cent of the net increase in imports.

“India is a bright spot in GDP and in terms of energy demand,” Dale maintained. “Its growth rate is strong,” he told reporters.

Spencer Dale, BP Group Chief Economist.
A conversation with Jeffrey Sachs ...

Exploiting low-cost oil best option for global efficiency

Economist Jeffrey Sachs (pictured left) is a living legend. He has advised countries around the world, from Bolivia to Poland to the Former Soviet Union. He has lectured widely on topics ranging from macroeconomic theory to human development strategies. At 29, he became one of the youngest professors to ever get tenure at Harvard University. Now 61, he is the Director of the Earth Institute, a multidisciplinary research institute at Columbia University in New York, whose purpose is to use science and technology to respond to the increasingly complex global development challenges of the day. Professor Sachs was in Vienna recently to participate in two public events — and to work with scholars at the International Institute for Applied Systems Analysis (IIASA). The OPEC Bulletin’s Alvino-Mario Fantini caught up with him there for a short interview.

Over the past several years, we have seen a number of interesting developments around the globe. Last year, in particular, was full of promises and turmoil. How would you evaluate last year?

From my niche, first, at the UN it was diplomatically very successful in the sustainable development and climate spheres because two major international agreements were reached: one to adopt the sustainable development goals (the SDGs) and, second, the Paris Climate Agreement. I regard both of those as major accomplishments.

On the macroeconomic side, I did not forecast oil at $30/barrel. I still am a bit shell-shocked by this. I don’t expect it to last. But I did not expect it to fall to this extent. This is obviously a complicated set of issues, but it involves both the demand side, through China’s slower growth, and the supply side, especially in the United States. So that was a big macroeconomic surprise.

On the geopolitical side, the Syrian conflict got completely out of hand and has created a lot of instability in Europe and in the Middle East. And it’s a major concerning factor, especially with the risks of very high tensions between Russia and Turkey. Whenever there’s a big conflict, the danger of things going badly wrong are real. So I would put this on the same ‘headline’ level.

So it was a complicated year: some good, some quite bad, and some very puzzling.

The Earth Institute and IIASA share similar approaches, in that they both often use tools that try to understand complex ‘systems’ by looking at the many factors that may affect a given situation and how they interact. What is the thinking behind this?

I think the whole theory is that we’re trying to understand a complex system — that is, say, an interacting world economy, the physical environment, geopolitics. This makes diagnostics quite complicated. You’re always trying to interpose some answers in the middle of a lot
of uncertainty and a lot of complexity. It’s definitely the way that I tend to view issues.

*Just like Dr House from the television show?*

It’s my favourite show!

*So, like you, he looks at complex systems and never depends on only one answer or another. So it’s always about the interaction of many different factors.*

That’s why I love the show! And when I coined a phrase for the kind of economics I do, in a book that I wrote ten years ago called The End of Poverty, I called it “clinical economics”.

I used this term because I said that being a good economist is like being a good diagnostician and clinician. So you ask: “In this complex mess, what is the answer — and the intervention — that can be appropriate to this particular context?”

*Given the current global economic and financial situation, what kind of interventions might you recommend?*

There are two issues that are at the top of my mind right now. One is the geopolitical situation, especially in the Middle East. My main recommendation (and hope) on that is to move to a cease-fire, especially in Syria, and to look for a different gradual political process.

And since we’re at the 100th anniversary of World War I, and the Sykes-Picot Agreement which will have its 100th anniversary on May 20th this year, my main recommendation is for countries to sit down together and say: “It’s time that we resolve our issues. ‘Thank you’ to the rest of the world but let us actually solve the problems this time.”

So on the geopolitical side, I would like to see peace in Syria.

On the economic side, I basically take the view that there is an excess of saving over investment at full employment in the world right now. And there are three different approaches to resolving that: ones that I don’t like and the one that I favour. One is easy money to stimulate private investment, but I think we’ve basically run our course on that. One is easy money to stimulate private investment, but I think we’ve basically run our course on that. It’s created a lot of bubbles —

*In all sorts of asset markets ...*

— in all sorts of asset markets. So I don’t think we’re going to get too much more private stimulus through monetary easing.

The second approach is to do what the US tells China all the time: Raise consumption, raise consumption, raise consumption. It doesn’t really work very well and it creates a lot of problems down the road.

So the way that I would prefer is to stimulate infrastructure spending and long-term public investment — not only in physical infrastructure but in human capital, in education, in training — and to absorb the excess saving through productive long-term and mainly public investment that I think would also spur private investment along the way.

The problem there is that good public investment requires good governance — and that is also a scarce
commodity. We’re just not able to do longer term things very well.

Part of my long economics campaign is to try to introduce the ‘long-term’ again. John Maynard Keynes, who I love and admire, and who I took as my role model in a way in my youth, did a disservice when he said: “In the long-run we’re all dead.” It was a great quip — but it’s not true of society. I think we would have done better without the quip.

*How do you convince countries, whether developing or industrialized, to work on improving governance and long-term strategic planning?*

What I try to do in my work is to show what a longer term path actually looks like. So I believe the constructive approach is by constructive suggestions.

Here are things we should do: The United States needs to revamp its energy system. It needs to revamp its infrastructure. It needs to revamp its transport. We have, every few years, our civil engineering society do an assessment of our roads, highways, rail, dams, and so forth. And each report says we have a two trillion dollar deficit of repair and modernization. You know when you go to a US airport that you’re increasingly going to a museum — and seeing a state-of-the-art 1950s airport. So this is what I would recommend for the United States.

For Africa, this is a whole massive continent — massive! — that doesn’t have a decent power supply. So building the energy infrastructure would be my first order of business. Based on that, I would then emphasize the transport infrastructure. Those to me are high priorities.

In Asia, China has created this ‘One belt, one road’ approach [*Editor’s note: also known as the ‘Belt and Road Initiative’*] and the new Asian Infrastructure Investment Bank. Those are two important initiatives along the direction I’m suggesting — which is to put China’s saving to work and to finance longer term regional infrastructure. It’s the right approach.

Unfortunately, Europe is quite weak at long-term investment right now. Europe, despite all its institutional development, and capacity, and sophistication, can’t even make a Europe-wide energy policy where the grid goes between countries where you complete the gaps, say, from Greece to Germany in energy supply. This would allow Greece to sell wind and solar energy to southern Germany.

In the United States, I am looking closely at how to integrate Canadian hydropower with the Canadian northeast. ... But it turns out that even getting Canada and the United States on sound energy policy is institutionally almost beyond our capability. So you say: “Are you kidding? We’ve been peaceful neighbours for two centuries! What’s the problem?” But it has turned out to be a problem.

*That’s discouraging. We’ve learned so much over the centuries — and yet it seems we’re still mired in the same nonsense.*

I agree! And I think that one of the confusions in our thinking is that we understand that the market economy has done a tremendous amount of good — which it has — but then, of course, we take everything to an exaggeration and say it can only be the market. And so now we’re suffering from a dearth of public capacity.

*You have had a long career both as an academic and as a policy adviser to many different countries in many regions of the world. How have your views evolved over the years?*

Actually, less than sometimes people imagine. I know a lot more than I did before. I think I now am probably more capable of seeing the ‘big picture’ because I’ve learned a lot over the last 30 years through this kind of public engagement.

I was born and raised in a family that believed in an active government together with the market. But what I came to understand, as I was dealing in Bolivia in the mid-1980s, or in Eastern Europe in the early 1990s, or in Africa after that, is that context matters tremendously. In Bolivia, my first assignment ... was to address a hyper-inflation. That required a certain kind of approach. In Eastern Europe, the goal was to overcome a half-century of communism. That required a certain context. In Africa, it was to fight extreme poverty. That required yet a different context. So what I learned most of all is — going back to where we started — ‘differential diagnosis’.

But people don’t quite believe it because they assume that I was a radical free-market person then. Today I am known, in the U.S. context, as being on the left and so forth. People say: “You migrated! When did you have this ‘epiphany’?”

I remember an interview that I did in 1989 in Poland. I was recommending quite radical market reforms and the interviewer asked me: “What’s your political philosophy?” And I said: “I’m a social democrat and my
favourite place is Scandinavia.” He said: “What?!” And I said: “Yes. But if you are starting where Poland is right now, you have to build the basic institutions of a market economy. Where you end up — whether it’s US free market or Swedish social democracy — that’s going to be Poland’s decision in future years. But right now you just have basic building blocks.”

People don’t quite believe that when they read that interview. But it’s back in 1989 and so, in this sense, I would say there’s been a lot of continuity in my basic orientation, which is perhaps not so surprising. I just know a lot more than I did then! [laughs] So just a tremendous amount of experience: I feel like a clinician that’s now seen a lot of patients over the years.

One of the problems is that a lot of these nuances, and the importance of context, is often lost on people. People want to categorize and label things, and put everything into tidy little boxes. But you can’t. So I like your emphasis on context: You just can’t apply the same response or solution used in one situation to another.

I didn’t understand this when I started 30 years ago, when I was invited to Bolivia and was asked about a particular problem. It was a hyperinflation. I studied that and I fortunately was able to be helpful. Of course, I had no sense of what this was going to lead to personally, but one thing led to another — which is called ‘life’! — and I had lots of other experiences.

But when it really hit me was when I started working in Africa in 1995, after I had advised Poland in 1989 to 1991, and I was in, I think, Zambia or maybe Kenya, and the IMF was saying: “stabilize, liberalize, and privatize!” And I said: “Oh … you know … I think … how about fighting malaria and AIDS?” And they said: “stabilize, liberalize, and privatize!” And I said: “Well … how about building roads here?”

At one point, the IMF person turned to me and said: “But Professor Sachs, we’re just repeating what you said in Poland!” (He literally said that!) And I said: “I know! But actually in Warsaw there were roads; there was power; and there was no malaria. So it’s a different issue here!”

And this struck me because the fellow — very honestly — had said this to me. It was not a barbed comment. It was just: “I don’t understand! What’s the problem?”

So he was saying: “You said this!”

Yeah, exactly: “You said this!” And I said: “I know! But Warsaw is different from Nairobi!” [laughter]

What is your outlook for the Middle East, particularly the oil producing countries of the region?

I think first of all, the outlook for fossil fuels is that they will be phased out in the 21st century and so every strategy in the Middle East should take that as a reality. What is secondly true is that a lot of our known reserves are going to stay under the ground if we are going to stay below the 2°C [agreed upon in the 2015 Paris Climate Agreement]. At the same time, the Gulf resources are the world’s low-cost hydrocarbon resources, so they will be used — not in entirety but they are the low-cost producers.
I think a diplomatic approach I’ve always believed in is to say: “We have the oil and the gas we need. It’s mostly in the Middle East. It will be run down significantly but not completely this century. Climate change is real. It’s not to be denied. We should stop drilling in the Arctic. We should stop drilling in the deep sea. We should stop developing heavy oils and so forth. And we should go with the low-cost resources.” (Those actually are OPEC resources, by and large.)

That’s the right approach from a global efficiency point of view. It’s the right approach from the region’s point of view. And to my mind the main message that I think diplomatically should be supported also is to say: “Let’s agree not to develop high-cost alternative reserves because we have no real use for them. It’s detrimental for the Gulf states which depend on this. And it’s also economically inefficient from a global point of view.” So that’s starting point number one.

Starting point number two is for the Gulf countries to take seriously the climate agenda because I think it’s real. It’s scientifically absolutely real. It’s politically a lot more real after Paris. But the reason we have a Paris agreement is that all over the world countries are seeing derangements of their climate. So this is not hypothetical. This is a reality that is already shifting rather fundamentally the politics of energy.

**Will the oil majors and other industry players accept this?**

I think inside the big oil system this may not be as accepted as it should be. But I’m operating in a lot of different spheres where I think we’re on a path now of de-carbonization. And I’m sitting in lots of different places where governments are actively planning de-carbonization and they’re looking at how to deploy alternatives.

So this is another point that I think needs to be in the strategic mix. It’s one of the reasons why the region should make peace for one thing — because regional integration focusing on alternative industries and so forth requires peace and integration.

**Is there anything else you would like to include in your outlook for the Gulf region?**

The Middle East is obviously rich not only in hydrocarbons but in solar. And it’s already started a lot of activities in that area. I’m a big believer in that and not only for, say, the Gulf region’s own use. We really should be looking at integrated long-distance transmission of solar energy because high-voltage direct current transmission works. Very low-cost. Low waste.

The Gulf could be a major exporter of solar energy just like it’s a major exporter of hydrocarbon energy. I would like to promote that kind of approach. And I think that it would be really economically smart. So this is obviously a big deal — and a big transformation.

I don’t think the news for the region is fantastic in the sense that there are still painful realities. On the other hand, the almost complete dependency on oil has definitely had its costs for the region, especially outside meddling for a century.

Oil has been the attraction for the British Empire, for the US, and for others, and it’s created a tremendous, tremendous set of crises and difficulties for the region.

So I think a transformation in this century — one that is locally-made, that involves more human capital-based economies and more regional integration — is going to serve the well-being of the region’s populations. So I don’t see it all as bleak; but I do see it as a big transformation ahead.
The OPEC Energy Review

A revamp for the next 40 years

In the lead-up to its 40th year of publication, the OPEC Energy Review, OPEC’s academic quarterly, has made important changes. From revamping its Editorial Board to publishing a special thematic edition to joining (in collaboration with Wiley-Blackwell) one of the world’s leading online academic portals to facilitate the submission and review of manuscripts, the journal now marks a new phase in its history. These changes also highlight one of the many ways the Organization continues to contribute to the exchange of knowledge about energy and the oil markets with other market participants. The OPEC Bulletin takes a new look at this important publication.

We all know that universities and research institutes often have an academic journal or periodical in which they publish the research findings and scholarship of students, professors and other academics. They seek to make available the latest research in different academic subjects, and to contribute to the “state-of-the-art” in various disciplines. The overall goal of such journals is not only to promote the mission and objectives of their respective institutions, but also — and perhaps more importantly — to expand the ‘frontiers of knowledge’.

Similar efforts are made in the world of multilateral and international organizations. In an effort to bridge the world of academic research and the world of field practitioners, for example, organizations like the World Bank and the International Monetary Fund have made many advances in disseminating the in-house research and technical work of their staff members and consultants.

The United Nations, too, has sought to bridge the academic and professional world, and contribute to the expansion of knowledge and development expertise, by publishing books and publications. The UN has even gone as far as setting up the ‘United Nations University’ with its satellite research facilities and related institutes in Bonn, Bruges, Dresden, Helsinki, Reykjavik and Tokyo, among others.

Similarly, the Organization of the Petroleum Exporting Countries has also recognized the importance of serving as a bridge between academic research and those working in the industry. In much of its work, OPEC has sought to help to bring together and exchange industry-related research. As part of such efforts, the Organization in the early 1970s put together a plan to publish emerging scholarship about energy — and the oil markets — in the form of its own academic journal.

Origins and growth

Initially titled The OPEC Review, the first edition of this new publication was published in February 1976. It was a welcome enterprise, particularly among OPEC Member Countries, and its benefits were immediately clear: It served as an important platform for the publication of interesting and innovative research that many people in the oil industry found useful and interesting.

In time, the impact, reach and effectiveness of the publication was found to be quite extensive. And under the leadership of its Editorial Board, the journal expanded its audience. It also emphasized the importance of reaching more researchers from around the world, particularly from developing countries.
Over the years, there were ongoing discussions within the OPEC Secretariat about other innovative ways to continue to improve the journal. Part of this process included a study to examine different options, the results of which eventually became the basis for a strategic plan of action. And, as part of this, the title of the journal was officially changed to the OPEC Energy Review (OER) in 2008 (with Issue 1 of Volume 32).

But change is a constant, ongoing process. Thus, at a meeting of the Editorial Board in 2012, another collective look was given to specific areas of the OER and several specific objectives were identified.

Among these was the need to seek an increase in the number of peer reviewers used to evaluate manuscripts, finding ways to ensure adherence to the latest academic standards, and making sure submissions from scholars and researchers in OPEC Member Countries were further encouraged.

A follow-up meeting in 2014 was then held to discuss the possibility of implementing other structural changes. At the meeting’s conclusion, the Editorial Board decided on a set of very specific steps: First, the composition of the Editorial Board would be reviewed and expanded to include internationally recognized high-level experts. Second, a detailed “Author Guidelines” would be developed specifying the basic requirements for all submissions. And third, other ways to ‘sharpen’ the international profile of the publication would be sought.

A strengthened Editorial Board

As of last year, the Editorial Board of the journal was restructured and two new members joined. First, there is Dr Derek Bunn, Professor of Decision Sciences at the University of London, and a specialist in forecasting, decision analysis and energy economics. The expertise he brings to the OER is extensive, as he has long been working on applying his areas of specialty to the energy and oil industries.

Second, there is Prof Herbert Hofstätter, Head of the Department of Petroleum and Geothermal Energy Recovery at the University of Leoben. His long experience as an academic specializing in petroleum promises to be of great use to the OER — especially as the nature of the industry changes.

The Editorial Board continues to include two other external members: Dr Sadek Boussena, a former Senior Associate at Cambridge Energy Research Associates, who serves as General Academic Editor of the OER; and Dr Bassam Fattouh, Director of the Oxford Institute for Energy Studies, and Professor in the Department of Financial and Management Studies at the School of Oriental and African Studies at the University of London.

In addition, five members of the staff at the OPEC Secretariat continue to serve on the Board as well: Dr Omar S Abdul-Hamid, Director of the Research Division and Chairman of the OER Editorial Board; Hasan Hafidh, Head of OPEC’s Public Relations and Information Department, and Executive Editor of the OER; Ms Asma Muttawa, General Legal Counsel of the OPEC Secretariat; Dr Mohammad Taeb, Environmental Coordinator of OPEC’s Environmental Matters Unit; and Dr Aziz Yahyai, Senior Research Analyst in OPEC’s Petroleum Studies Department.

As the Editorial Board changed, however, the important work of its outgoing members was not overshadowed. For having shown great dedication to the publication during their tenure, the Board recognized the contributions and support provided over the years by outgoing Editorial Board members.

Thus, under the leadership of current and previous Editorial Board members, the OER has been able to achieve an admirable balance between stability and change, continuity and growth. By supplementing the expertise of its long-standing Board members with the specialized expertise of its new members, the journal has found the right combination of qualities and insights with which it can continue to move forward — and continue to provide a valuable service to the industry.

A revamped journal

The new Editorial Board met for the first time in June 2015. It discussed the journal’s achievements, its challenges and what steps to take as the journal approached its 40th year of publication.

The Board also considered ways to incorporate other changes so that the OER might continue to serve the needs of academics, researchers, and other stakeholders in the industry.
It identified three specific objectives that the journal would make explicit on its opening page: First, to offer a top-quality research platform for the publication of energy and petroleum related matters. Second, to contribute to the producer-consumer dialogue through informed analyses and the sharing of perspectives. And third, to promote the consideration of innovative or academic ideas which may enrich the methods and tools used by stakeholders.

In addition, the Board also recommended that specialists in the field be used on occasion as external reviewers — particularly in the case of some submissions received that are especially technical in nature or which perhaps focus on a specialized aspect of the industry.

External peer reviewers can thus bring to bear on the journal unique insights and expertise that they may have on some of the more contentious topics of the day.

In addition, there is an additional benefit — that of strengthening the OER's networks among researchers working in the industry, so that both its profile and reach, as well as the overall quality of the articles being published, are improved.

A new online portal

In support of these objectives, the Board also chose to put more emphasis on modernizing the submission and review process. With this in mind, the OER teamed up with its publisher, Wiley-Blackwell, to move the entire process online. The result has been the creation of a page dedicated to the OER at ScholarOne, a leading peer review tool used by scholarly publishers and journals around the world.

ScholarOne is a powerful tool. It not only leverages patented technology developed by Thomson Reuters but also benefits from the company's networking and communications prowess. It essentially allows potential authors to submit their manuscripts directly to administrators and editors of the OER via an online uploading programme. It then tracks those submissions, alerting OER administrators and editors, and allows them to conduct a preliminary review before assigning the article for peer review.

Once assigned, the peer reviewers can then do all their work online and provide final assessment — and the reasons for their evaluation — online. This helps to facilitate the exchange and sharing of information, and reduces the reliance on paper.

“The OER is a welcome publication. ... From my point of view, as a professor, it is most important to demonstrate the importance of interdisciplinary cooperation. We all need to have a look at this more carefully — so that we can bridge academic work with field work. And in this, OPEC — and the OER in particular — can really be a scientific hub.”

Dr Herbert Hofstätter, Head of the Department of Petroleum and Geothermal Energy Recovery, University of Leoben, and external member of the OER Editorial Board.

“Since energy issues — and the role of oil in particular — remain crucial to ... economic growth and sustainability, the OER's research contributions will be looking ever more widely at energy supply chains, demand, markets and technologies to inform these major global concerns.”

Dr Derek Bunn, Professor of Decision Sciences at the University of London, a specialist in forecasting, decision analysis and energy economics, and external member of the OER Editorial Board.
More importantly, it accelerates the entire submission-and-review process, thereby reducing the amount of time between submission and approval. Typically — according to scholars who have submitted to other academic journals — this process can take between 12 and 24 months.

But ScholarOne not only accelerates the process; it also improves communications between the authors and the reviewers and facilitates the management of submissions on the part of the editors.

Everyone involved in the editing and production of the journal can see where things stand and what the status of submissions is. As such, the platform increases the transparency of the entire process. These are quite significant and useful achievements.

A ‘special edition’

Another change that has been implemented is publishing specific articles on certain topics or subjects — by moving the OER towards occasional ‘thematic’ editions. The Chairman of the Board, Dr Omar S Abdul-Hamid, and the Executive Editor, Hasan Hafidh, both stressed that this was an important way to help further improve the journal’s profile. This would be especially useful in order to attract specialists and other authors, researchers and journalists.

Thus, in December 2015, the OER published its first thematic issue — a ‘special edition’. With the ‘Call for Papers’ going out under the theme of “oil demand in the transport sector”, submissions were received from countries around the world. In the end, three papers were chosen, each offering a unique perspective on transportation. These were accompanied by a broad overview of the transport sector derived from OPEC’s World Oil Outlook 2015.

The special December 2015 edition marked a new phase in the OER’s history. It also seems to have been ideally timed, since it is worth noting that the appearance of the ‘special edition’ reflects something that has been occurring in other academic publications around the world: the increased specialization of journals and the growing popularity of special ‘thematic’ editions.

The ‘special edition’ of the OER marked the first attempt to publish an edition with a very specific thematic focus bringing together perspectives from different fields and disciplines.

And so far, reaction to the ‘special edition’ has been extremely favourable. It is hoped that occasional future editions of the OER might also have a specific thematic focus.

Looking ahead

The OER has successfully contributed to the dissemination of knowledge and scholarship over the years, serving as a bridge between the academic world and the work of practitioners, and becoming a useful tool for researchers and scholars around the world for 40 years. And as the nature of the market and the industry changes, so, too, will the scope of the material published in the OER.

“\textit{The possibility of \[OPEC\] being a research organization depends in part on being such a place and having a publication like the OER in which information can be exchanged with other researchers. So, as an important body in the oil industry, \[OPEC\] cannot be absent from any industry debates. It must continue to share the innovative thinking that is going on around the world — using tools like an academic journal like the OER. And at such a critical time as the present, we need ‘light’ — that is, the illumination brought by research articles by professors and university researchers.”}

\textit{Dr Sadek Boussena, General Academic Editor of the OER.}
The recent changes to the OER’s Editorial Board, and to the process used to review and accept papers, have all been useful in this process of the journal’s evolution. However, it will need to make sure it continues to remain “an important forum that will contribute to the broadening of awareness of [different] issues through an intellectual exchange of ideas”, as stated in the journal itself. And it will need to continue to seek ways to bring new content to its readers.

Thus, as the OER looks ahead to another decade or two of publication, it will need to continue to find ways to reach even new researchers and to encourage young scholars — particularly in developing countries — in order to have them submit their work to the journal.

And they will need to be complemented by increased promotion of the OER through different channels, as has been done in recent months. This will continue to help increase the journal’s profile among scholars, with an associated improvement in the profile and institutional affiliation of its authors — many of whom have international standing as prominent figures in their field or as “thought leaders” in the oil industry.

There is much research that has taken place in the energy field and in the oil industry. Recent technological innovations have been impressive; the advances in our understanding of the economics and finance of petroleum, and of the policy options surrounding the industry, have been significant, if not critical.

Of course, there is always more to be discovered and more to be learned, particularly from scholars doing cutting-edge research, and in this, the OER will play an important role.

The OER is well-poised to continue to serve as a platform for the exchange of research and as a bridge between academics and practitioners. If it can continue to do so in the coming years, so that people may share their findings with those who may benefit from them, then it — and the Organization it represents — will continue to play an important role in the advancement of knowledge for the benefit of all.
Call for papers

The OPEC Energy Review is a quarterly energy research journal published by the OPEC Secretariat in Vienna. Each issue consists of a selection of original well-researched papers on the global energy industry and related topics, such as sustainable development and the environment. The principal aim of the OPEC Energy Review is to provide an important forum that will contribute to the broadening of awareness of these issues through an intellectual exchange of ideas. Its scope is international.

The three main objectives of the publication are to:
1. Offer a top-quality original research platform for publishing energy issues in general and petroleum related matters in particular.
2. Contribute to the producer-consumer dialogue through informed robust analyses and objectively justified perspectives.
3. Promote the consideration of innovative or academic ideas which may enrich the methodologies and tools used by stakeholders.

Recognizing the diversity of topics related to energy in general and petroleum in particular which might be of interest to its readership, articles covering relevant economics, policies and laws, supply and demand, modelling, technology and environmental matters will be considered.

The OPEC Energy Review welcomes submissions from academics and other energy experts. Submissions should be made to: Executive Editor, OPEC Energy Review, OPEC Secretariat, Helferstorferstrasse 17, 1010 Vienna, Austria; or online via: https://mc.manuscriptcentral.com/opec

All correspondence about subscriptions should be sent to John Wiley & Sons, which publishes and distributes the quarterly journal on behalf of OPEC (see inside back cover).

OPEC Energy Review
Chairman, Editorial Board: Dr Omar S Abdul-Hamid
General Academic Editor: Professor Sadek Boussena
Executive Editor: Hassan Hafidh
Khalid A Al-Falih, Chairman of the Board of Directors of the national oil company, Saudi Aramco, has been named by *Energy Intelligence* as its Petroleum Executive of the Year for 2016.

The 20th winner of the prestigious, peer-selected honour, Al-Falih was selected by a group of top global oil industry executives.

**Strong leadership**

“The selection of Khalid A Al-Falih by his peers is a reflection of his strong leadership of Saudi Aramco, the world’s largest oil company, during a period of dynamic growth and severe challenges to the international petroleum industry,” commented Thomas Wallin, Editor-in-Chief of *Energy Intelligence*, which administers the annual award.

Al-Falih was appointed Chairman of the Board of Saudi Aramco in May 2015. He was also appointed as Minister of Health at the same time.

He joined Saudi Aramco in 1979 and has held a number of positions of increasing responsibility including Executive Vice President of Operations and Chief Executive Officer and President from January 1, 2009 until May 1, 2015.

Al-Falih has led the expansion of Saudi Aramco’s oil production capacity, the world’s largest, through a number of upstream projects and also significantly increased its refining and petrochemical capabilities through a series of new world class facilities.

In addition, the company has played a lead role in international petroleum markets as the world’s largest exporter of crude oil with direct sales to all of the main world markets, as well as supplying its own and international refining and marketing partnerships.

Under Al-Falih’s leadership, the company became a major natural gas producer as part of a strategy to reduce domestic use of liquid fuel for power generation and to drive economic growth and diversification.

Al-Falih was also instrumental in Saudi Aramco’s emergence as a leading innovator and creator of advanced technology through the establishment of a network of research centres, both in the Kingdom and internationally, in partnership with world-renowned academic and industry research institutions.

In the months leading up to the United Nations International Conference on Climate Change (COP21) in Paris in November/December last year, Al-Falih played a leading role in the World Economic Forum-sponsored Oil and Gas Climate Initiative (OGCI), an industry-driven initiative that sought to catalyze practical, meaningful and technology-enabled actions to address climate change.

In September 2014, Al-Falih spoke on behalf of the industry at the UN-sponsored Climate Summit in New York, where he called for collaboration and the sharing
of best practices and technical solutions to address climate change and sustainable energy.

Al-Falih holds a Bachelor of Science degree in Mechanical Engineering from Texas A&M University and an MBA from King Fahd University of Petroleum and Minerals (KFUPM).

He was chair of the World Economic Forum Oil & Gas Community and has served on many boards. He is currently serving on the board of King Abdullah University of Science and Technology (founding member) and on the American University of Sharjah Board of Trustees.

The Petroleum Executive of the Year award is the international energy industry’s most prestigious award given in recognition of outstanding leadership by an executive in the international energy industry.

Nominations for the award are solicited from CEOs and other senior managers of over 100 of the world’s largest oil and gas firms, as they appear in the annual rankings by Energy Intelligence. The recipient is then chosen through a confidential peer selection process involving CEOs and other senior energy executives.

Award to be presented in October

The award will be presented to Al-Falih on October 18 at an honorary dinner during the 37th Annual Oil & Money Conference in London.

Previous winners of the award from OPEC Member Countries include Luis E Giusti, CEO of Petroleos de Venezuela SA in 1998; Abdallah S Jum’ah, President and CEO of Saudi Aramco in 2005; Dr Shokri Ghanem, Chairman of the Libyan National Oil Corporation (NOC) in 2006; and Abdullah Bin Hamad Al Attiyah, Chairman and Managing Director of Qatar Petroleum in 2007.
UAE appoints Al Jaber as new ADNOC Director General

Dr Sultan Al Jaber (pictured), United Arab Emirates (UAE) Minister of State, has been appointed Director General of the country’s national energy concern – the Abu Dhabi National Oil Company (ADNOC).

His appointment was made by royal decree and was announced in a statement released by the General Secretariat of Abu Dhabi’s Executive Council in March.

Al Jaber succeeds Abdullah Nasser Al Suwaidi who was appointed ADNOC Director General in 2011 and oversaw the renewal of Abu Dhabi’s biggest onshore concessions last year.

Al Jaber is Chairman of the UAE’s renewable energy concern, Masdar, which commented on its website: “Dr Al Jaber spearheaded the launch and establishment of Masdar in 2006 and continues to drive the company’s strategic direction as it takes on an increasingly prominent role in global efforts toward advancing renewable energy and clean technology.”

Al Jaber is also Chairman of the Abu Dhabi Ports Company, the Abu Dhabi Media Investment Corporation and Sky News Arabia. In addition, he is Chief Executive of Energy at the state-run Mubadala investment and development group.

He takes over at ADNOC “one of the world’s leading oil companies,” as the national energy concern is looking to boost its crude oil production capability to 3.5 million barrels/day by the end of 2017–18 from the current 3m b/d. This will require the company investing billions of dollars in onshore and offshore fields.

ADNOC is also developing its natural gas assets to meet growing domestic energy requirements.

According to 2014 data, ADNOC is the 12th largest oil producer in the world. It accounts for almost all of the UAE’s crude output revenues, which contribute about 60 per cent of the Federal budget.

Al Jaber was appointed UAE Minister of State and a member of the UAE Federal Cabinet in 2013.

He was invited to serve as a member of the United Nations Secretary General’s Advisory Group on Energy and Climate Change (AGECC) in 2009 and, according to Mubadala, “has been responsible for developing and advocating the UAE’s position on energy, environment, water and international climate change negotiation as the UAE’s Special Envoy for Energy and Climate Change since 2010.”

A graduate of Chemical Engineering from the University of Southern California, Al Jaber began his career as a Process and Planning Engineer at Abu Dhabi Gas Industries Limited (GASCO), where he worked on gas-related projects spanning five years to 2002.

He then became Senior Projects Manager for Mubadala’s energy and industry unit from 2004 to 2006 and spearheaded and launched Mubadala’s renewable energy arm, Masdar, ten years ago, which catapulted the UAE on to the global map for renewable energy.

The UAE has since become host to the International Renewable Energy Agency (Irena) and Masdar has delivered more than one gigawatts of installed clean energy capacity domestically and abroad with assets valued at close to $7 billion.

Speaking on his appointment, Adel Albuainain, Chief Executive of Dolphin Energy, a unit of Mubadala, was quoted as saying that Al Jaber was a strong leader who had helped to “raise the profile of the UAE.”

“He possesses an incredible amount of experience and expertise and I cannot think of a more suitable person for the role at a time when the country is embracing new challenges,” he affirmed.

Meanwhile, Ahmad Belhoul, former Chief Executive of Masdar and now Minister of State for Higher Education Affairs, said Al Jaber had always been recognized as a leader.

“Al Jaber has proven himself to be a trusted, dynamic and successful leader, whether as the Chief Executive of Mubadala’s overall energy portfolio, the driving force behind Masdar, or as Chairman of the Abu Dhabi Ports company.

“Throughout his career, he has been recognized as a leader who persistently delivers and he will play a crucial role in ADNOC’s evolution,” he added.
Senior Research Analyst

The Organization of the Petroleum Exporting Countries (OPEC) has a vacancy based in Vienna, Austria, for a Senior Research Analyst in its Energy Studies Department.

Main responsibilities:
- Develops methodologies to analyse and assess energy technologies, builds up frameworks and quantitative models for monitoring and assessing recent and future technological developments.
- Searches for, identifies, collects and maintains data and information on energy related technologies and other relevant issues and conducts studies on energy technologies.
- Develops technology-rich scenarios as input to OPEC's World Oil Outlook and other model-based studies.
- Assists in establishing and maintaining a network of experts from Member Countries related to technological research and identifies potential areas of co-operation between Member Countries on technological issues.
- Contributes to and/or delivers speeches, articles and presentations to both internal meetings and various international forums.

Requirements:
University degree in engineering or sciences; Advanced degree preferred; University degree: ten years of work experience; Advanced degree: eight years of work experience.

Skills and knowledge:
Energy technology; energy economics; knowledge of related environmental issues an asset; communication and interpersonal skills; analytical and presentation skills; customer service orientation; initiative and integrity; proficiency in written and spoken English.

Offer:
Commensurate remuneration package ie monthly basic salary of (€6,176 x 12/year) with tax-free benefits and six-week annual leave.

Job Code 5.2.03

Database Systems Administrator

The Organization of the Petroleum Exporting Countries (OPEC) has a vacancy based in Vienna, Austria, for a Database Systems Administrator in its Data Services Department.

Main responsibilities:
- Administers, installs and designs database systems and resolves database management problems in order to ensure data availability and integrity; installs, administers and maintains servers for database systems;
- Installs, administers and maintains OPEC intranet servers;
- Implements and maintains database security; defines, allocates and loads physical databases;
- Controls and executes system utilities for creating and modifying database structure and establishing standards for database performance;
- Coordinates interface with other databases so as to facilitate data sharing and ensures compatibility;
- Analyses system failures and executes procedures for restoring system and database operations.

Requirements:
University degree in computer science, information technology or other science studies related to information technology; Certification in Oracle database administrator associate and Oracle database administrator professional; six years of work experience.

Skills and knowledge:
Oracle database administration including installation, design, development; DBA certification preferred; UNIX administration; programming languages: PL/SQL, Java, Visual C++, MS Access, JavaScript, CSS; development in new software and/or programming languages (Oracle RDBMS, Oracle Portal, Java etc); general knowledge of software design principles, software development cycles; communication and interpersonal skills; analytical and presentation skills; customer service orientation; initiative and integrity; proficiency in written and spoken English.

Offer:
Commensurate remuneration package ie monthly basic salary of (€4,357 x 12/year) with tax-free benefits and six-week annual leave.

Job Code 3.3.05

Applications:
Applicants should kindly complete the ‘Application Form’ which can be downloaded from our website (www.opec.org) and send it to: OPEC Finance & Human Resources Department, Helferstorferstrasse 17, A-1010 Vienna, Austria. Or e-mail: recruitment@opec.org. Online applicants should quote ‘Job Code ...’ in the ‘Subject’ field. An automatic reply will be sent to confirm the successful submission of the documents. The deadline for receipt of applications is April 17, 2016. Acknowledgements will only be sent to short-listed candidates.
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.

February 4

Mark Papa (l), a Partner with Riverstone Holdings LLC, and former head of EOG Resources, visited Abdalla Salem El-Badri, OPEC Secretary General.

February 9

Mohamed Benhocine (l), Ambassador of Algeria to Austria, visited Abdalla Salem El-Badri, OPEC Secretary General.
Filippo Formica (l), Ambassador of Italy to Austria, visited Abdalla Salem El-Badri, OPEC Secretary General.

Auday Al-Khairalla (l), Ambassador of Iraq to Austria, visited Abdalla Salem El-Badri, OPEC Secretary General.
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

December 14  Students from the European Student Think Tank.

December 15  Students from the Politische Akademie Wien.

December 16  Students from the Vienna University of Economics and Business.
December 17
Students from the European Law Students’ Association (ELSA), Vienna.

December 17
Students from the Aalto University Helsinki and the Department of History of the University of Vienna.

January 18
Students from the Hanssel Escobar Cascante Costa Rica Study Group.
UAE Group adds Vienna’s Imperial Hotel to its portfolio

The United Arab Emirates (UAE), renowned for its trade and enterprise in both the oil and non-oil sectors, stands today as one of the most preferred nations in the world to do business with. And that is something the Al Habtoor Group knows only too well. As one of the country’s most respected and successful businesses, it now counts seven world-class hotels in its impressive and growing international portfolio. The most recent of these is the historic Imperial Hotel in Vienna, the capital of Austria where OPEC has had its headquarters for over half a century. OPEC Bulletin Editor-in-Chief, Hasan Hafidh, was in attendance at the signing ceremony in February when the celebrated establishment changed hands.
The Al Habtoor Group has become synonymous with the dynamic growth witnessed by the United Arab Emirates (UAE) over the years of its remarkable and continuing development.

This is evidenced by its commitment to establish and expand businesses in a number of lucrative areas, including primarily construction activities, but also the automotive sector, real estate, education and publishing.

**Spreading its wings**

One other important development area is its hotels division which, in recent years, has seen the group spreading its wings both within the UAE and abroad.

In fact, the Al Habtoor Group takes great pride in the fact that, while being predominantly a home-grown operation, it is now successfully competing on the world stage with many established international hotel chains that are active throughout the Gulf region.

Today it stands as the Middle East’s longest established hotel group, having chalked up decades of experience that has earned it a reputation for its exemplary service and offering unique properties in best locations.

It was, therefore, no surprise when the group announced that it had purchased the stately Hotel Imperial in Vienna from Starwood Hotels & Resorts Worldwide, Incorporated.

The acquisition brings to seven the total number of overseas hotels held within the investment arm of the Al Habtoor Group.

Khalaf Ahmad Al Habtoor, Group Chairman, said at the signing in February: "I am delighted to add such a historic hotel to our international hospitality portfolio."
The hotel is one of the city's most renowned pieces of architecture."

A press release pointed out that Hotel Imperial will continue to operate as part of the Starwood Hotels & Resorts Worldwide 'Luxury Collection' brand under a new long-term management agreement.

Built in 1863 as the Viennese residence of the German prince, Duke Philipp of Württemberg, the building was transformed into a hotel to accommodate visitors of the 1873 World's Fair.

Situated on the iconic Vienna Ringstrasse in the city's First District, Hotel Imperial occupies a prime location at Kärntner Ring 16.

The luxury hotel sits next to the legendary Musikverein concert hall and is just a short walk away from such famous attractions as the Vienna State Opera House, the Kunsthistorisches Museum and the Secession Building.

The seven-storey Hotel Imperial comprises 138 rooms, including 59 suites, and boasts five meeting rooms and conference salons equipped with state-of-the-art technology. It also has three food and beverage outlets, including Café Imperial Wien, a veritable institution among Viennese coffee houses, the award-winning Opus Restaurant and the historic Halle & Salon Bar, which dates back to 1873.

Continued Al Habtoor: "Hotel Imperial is one of Europe's most extraordinary luxury hotels and a premium addition to our growing global portfolio. We look forward to making further improvements to this legendary property and continuing to provide exceptional luxury hospitality to the next generation of luxury travellers."

Thomas Mangas, Chief Executive Officer of Starwood Hotels & Resorts, was quoted as saying that the hotel is one of Europe's most spectacular luxury properties and a perennial favourite among Starwood's loyal travelers.

Hotel Imperial is the fifth Starwood property in

"The hotel's Opus restaurant, a 1930's style gourmet establishment."
the Al Habtoor Group’s portfolio of 14 world-class hotels, joining the newly opened St Regis Dubai, as well as the upcoming W Dubai — Al Habtoor City, the Westin Dubai, Al Habtoor City and the Al Habtoor Polo Resort and Club.

Expanding its hospitality

The Group has been expanding its hospitality both internationally and locally over the past few years. Its Dubai assets include the Habtoor Grand Beach Resort & Spa, Autograph Collection; and the Waldorf Astoria Dubai Palm Jumeirah.

Al Habtoor Investment recently acquired its first hotel in London with the purchase of the Hilton London Wembley. It also has two Hilton-branded hotels in Lebanon, one in the United States, and two five-star hotels in Hungary.

In December 2015, Al Habtoor said it had allocated over $500 million for overseas investments in 2016.

The Al Habtoor Group, which boasts a highly qualified, experienced and professional multi-national team, consisting of thousands of employees, is expected to continue to grow in line with its planned expansion.

The Group’s Construction division — Al Habtoor Engineering — has had an extensive track record in the successful delivery of large-scale projects across the region. For more than 40 years it has built a strong and loyal client base across both the public and private sectors.

Now part of the Habtoor Leighton Group (an independent entity), it focuses on five core market sectors namely infrastructure, building, rail, oil and gas and mining.

Al Habtoor Motors’ brand portfolio includes Mitsubishi, with a wide choice of sedans, 4x4’s and commercial vehicles, Temsa buses and premium marques such as Bentley, McLaren and Bugatti. Al Habtoor Motors imported more than 43,000 vehicles from Japan in 2013.

The company has a well-established network of nine showrooms, nine service centres, four body shops and ten parts centres that effectively cover the entire UAE.
Although OPEC Member Countries share a significant commonality with regards to economics in all being notable producers and exporters of one of the world’s most valuable commodities — crude oil — this harmony also extends to the cultural domain among some of them. Several Member States, namely Angola, Ecuador, Indonesia, Nigeria and Venezuela, each year stage a particularly remarkable event that unites and brings joy and celebration to their respective populations. It is the carnival. In this article, OPEC intern, Ayman Almusallam, takes readers on a fruitful journey to the Member Countries concerned to learn more about this revered mega festivity that triggers fever-pitched human sentiment and euphoria the world over.

The carnival is a tradition that dates back many hundreds of years, flavoured by the practices of Christianity.

Today it remains one of the most anticipated and celebrated of all annual festivities.

The legacy expounds carnival roots dating back to the catholic tradition that encouraged accomplished people to host feasts, in order to dispose of extravagant food items and drinks prior to the celebration of Lent.

Yet the carnival has been celebrated in some of these countries since the pre-Christianity era.

Angola

The Republic of Angola, which joined OPEC in 2007, is our first port of call in looking at the celebration of the carnival. Event participants in this southern African nation regularly attend the celebration wearing exciting costumers and colourful accessories. In addition, several traditional dances are performed, such as the Semba.

The carnival in Angola is celebrated normally during the three days leading up to Ash Wednesday and mainly in the capital city, Luanda. It is estimated that the tradition dates back to around 1857. Tradition has it that groups celebrating the carnival in Angola
usually comprise a king, a queen, dancers and musicians, in addition to the occasional nurse. All group members are expected to wear exotic colourful clothes, particularly garments made of the colours red, yellow and black, which represent the national colours of the Republic.

The nurses, however, are an exception, as they are expected to wear the traditional white costumes.

An important distinction between the carnival in Angola and other similar events is the worthy prizes on offer, which are handed out to outstanding performers, exceptional dancers and the group wearing the best costumes.

This customarily attracts children to participate in the festivities, as the rewards for prize winners tend to be sufficient enough to fund the preparation of costumes for the following year’s carnival.

A large number of historians actually consider the Angolan carnival to be the root of all other carnivals, including the famous carnival of Brazil. The narrative emphasizes that the deep-rooted tradition was conveyed to the rest of the globe during the time of slavery.

**Ecuador**

The Republic of Ecuador’s carnival dates back many years prior to the era of Christianity. In ancient times, Ecuadorians used to celebrate the second moon of every year by throwing perfumed water, flowers and flour.

Several years later, the longstanding tradition was merged with the Christian celebration of the carnival. Presently, it is held sometime during the month of February or March.

Ecuador’s carnival is celebrated extensively throughout the country. Participants are inclined to masquerade with colourful masks and entertain with folkloric dances.

Children, better known as diabíllos (little devils), can live up to their name by getting involved in exciting ‘snowball’ fights, throwing eggs and flour or water balloons … and in some cases, even car oil!

As per tradition, every year the ‘father’ of the carnival must be elected prior to the event. The duty of this symbolic figure is limited to heading the carnival parade.

The carnival in Ecuador is as well celebrated through the preparation of traditional food, with cultural dance performances and folkloric music.

One of the most popular activities taking place during the carnival season is at Ambato in the province of Tungurahua. This comprises an exceptional flower and fruit festival. During this event, the city is beautifully decorated. Both Ecuadorian nationals and tourists are encouraged to take part.

Another one is at Guaranda, in Bolivar province. Here the exciting combination of masked participants, parades and dancers becomes apparent around the city. The area,
which is renowned for its festivities and fabulous celebrations, also embraces the ‘little devil’ tradition, creating an enormous thrill for kids and teenagers alike.

Furthermore, a considerable number of Ecuadorians perceive the carnival as a national holiday; hence tourism destinations and beach areas tend to be overcrowded.

Ecuador, which became a Member of OPEC in 1973, suspended its Membership in 1992, but rejoined the Organization in 2007.

Indonesia

Solo Batik Carnival, the carnival of the city of Solo, is a yearly event held in Surakarta City in the Asian Republic of Indonesia. Notably, the uniqueness of this carnival, in comparison with others, stems from the fact that it is not related to the Christian celebration of pre-Lent, or contrary to the rest.

However, the occasion is used to promote Indonesian culture and its specialities, namely the motif of batik, in addition to exotic costumes worn by dancers.

Despite the fact that the carnival is well-attended and widely-known on a global scale, it is relatively new. The first Solo Batik Carnival was held in April 2008. The event has grown massively since then and today hosts several activities and performances, including folkloric shows and dances.

To maintain the public’s interest and to enhance the richness of the carnival, it has been decided that each year a theme should be embraced to guide the event and its activities and attractions.

Another important carnival that takes place in Indonesia is the Jember Fashion Carnival. It is held annually in Jember city, East Java. This carnival shares a few common aspects with the former carnival, as it does not have a direct connection to the Christian pre-Lent period. Furthermore, it promotes the traditional motif of Indonesia and unique dance costumes. The event tends to adopt global or nature-related themes.

Most notably, the notion of the carnival was initiated by a local fashion designer, who aimed to promote and popularise Indonesian fashion. The event takes place during the month of August.

Indonesia became a Member of OPEC in 1962, suspended its Membership in 2009, but reactivated it again at the beginning of 2016.

Nigeria

Calabar Carnival, better known as Africa’s biggest street party, is a massive gathering that takes place in Nigeria’s most visited area by national and international tourists — Cross River State.

The celebrations kick off on the first day of December and last until the end of the year, enhancing the awareness of Nigerian culture among carnival participants, while entertaining millions. Additionally, it is perceived as a boost to the country’s economy.

Although the occasion was founded relatively recently, it is today attended regularly by millions of
locals and tourists. The carnival was initiated in 2004 by the Governor at that time of Cross River State. The aim was to help develop tourism and the hospitality sector in the region and consequently on the African continent, a vision that has harvested considerable fruit since the State became a major point of interest in the country.

The event is notably influenced through the region’s history, local culture and longstanding heritage. Furthermore, several influential figures attend the carnival, such as politicians, footballers and actors.

During the carnival, an extensive range of activities can be found, including football competitions, music shows by local and international artists, fashion shows and cultural dances.

Occasionally, writing competitions are included in the carnival’s busy programme. Of note, the festival’s management embraces a policy that encourages individuals to propose new ideas and activities aimed at developing the carnival further. However, suggestions come with the strict condition that they must embrace Nigerian culture and promote it.

Nigeria joined OPEC in 1971.

**Venezuela**

The carnival in Venezuela, one of the countries that helped found OPEC in 1960, is today legendary. Each and every year the celebrations bring an immense amount of delight and good feeling to the people of this South American nation.

The celebration of the longstanding carnival lasts a bit longer than a month. And it is quite a spectacle. Costumes are diverse, with the imitation of contemporary cartoon characters, in addition to kings, queens, jesters and couriers, most notably prevalent.

The characterisation and impersonation of various devil figures, particularly with the use of horns, is commonly found among festival participants.

The annual carnival roughly starts 40 days before Easter Sunday. However, there is not a fixed date as Easter is a floating holiday.

The carnival was previously celebrated mostly in the big cities and large urban centres, such as the capital, Caracas. But nowadays, it is celebrated primarily in the coastal areas and towns located on the seafront.

The historical El Callao Principality, famous for its gold prospecting, is one of the Venezuelan towns renowned globally for its massive carnival celebrations. Established in 1853, El Callao’s inhabitants started to perceive the festival with importance from 1925 onwards.

Today, the carnival is regularly attended by thousands of people from various backgrounds and ethnicity and regardless of their age. The event is therefore enjoyed by adults, teenagers and children alike.
OFID’s grant assistance: Small in scale, big in impact
What is it about OFID’s grant assistance that makes it so special?

If you take just numbers, the share of the grant programme in OFID’s overall operations is relatively small. Worth a total $613 million to date (end of October 2015), it accounts for just over three per cent of the institution’s total cumulative commitments. Nevertheless, with over 1,680 grants approved, the programme represents an important diversity of projects and interventions.

The truth is that projects supported through other financing windows might not address the needs of all communities. Take electricity access as an example. There are large numbers of people who live in scattered, isolated communities that are not connected to the main grid. These communities are marginalized and poor, but providing them with electricity is not a priority for the majority of governments.

When it comes to investment, priority is always going to be given to areas with a higher population density and greater economies of scale — you can reach more for less. But this does not mean we should ignore these poor, isolated communities. With a grant for a small-scale project, we can literally change their lives.

Do you have some concrete examples of this approach?

There are many examples, but one in particular is a solar mini-grid project that we are carrying out in Guinea Bissau, in collaboration with the Foundation for Rural Energy Services, a non-governmental organization (NGO).

This grant-financed initiative is not only meeting the immediate needs of disadvantaged communities, in terms of having a sustainable power supply, it is also giving a valuable boost to economic activity. Over the medium-term, this will help improve the socioeconomic prospects of the whole country.

With projects like this, there are also opportunities to develop synergies and perhaps even leverage additional financing. For instance, if pilot projects are found to be successful, they could be scaled-up or replicated and lead to further investments from bigger players.

What about examples away from the energy sector — do you have some that you could share?

One initiative I always like to hold up as a great model is our cooperation with the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) to establish the PalFund microfinance facility.

Since it was set up in 2002, the PalFund has grown to become one of our most successful operations and the largest microfinance programme in the Palestinian
territories. It functions as a revolving facility, so the $10m initially invested by OFID has actually provided 76,000 loans worth a total of close to $108m.

These resources have helped thousands of small and micro-entrepreneurs, many of them women and young people, to establish and develop successful businesses.

The scheme has very good repayment rates, which is one of the main indicators of success for a microfinance facility. We have also received positive feedback from UNRWA and from the beneficiaries.

This is a concrete example, where one can see how grant financing can achieve significant and sustainable impacts that improve people’s lives.

Another example is our cooperation with UN Habitat’s Global Water Operators’ Partnerships Alliance (GWOPA), which we initiated in 2013 to boost progress toward the Millennium Development Goals (MDGs) and help realize the Human Right to Water declared by the United Nations General Assembly in 2010.

Through this programme, we connected nine African water operators with recognized strong performance in certain areas, to beneficiary operators who needed help in such areas and who had expressed their interest in getting technical assistance from their peers.

Based on lessons learned from the implementation of this programme, GWOPA is now keen on establishing a strategic partnership with OFID to support water operators in achieving the recently approved Sustainable Development Goal (SDG) on water.

Within this partnership, both parties would develop a long-term plan to replicate and scale up the use of the GWOPA approach to support water operators in more countries in Africa and other regions of the global South.

The examples you mention are strong evidence of grant assistance as a catalyst for development. Despite that, there are still people who, perhaps because of their lack of understanding, view grants as charity. What is your reaction to this?

We have indeed noticed that there is a misconception on the part of the general public about the role and purpose of grants. This is perhaps due to the fact that grants are often associated with donations and as supporting “band-aid” rather than sustainable solutions.

Of course, OFID has always provided humanitarian aid in response to natural disasters and conflicts and this will continue to be a part of our work. But we do need to change the perception that this is all grants are good for.
To help us with this, we have developed some communication tools, including a brochure that contains information about our programme and some highlights of its interventions.

Although we have been improving in this respect in recent years, we still need to put more into outreach efforts, to educate our partners and the public at large on the amazing things we do through our grant programme.

**What are your strategies and new ideas to further enhance the role and contribution of the grant programme?**

Given our relatively limited resources, we have to continue prioritizing projects that can produce measurable, significant and sustainable results; projects that could be replicated and scaled up.

We started this effort several years ago and we have to continue in this direction. It is also important to be more focused sector-wise.

In this respect, we will try to prioritize the three sectors — energy, agriculture and water — that have been identified as the main planks of OFID’s Corporate Plan for the period 2016–25.

These three sectors are also among the top priorities in the post-2015 global development agenda and specifically covered by the SDGs.

And last, but not least, we will continue to build on successful partnerships and also to develop new partnerships with other development institutions, to maximize the impact and ensure the effectiveness and sustainability of our interventions.

**Does this mean that we will see grants supporting more projects in the energy, water and food sectors in the coming years?**

While the SDGs and OFID’s Corporate Plan provide strategic frameworks for grants to place more emphasis on the energy-water-food nexus, we will continue to use a demand-driven approach, responsive to the needs of our partner countries.

It is our partner countries who will establish their priorities, and we will have to find the best way to support them.

**Talking about partnerships, are there specific plans to expand this network?**

We already have a good network of partners, but we are open to new partnerships with institutions that share our values and mission.

Partnerships are always important to us, since our partners could add value to our operations through their technical expertise and their field presence. A wide and diverse partnership network also improves the opportunity for us to achieve greater impact and enhance our visibility.

**How would you relate the grant programme to the celebration of OFID’s 40th anniversary?**

With OFID choosing to dedicate this special anniversary to the plight of refugees, we have a unique opportunity to showcase the work done through our grant programme in this area, particularly in terms of emergency aid to people fleeing conflict, as well as support their longer-term needs, such as resettlement, whenever that is possible.

The current refugee crisis is one that the world cannot ignore. Anything we at OFID can do to highlight the need for global action, whether through advocacy or direct intervention, is a move that I fully support.
Forthcoming events

**Improved oil recovery conference**, April 9–13, 2016, Tulsa, OK, USA. Details: Society of Petroleum Engineers, PO Box 83386, Richardson, TX 75083-3863, USA. Tel: +1 972 95 23 93; fax: +1 972 95 29 435; e-mail: spedal@spe.org; website: www.spe.org.

**18th international conference and exhibition on liquefied natural gas**, April 11–15, 2016, Perth, Australia. Details: The Petroleum Economist Ltd, 69 Carter Lane, London EC4V 5EQ, UK. Tel: +44 207 77 98 800; fax: +44 207 77 98 899; e-mail: customerservice@petroleum-economist.com; website: www.spe.org.

**Tank world expo 2016**, April 12–13, 2016, Dubai, UAE. Details: Easifairs UK Ltd, 2nd Floor, Regal House, 70 London Road, Twickenham TW1 3QS, UK. Tel: +44 208 84 38 80 0; fax: +44 208 89 21 92 9; e-mail: uk@easifairs.com; website: www.easifairs.com/events_216/tank-world-expo-2016_79402.

**Global oil & gas Atyrau**, April 12–14, 2016, Atyrau, Kazakhstan. Details: ITE Group plc, Oil and Gas Division, 105 Salusbury Road, London NW6 6RG, UK. Tel: +44 20 79 59 65 233; fax: +44 207 59 65 106; e-mail: oilgas@ite-exhibitions.com; website: www.ite-exhibitions.com/Event-Management/ITECA/Global-Oil-Gas-Atyrau.aspx.

**International SAP conference for oil & gas 2016**, April 12–14, 2016, The Hague, The Netherlands. Details: T A Cook Consultants Ltd, 4th Floor, McLaren Building, A6 The Priory Queensway, Birmingham, B4 7LR, UK. Tel: +44 84 50 94 04 42; fax: +44 84 50 94 04 43; e-mail: info@tacook.com; website: http://uk.tacook.com/events/conferences/international-sap-conference-for-oil-and-gas.html.

**UNITI mineral oil technology congress 2016**, April 13–14, 2016, Stuttgart, Germany. Details: UNITI Mineralöltechnologie GmbH, Ms Carmen Fogel, Jägerstrasse 6, Berlin 10117, Germany. Tel: +49 30 75 54 14 40 0; fax: +49 30 75 54 14 47 4; e-mail: fogel@uniti.de; website: www.umtf.de/front_content.php?changelang=2.

**3rd international Congo oil & gas conference & exhibition**, April 14–16, 2016, Brazzaville, Congo. Details: AME Trade Ltd, Unit 408, United House, 39–41 North Rd, London N7 9DP, UK. Tel: +44 207 70 04 949; fax: +44 207 68 13 120; e-mail: trade@ame.trade.org; website: www.mozmec.com.

**FPSO roundtables 2016**, April 15, 2016, Singapore. Details: IQPC Ltd, Anchor House, 15–19 Britten Street, London SW3 3QL, UK. Tel: +44 207 36 89 300; fax: +44 207 36 89 301; e-mail: enquire@iqpc.co.uk; website: www.fpsodialogue.com.


**8th Mediterranean offshore conference & exhibition**, April 19–21, 2016, Alexandria, Egypt. Details: IES International Exhibition Services, 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@moc-egypt.com; website: www.moc-egypt.com.

**ARTC 19th annual meeting**, April 19–21, 2016, Kuala Lumpur, Malaysia. Details: Global Technology Forum, Highview House, Tattenham Crescent, Epsom Downs, Surrey KT18 5QJ, UK. Tel: +44 37 37 36 51 00; fax: +44 17 37 36 51 01; e-mail: events@gtforum.com; website: http://artc.events.gtforum.com.

**7th annual Ghana summit**, April 20–21, 2016, Accra, Ghana. Details: CWC Associates Ltd, Regent House, Oyster Wharf, 16–18 Lombard Road, London SW11 3RF, UK. Tel: +44 207 97 80 00; fax: +44 207 97 80 099; e-mail: sshelton@thecwgroup.com; website: www.thecwgroup.com; website: www.cwcghana.com.

**Middle East petroleum & gas week**, April 23–28, 2016, Abu Dhabi, UAE. Details: Conference Connection Administrators Pte Ltd, 105 Cecil Street #07–02, The Octagon, 069534 Singapore. Tel: +65 62 22 02 30; fax: +65 62 22 01 21; e-mail: info@connection.org; website: www.connection.org/conference/MPGC/2016/MPGCWeek.html.

**24th annual Middle East petroleum & gas conference**, April 24–26, 2016, Abu Dhabi, UAE. Details: Conference Connection Administrators Pte Ltd, 105 Cecil Street #07–02, The Octagon, 069534 Singapore. Tel: +65 62 22 02 30; fax: +65 62 22 01 21; e-mail: info@connection.org; website: www.connection.org; website: www.mpcc.cc.

**2nd annual Somalia oil, gas & mining summit 2016**, April 26–27, 2016, London, UK. Details: AME Trade Ltd – Africa and Middle East Trade Ltd, Unit 408, United House, 39–41 North Rd, London N7 9DP, UK. Tel: +44 207 70 04 949; fax: +44 207 68 13 120; e-mail: trade@ame.trade.org; website: www.solutions4africa.com.

**5th Mozambique mining, energy & oil & gas conference & exhibition**, April 27–28, 2016, Maputo, Mozambique. Details: AME Trade Ltd – Africa and Middle East Trade Ltd, Unit 408, United House, 39–41 North Rd, London N7 9DP, UK. Tel: +44 207 70 04 949; fax: +44 207 68 13 120; e-mail: trade@ame.trade.org; website: www.mozmec.com.

**9th annual sub-Saharan Africa oil & gas conference 2016**, April 27–28, 2016, Houston, TX, USA. Details: Energy & Corporate Africa, Headquarters, 10103 Fondren Road, Suite 321, Houston, TX 77096, USA. Tel: +1 713 27 17 778; fax: +1 713 27 17 773; e-mail: info@energycorporateafrica.com; website: www.energycorporateafrica.com.

**16th Annual CIS oil & gas summit 2016**, April 28–29, 2016, London, UK. Details: The Exchange Ltd, 5th Floor, 86 Hatton Garden, London EC1N 8QQ, UK. Tel: +44 207 06 71 80 0; fax: +44 207 24 22 673; e-mail: marketing@theenergyexchange.co.uk; website: http://cissummit.theenergyexchange.co.uk.

**Offshore technology conference**, May 2–5, 2016, Houston, TX, USA. Details: Society of Petroleum Engineers, 10777 Westheimer, Suite #335, Houston, TX 77042, Tel: +1 713 77 99 595; fax: +1 713 77 94 216; e-mail: spelou@spe.org; website: http://2016.otc.net/conference/ofcs/2016/ga_12.37761414.72 5780394.1385559793.

**Oilfield corrosion conference**, May 9–10, 2016, Aberdeen, UK. Details: Society of Petroleum Engineers, Part Third Floor East, Portland House, 4 Great Portland Street, London W1W 8QJ, UK. Tel: +44 207 299 3300; fax: +44 207 29 93 309; e-mail: spe@spe.org; website: www.spe.org/events/ofcs/2016.
Global economy set to improve this year, supporting oil demand

Despite ongoing challenges, the global economy is expected to improve in the current year, especially in countries where the gross domestic product (GDP) is more oil intensive, such as in the major emerging economies.

That is the view put forward by the OPEC Secretariat’s Monthly Oil Market Report (MOMR) for March.

And it observed that, given the current price trend, oil demand is likely to grow this year, broadly in line with the average of the last three years.

“Provided some of the existing upside potentials materialize, improving global economic growth can lead to higher oil demand later this year,” the MOMR’s feature article stated.

In offering an assessment of the global economy, the report said that after estimated global GDP growth in 2015 of 2.9 per cent, the global economy is forecast to grow by 3.1 per cent in the current year.

“The current 2016 growth forecast is somewhat below the initial figure of 3.4 per cent in July 2015,” it said.

The MOMR explained that major revisions to this number have just materialized in the past two months, when it became clearer that challenges in the emerging and developing economies are becoming more pronounced and that OECD economies are also dealing with an increasing number of issues.

While some upside potential exists, the growth risk remains skewed to the downside, it maintained.

“Increasing volatility in various asset markets, such as equities and crude oil, reflects the rising uncertainties about the future.

“This situation is also attracting short-term speculators and, as a result, price swings may become increasingly exaggerated and not reflect developments in the real economy,” it affirmed.

In the United States, said the report, labour market improvements have continued to support the economy. At the same time, industrial production has been affected by low oil prices, which has led not only to a declining value in output, but also to a significant cut in investments in the energy sector.

“The negative effect of the decline in output in the energy sector, in combination with the loss of some momentum in manufacturing and services, will weigh on growth numbers this year,” it asserted.

Meanwhile, said the MOMR, the Euro-zone has enjoyed a cyclical recovery, partly supported by the European Central Bank.

“However, the ongoing weakness in the banking sector, re-emerging deflation, continuing sovereign debt-related issues in Greece and the uncertain outcome of the upcoming Brexit referendum will weigh on the region this year.

“Together with the deceleration in domestic demand growth, this is likely to lead to slightly lower economic growth in the current year.”

The report noted that Japan has just recently reported negative GDP growth in the second and fourth quarters of 2015.

“Moreover, the economy is facing numerous issues, ranging from declining exports, the rising value of the Japanese yen to the US dollar, slowing domestic demand and low inflation. Hence, GDP is expected to rise only marginally in the current year.”

The report said that within emerging and developing countries, the growth trends are increasingly different.

Brazil and Russia are expected to see a second year of recession. Despite slowing momentum, China’s GDP growth is holding up relatively well, while India is expanding its growth level this year.

“For several developing countries, the significant slowdown in commodity prices has put a considerable strain on their economies. This will make it difficult for them to improve their economic growth substantially.

“The decline in global trade, partly due to sluggish demand from major economies for raw materials and products, as well as lower commodity prices in general, is particularly harmful to these economies, making it necessary to provide governmental-led support,” the MOMR stated.
The OPEC Reference Basket recovered in February for the first time in three months, gaining 8.4 per cent or $2.22 to reach $28.72/b. Crude oil futures were mixed, with ICE Brent ending up $1.60 to reach $33.53/b, while Nymex WTI fell by $1.16 to stand at $30.62/b. The Brent-WTI spread halted its narrowing trend, widening by $2.76 to $2.91/b.

World economic growth has been revised down for this year to 3.1 per cent, after estimated growth of 2.9 per cent in 2015. OECD growth in 2016 has been revised lower to 1.9 per cent, slightly below the 2.0 per cent seen in 2015. In the emerging economies, India and China are seen continuing to expand at a considerable pace of 7.5 per cent and 6.3 per cent, respectively. Brazil and Russia, however, are now forecast to see a larger-than-expected contraction in 2016.

World oil demand growth for 2015 stands at 1.54 million barrels/day to average 92.98m b/d, in line with the previous report. Global oil demand growth for 2016 also remains unchanged at around 1.25m b/d to average 94.23m b/d.

Non-OPEC oil supply growth for 2015 has been revised up by around 100,000 b/d to 1.42m b/d for an average of 57.09m b/d. This revision was mostly driven by upward adjustments to fourth quarter 2015 data in the OECD. In 2016, non-OPEC oil supply is forecast to contract by 700,000 b/d to average 56.39m b/d. Output of OPEC NGLs is expected to increase by 170,000 b/d this year, following growth of 150,000 b/d in 2015. In February, OPEC crude oil production, according to secondary sources, decreased by around 175,000 b/d to average 32.28m b/d.

Despite strong gasoline demand, the oversupply environment exerted pressure on the product market and caused margins to weaken in the Atlantic Basin. Meanwhile, in Asia, light distillates oversupply caused the gasoline and naphtha crack spreads to suffer a sharp fall. This, along with the continued weakening at the middle of the barrel, caused refinery margins to exhibit a sharp loss in the region.

Dirty tanker spot freight rates declined in February, with rates falling for almost all vessels on all reported routes. The drop was mainly due to limited activity and holidays in the East. The only exception was Aframax rates for Caribbean’s loadings, which were supported by bad weather conditions. The clean tanker market experienced the same general negative trend in February, as rates dropped both East and West of Suez by 14 per cent and 18 per cent, respectively.

OECD commercial oil stocks rose in January to stand at 3,023m b. At this level, inventories were around 328m b higher than the five-year average, with crude and products showing a surplus of around 244m b and 84m b, respectively. In days of forward cover, OECD commercial stocks stood at 65.3 days in January, some 6.8 days higher than the five-year average.

Demand for OPEC crude in 2015 is estimated to have averaged 29.7m b/d, following a downward revision of 100,000 b/d from the previous month’s report and broadly unchanged from the previous year. In 2016, demand for OPEC crude is expected to stand at 31.5m b/d, 100,000 b/d, lower than the previous month, and representing an increase of 1.8m b/d over the previous year.
**Table 1: OPEC Reference Basket spot crude prices**

<table>
<thead>
<tr>
<th>Crude/Member Country</th>
<th>2015</th>
<th>2016</th>
<th>Weeks 5–9/2016 (week ending)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Feb</td>
<td>Mar</td>
<td>Apr</td>
</tr>
<tr>
<td>Arab Light — Saudi Arabia</td>
<td>53.78</td>
<td>52.20</td>
<td>57.73</td>
</tr>
<tr>
<td>Basrah — Iraq</td>
<td>51.82</td>
<td>50.53</td>
<td>55.61</td>
</tr>
<tr>
<td>Bonny Light — Nigeria</td>
<td>58.46</td>
<td>56.75</td>
<td>60.65</td>
</tr>
<tr>
<td>Es Sider — Libya</td>
<td>56.83</td>
<td>54.78</td>
<td>58.40</td>
</tr>
<tr>
<td>Girassol — Angola</td>
<td>58.27</td>
<td>56.86</td>
<td>61.12</td>
</tr>
<tr>
<td>Iran Heavy — IR Iran</td>
<td>53.26</td>
<td>51.27</td>
<td>56.26</td>
</tr>
<tr>
<td>Kuwait Export — Kuwait</td>
<td>52.25</td>
<td>50.52</td>
<td>55.96</td>
</tr>
<tr>
<td>Marine — Qatar</td>
<td>55.38</td>
<td>54.27</td>
<td>58.51</td>
</tr>
<tr>
<td>Merey — Venezuela</td>
<td>48.41</td>
<td>45.79</td>
<td>49.49</td>
</tr>
<tr>
<td>Minas — Indonesia*</td>
<td>55.90</td>
<td>54.11</td>
<td>58.51</td>
</tr>
<tr>
<td>Murban — UAE</td>
<td>58.56</td>
<td>57.41</td>
<td>61.66</td>
</tr>
<tr>
<td>Oriente — Ecuador</td>
<td>47.00</td>
<td>45.79</td>
<td>52.73</td>
</tr>
<tr>
<td>Saharan Blend — Algeria</td>
<td>58.18</td>
<td>56.93</td>
<td>59.75</td>
</tr>
</tbody>
</table>

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).

* Indonesia suspended its OPEC Membership on December 31, 2008, but this was reactivated from January 1, 2016.

**Table 2: Selected spot crude prices**

<table>
<thead>
<tr>
<th>Crude/Member Country</th>
<th>2015</th>
<th>2016</th>
<th>Weeks 5–9/2016 (week ending)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Feb</td>
<td>Mar</td>
<td>Apr</td>
</tr>
<tr>
<td>Arab Heavy — Saudi Arabia</td>
<td>51.07</td>
<td>49.34</td>
<td>54.26</td>
</tr>
<tr>
<td>Brega — Libya</td>
<td>57.73</td>
<td>55.68</td>
<td>59.20</td>
</tr>
<tr>
<td>Brent — North Sea</td>
<td>58.13</td>
<td>55.93</td>
<td>59.50</td>
</tr>
<tr>
<td>Dubai — UAE</td>
<td>55.85</td>
<td>54.66</td>
<td>58.55</td>
</tr>
<tr>
<td>Ekofisk — North Sea</td>
<td>59.22</td>
<td>57.18</td>
<td>60.51</td>
</tr>
<tr>
<td>Iran Light — IR Iran</td>
<td>55.97</td>
<td>54.79</td>
<td>59.34</td>
</tr>
<tr>
<td>Isthmus — Mexico</td>
<td>52.68</td>
<td>51.41</td>
<td>59.10</td>
</tr>
<tr>
<td>Oman — Oman</td>
<td>56.58</td>
<td>55.12</td>
<td>58.66</td>
</tr>
<tr>
<td>Suez Mix — Egypt</td>
<td>54.70</td>
<td>52.05</td>
<td>57.07</td>
</tr>
<tr>
<td>Urals — Russia</td>
<td>57.81</td>
<td>55.07</td>
<td>59.70</td>
</tr>
<tr>
<td>WTI — North America</td>
<td>50.76</td>
<td>47.77</td>
<td>54.43</td>
</tr>
</tbody>
</table>

Sources: The netback values for TjL price calculations are taken from RVM, Platt’s, as of January 1, 2016, Argus, Secretariat’s assessments.
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).

Indonesia suspended its OPEC Membership on December 31, 2008, but this was reactivated from January 1, 2016.
### Table and Graph 3: North European market — spot barges, fob Rotterdam

<table>
<thead>
<tr>
<th></th>
<th>naptha</th>
<th>regular gasoline 50ppm</th>
<th>diesel ultra light</th>
<th>jet kero</th>
<th>fuel oil 1 per cent S</th>
<th>fuel oil 3.5 per cent S</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>55.35</td>
<td>73.71</td>
<td>75.02</td>
<td>75.70</td>
<td>47.05</td>
<td>47.79</td>
</tr>
<tr>
<td>March</td>
<td>55.65</td>
<td>77.62</td>
<td>71.77</td>
<td>71.93</td>
<td>45.35</td>
<td>46.07</td>
</tr>
<tr>
<td>April</td>
<td>57.96</td>
<td>82.31</td>
<td>74.21</td>
<td>73.97</td>
<td>49.20</td>
<td>49.64</td>
</tr>
<tr>
<td>May</td>
<td>60.76</td>
<td>87.70</td>
<td>79.16</td>
<td>78.67</td>
<td>52.57</td>
<td>53.41</td>
</tr>
<tr>
<td>June</td>
<td>59.34</td>
<td>93.68</td>
<td>76.37</td>
<td>76.99</td>
<td>50.32</td>
<td>51.12</td>
</tr>
<tr>
<td>July</td>
<td>52.04</td>
<td>90.50</td>
<td>68.59</td>
<td>68.18</td>
<td>44.59</td>
<td>45.30</td>
</tr>
<tr>
<td>August</td>
<td>44.38</td>
<td>77.52</td>
<td>60.66</td>
<td>60.18</td>
<td>35.24</td>
<td>35.80</td>
</tr>
<tr>
<td>September</td>
<td>45.30</td>
<td>70.72</td>
<td>61.41</td>
<td>61.35</td>
<td>33.88</td>
<td>34.41</td>
</tr>
<tr>
<td>October</td>
<td>47.36</td>
<td>66.73</td>
<td>59.23</td>
<td>59.68</td>
<td>33.89</td>
<td>34.43</td>
</tr>
<tr>
<td>November</td>
<td>46.13</td>
<td>65.27</td>
<td>57.06</td>
<td>56.78</td>
<td>30.20</td>
<td>30.68</td>
</tr>
<tr>
<td>December</td>
<td>42.67</td>
<td>58.79</td>
<td>45.68</td>
<td>47.54</td>
<td>22.40</td>
<td>22.59</td>
</tr>
<tr>
<td>January</td>
<td>35.13</td>
<td>53.41</td>
<td>38.11</td>
<td>39.21</td>
<td>19.85</td>
<td>15.08</td>
</tr>
<tr>
<td>February</td>
<td>32.32</td>
<td>49.48</td>
<td>40.41</td>
<td>41.48</td>
<td>21.45</td>
<td>17.91</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>naptha</th>
<th>premium gasoline 50ppm</th>
<th>diesel ultra light</th>
<th>jet kero</th>
<th>fuel oil 1 per cent S</th>
<th>fuel oil 3.5 per cent S</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>52.53</td>
<td>68.31</td>
<td>76.34</td>
<td>49.07</td>
<td>46.78</td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>52.55</td>
<td>73.37</td>
<td>73.42</td>
<td>47.87</td>
<td>46.03</td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>54.42</td>
<td>78.27</td>
<td>75.84</td>
<td>51.02</td>
<td>49.58</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>58.37</td>
<td>82.87</td>
<td>80.99</td>
<td>54.19</td>
<td>52.79</td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>56.05</td>
<td>86.19</td>
<td>78.19</td>
<td>51.87</td>
<td>51.46</td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>48.48</td>
<td>83.94</td>
<td>70.34</td>
<td>45.57</td>
<td>44.77</td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>42.33</td>
<td>70.26</td>
<td>62.21</td>
<td>36.31</td>
<td>35.76</td>
<td></td>
</tr>
<tr>
<td>September</td>
<td>43.00</td>
<td>63.02</td>
<td>63.34</td>
<td>34.49</td>
<td>34.26</td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>45.25</td>
<td>58.98</td>
<td>61.26</td>
<td>36.20</td>
<td>34.97</td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>44.06</td>
<td>58.77</td>
<td>57.28</td>
<td>32.83</td>
<td>30.02</td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>40.29</td>
<td>51.81</td>
<td>46.40</td>
<td>25.88</td>
<td>22.20</td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>33.42</td>
<td>47.01</td>
<td>39.48</td>
<td>21.22</td>
<td>18.35</td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>30.99</td>
<td>42.98</td>
<td>41.88</td>
<td>22.53</td>
<td>21.14</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* FOB barge spot prices.

Source: Platts. As of January 1, 2016, Argus. Prices are average of available days.

### Table and Graph 5: US East Coast market — spot cargoes, New York

<table>
<thead>
<tr>
<th></th>
<th>regular gasoline unleaded 87</th>
<th>gasoil*</th>
<th>jet kero*</th>
<th>fuel oil 0.3 per cent S</th>
<th>fuel oil 3.0 per cent S</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>67.86</td>
<td>78.66</td>
<td>77.29</td>
<td>66.91</td>
<td>50.22</td>
</tr>
<tr>
<td>March</td>
<td>69.59</td>
<td>68.35</td>
<td>72.79</td>
<td>60.93</td>
<td>46.65</td>
</tr>
<tr>
<td>April</td>
<td>75.99</td>
<td>72.65</td>
<td>74.67</td>
<td>61.66</td>
<td>49.04</td>
</tr>
<tr>
<td>May</td>
<td>82.00</td>
<td>76.98</td>
<td>80.00</td>
<td>61.89</td>
<td>53.03</td>
</tr>
<tr>
<td>June</td>
<td>84.60</td>
<td>74.07</td>
<td>75.76</td>
<td>59.69</td>
<td>51.51</td>
</tr>
<tr>
<td>July</td>
<td>78.66</td>
<td>64.91</td>
<td>67.53</td>
<td>52.31</td>
<td>44.07</td>
</tr>
<tr>
<td>August</td>
<td>68.26</td>
<td>58.40</td>
<td>60.76</td>
<td>44.45</td>
<td>36.44</td>
</tr>
<tr>
<td>September</td>
<td>61.40</td>
<td>59.78</td>
<td>61.60</td>
<td>43.40</td>
<td>35.77</td>
</tr>
<tr>
<td>October</td>
<td>58.62</td>
<td>58.73</td>
<td>60.94</td>
<td>46.36</td>
<td>35.64</td>
</tr>
<tr>
<td>November</td>
<td>58.51</td>
<td>55.08</td>
<td>59.07</td>
<td>45.01</td>
<td>33.12</td>
</tr>
<tr>
<td>December</td>
<td>53.68</td>
<td>43.89</td>
<td>49.31</td>
<td>35.65</td>
<td>24.09</td>
</tr>
<tr>
<td>January</td>
<td>46.88</td>
<td>39.14</td>
<td>40.13</td>
<td>32.01</td>
<td>20.16</td>
</tr>
<tr>
<td>February</td>
<td>42.59</td>
<td>39.48</td>
<td>43.03</td>
<td>32.46</td>
<td>20.20</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* FOB barge spot prices.

Source: Platts. As of January 1, 2016, Argus. Prices are average of available days.
Table and Graph 6: Singapore market — spot cargoes, fob

<table>
<thead>
<tr>
<th></th>
<th>naphtha</th>
<th>premium gasoline</th>
<th>premium gasoline</th>
<th>gasoil</th>
<th>jet kero</th>
<th>fuel oil 180 Cst</th>
<th>fuel oil 380 Cst</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>February</td>
<td>57.39</td>
<td>70.46</td>
<td>67.06</td>
<td>71.14</td>
<td>73.25</td>
<td>54.93</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>57.38</td>
<td>73.84</td>
<td>70.34</td>
<td>70.75</td>
<td>70.01</td>
<td>51.54</td>
</tr>
<tr>
<td></td>
<td>April</td>
<td>59.56</td>
<td>75.55</td>
<td>73.07</td>
<td>72.37</td>
<td>72.08</td>
<td>54.82</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>62.04</td>
<td>83.73</td>
<td>81.10</td>
<td>78.02</td>
<td>77.69</td>
<td>61.28</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>60.89</td>
<td>83.97</td>
<td>81.02</td>
<td>74.73</td>
<td>74.56</td>
<td>57.08</td>
</tr>
<tr>
<td></td>
<td>July</td>
<td>53.15</td>
<td>75.95</td>
<td>72.52</td>
<td>65.07</td>
<td>65.81</td>
<td>48.71</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>45.76</td>
<td>66.00</td>
<td>61.95</td>
<td>57.12</td>
<td>57.08</td>
<td>39.04</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>46.81</td>
<td>65.24</td>
<td>61.59</td>
<td>59.48</td>
<td>58.99</td>
<td>37.37</td>
</tr>
<tr>
<td></td>
<td>October</td>
<td>48.92</td>
<td>63.39</td>
<td>60.55</td>
<td>59.13</td>
<td>59.28</td>
<td>38.32</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>48.95</td>
<td>59.10</td>
<td>56.42</td>
<td>57.46</td>
<td>57.46</td>
<td>36.11</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>45.69</td>
<td>55.63</td>
<td>52.83</td>
<td>46.86</td>
<td>47.29</td>
<td>28.20</td>
</tr>
<tr>
<td></td>
<td>January</td>
<td>36.78</td>
<td>50.33</td>
<td>47.04</td>
<td>36.16</td>
<td>37.93</td>
<td>26.77</td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>33.97</td>
<td>44.33</td>
<td>41.29</td>
<td>38.51</td>
<td>40.98</td>
<td>25.92</td>
</tr>
</tbody>
</table>

2016

|       | February| 33.97            | 44.33            | 41.29  | 38.51    | 40.98           | 25.92           |

Table and Graph 7: Middle East Gulf market — spot cargoes, fob

<table>
<thead>
<tr>
<th></th>
<th>naphtha</th>
<th>gasoil</th>
<th>jet kero</th>
<th>fuel oil 180 Cst</th>
<th>fuel oil 380 Cst</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>February</td>
<td>54.88</td>
<td>68.55</td>
<td>70.81</td>
<td>50.49</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>54.22</td>
<td>67.74</td>
<td>67.18</td>
<td>47.63</td>
</tr>
<tr>
<td></td>
<td>April</td>
<td>56.96</td>
<td>69.66</td>
<td>69.51</td>
<td>51.01</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>59.89</td>
<td>75.15</td>
<td>74.98</td>
<td>57.06</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>58.06</td>
<td>71.44</td>
<td>71.45</td>
<td>51.98</td>
</tr>
<tr>
<td></td>
<td>July</td>
<td>50.09</td>
<td>61.29</td>
<td>62.23</td>
<td>44.31</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>43.45</td>
<td>53.64</td>
<td>53.79</td>
<td>35.34</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>45.55</td>
<td>56.93</td>
<td>56.60</td>
<td>34.36</td>
</tr>
<tr>
<td></td>
<td>October</td>
<td>48.00</td>
<td>57.13</td>
<td>57.40</td>
<td>35.30</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>47.58</td>
<td>55.40</td>
<td>55.51</td>
<td>32.63</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>43.62</td>
<td>44.42</td>
<td>45.39</td>
<td>24.35</td>
</tr>
<tr>
<td></td>
<td>January</td>
<td>34.96</td>
<td>33.85</td>
<td>35.75</td>
<td>20.87</td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>32.89</td>
<td>36.66</td>
<td>39.22</td>
<td>21.75</td>
</tr>
</tbody>
</table>

2016

|       | January | 34.96  | 33.85    | 35.75           | 20.87           |

Source: Platts. As of January 1, 2016, Argus. Prices are average of available days.