

The long-term role of crude oil in the global energy mix:

an interview with Dr. Carole Nakhlé

In the Middle East, discussions about energy tend to focus on the price of oil and the future of OPEC. That is hardly surprising given the dependence of so many of the region's biggest economies on revenues from oil exports, and the vulnerability that some of the region's importers have to high oil prices.

But the global energy market is much larger and more complex than the market for crude oil. In fact, crude oil accounts for only 30% of total energy consumption worldwide.

To understand how the global energy market is changing, and how these changes might affect the Middle East, *Arab Banker* spoke to Dr. Carole Nakhlé, the Founder of Crystol Energy and an advisor to governments and private sector companies on global energy trends.

ARAB BANKER: What long-term trends do you see in global energy usage, both looking back to the past, and forecasting what may happen in future?

DR. CAROLE NAKHLÉ: For most of the last 100 years, there was always one dominant fuel used as a source of energy: coal replaced biomass (mainly firewood), and then was itself replaced by oil. But since the first oil crisis in the early 1970s when oil became an expensive source of energy, several other sources have developed, such as gas, nuclear power and renewables, such as hydropower, biofuels, and solar and wind power.

We are currently living with a much more diverse energy mix than at any time in the past. Oil will continue to dominate the transport sector, and coal will remain important in China and India. Gas is becoming more plentiful, easier to use, and easier to trade. Oil, coal and gas

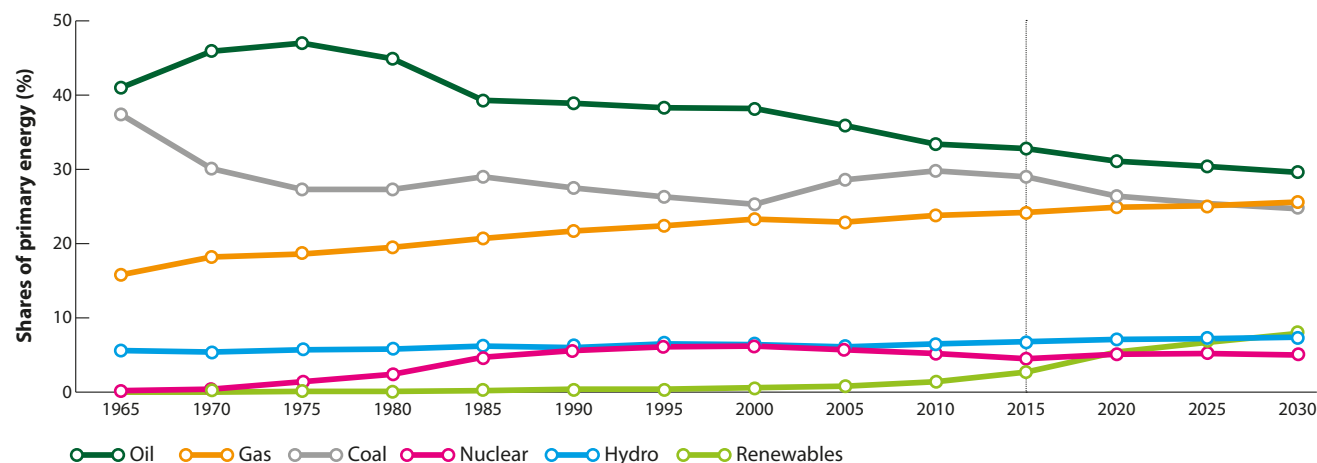
will likely have roughly equal shares of the global energy mix in the years ahead.

Nuclear energy's contribution is unlikely to play a major role as its expansion will be constrained by various economic, political, and environmental issues among others. Renewables, mainly solar and wind, will maintain their rapid growth but we should take into consideration that they are starting from a low base.

Why won't renewable energy have a bigger share, given all the attention that it is receiving these days?

There is a limit to how far you can expand hydroelectric power. Simply put, you can't block up every river in the world to build a dam. As for biofuels, there is a balance to be struck between using land and crops to create energy or using them to grow food. There is a choice, and in many countries, the

Shares of primary energy



Source: BP Statistical Review 2015, BP Energy Outlook 2016



Petrofac hosted a roundtable dinner for Women in Energy entitled 'Iran: Winners and Losers'. The dinner was held at London's Caledonian Club.

Providing access for Women in Energy

Women in Energy is a not-for-profit organisation founded by Carole Nakhlé in 2007 to encourage and help women to reach senior positions in the energy industry.

The group provides advice and networking opportunities for women working in the energy business. Its membership is diverse: it includes accomplished women and experienced professionals who hold senior positions in private sector firms or in the public sector and graduates keen to develop knowledge of global energy markets and extend the range of their personal contacts. The group publishes a regular newsletter and organises events for its members.

Women in Energy works closely with the Windsor Energy Group, a not-for-profit organisation chaired by Lord Howell of Guildford, that arranges high-level roundtables on current energy issues for both public and private sector executives.

The London firm MEC International acts as a Secretariat for Women in Energy and may be contacted at projects@meconsult.co.uk. More information on Women in Energy can be seen on the Crystol Energy website: www.crystolenergy.com

sensible choice will continue to be to grow crops for food not fuel.

As for other 'green' sources of energy, what we see is that every time the nuclear industry seems ready to take off, there is an accident: those at Chernobyl in 1986 and Fukushima in 2011 are the best known but there have been several other smaller nuclear accidents. Following these accidents, the commissioning of new nuclear power plants is delayed. Remember too that nuclear power plants have a limited life, so while some new plants are being commissioned, others are being de-commissioned, or are about to be de-commissioned – the net new availability of nuclear energy is therefore not substantial. So, I don't expect nuclear power to play a big role in the global energy mix at least in the two decades to come.

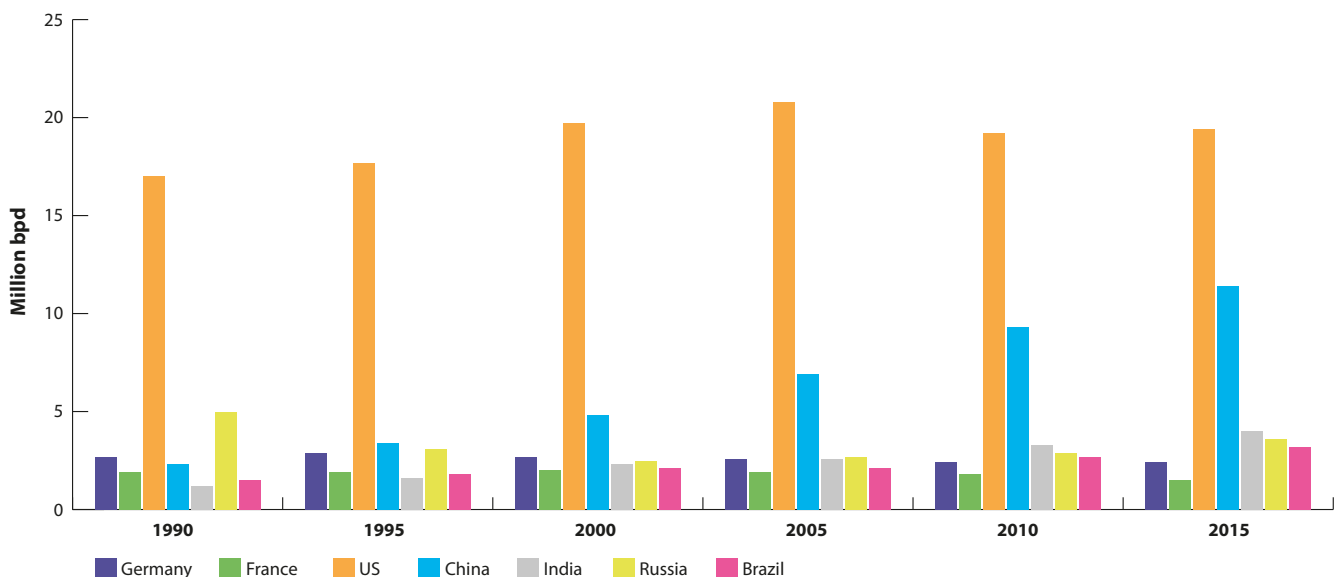
How will political pressures and the climate change agenda affect the types of energy we use over the long term?

Historically, we have focused on the price and availability of energy, whereas now we also need to consider the climate change agenda. Its impact will be gradual, but it will be important.

In June 2015, the G7 group of leading industrial nations agreed to end using fossil fuels by the end of this century. That is going to put downward pressure on the use of coal, oil and gas, regardless of their cost and availability.

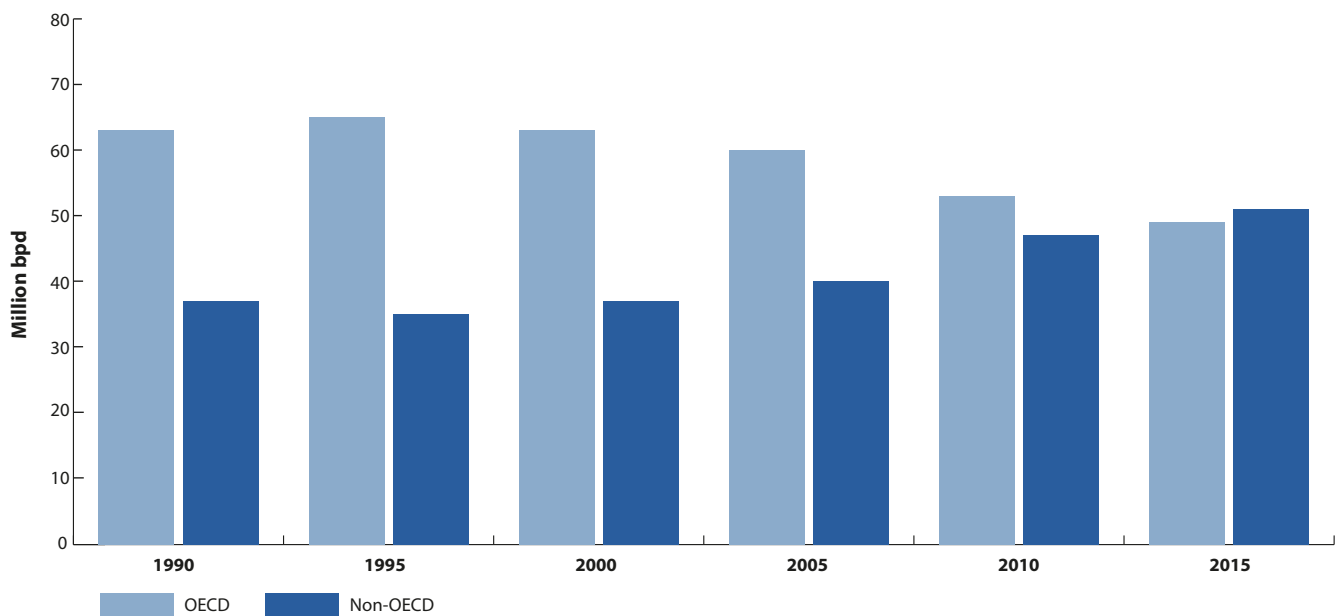
But we do need to keep a sense of proportion. For example, everyone is very excited about electric cars, and they certainly will become a significant feature on our roads. But the growth of electric cars is starting from a very low baseline, and of course ships and airplanes are going to continue using oil-based fuels for the foreseeable future.

Crude oil demand in major economies



Source: BP Statistical Review 2015, IEA May 2016 Monthly Report

Shares of primary energy demand



Source: BP Statistical Review 2015, IEA May 2016 Monthly Report

How is the gas market changing?

The percentage of gas that is traded remains low – around 30% of total supply. That percentage is increasing, with larger amounts of liquefied natural gas (LNG) linking various markets.

The way in which gas is bought and sold is very different from the way in which oil is traded. But currently the price of a significant proportion of traded gas remains linked to the price of oil. This system of indexation was developed in the early days of the development of the gas industry in the 1970s/80s when gas exporters needed a pricing mechanism that would make gas competitive with other existing fuels, mainly oil. But indexation no longer reflects the economic realities of either the gas market or the oil market. As a result, half of the gas market is always unhappy – they are either paying too much or receiving too little!

That is why LNG and gas is increasingly being traded 'spot' rather than through long-term contracts based on oil indexation.

Gas remains a fossil fuel. It may be a cleaner fossil fuel than coal or oil but it is still targeted by the G7 ambition to end fossil fuel usage by the end of the century.

Putting all that together, I see gas as a 'bridge fuel' that will be important as we transition from overwhelming dependence on coal and oil to greater reliance on renewable greener energy.

Which countries are going to be the main suppliers of global oil in the years ahead?

The big three oil suppliers are currently Russia, the US and Saudi Arabia. They are likely to remain so for the years ahead. But we should not discount other countries like Canada that continues to expand its oil output, and China.

Other countries and regions still surprise. Oil production from the North Sea, for instance, showed a reversal in decline for the first time in two decades. New fields continue to be discovered and developed. The Johan Sverdrup Field, discovered in 2010, is one of the five biggest

oilfields on the Norwegian continental shelf. Its production is expected to start in 2019 and extend well beyond 2050.

Venezuela has proven that the availability of resources in the ground does not dictate production levels or trends. Venezuela not Saudi Arabia has the largest proven oil reserves in the world. That is because the very heavy crude oil in the country's Orinoco Oil Belt was not previously considered commercial, but with the development in oilfield technology, such a heavy oil is now classed as 'conventional' oil. Yet, because of erratic government policies, Venezuela's oil production does not reflect its potential.

Isn't shale oil revolutionising the global energy supply market?

If you mean bringing in new suppliers – not really because shale production, which started first with gas then extended to oil, did not create any new oil producers; it simply expanded the capacity of existing producers and, in particular, arrested the decline in US oil production.

In terms of changing the existing oil order, yes – think of the stability in the oil price between 2010 and 2013 then the decline in summer 2014 and the implications on OPEC's strategy.

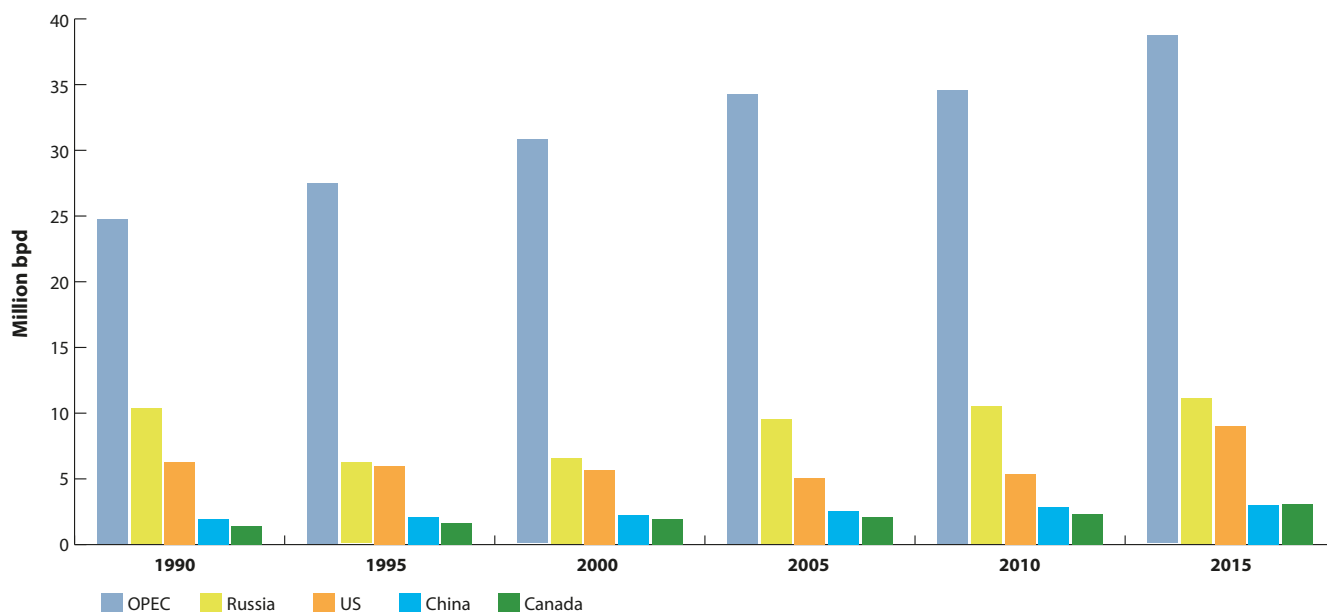
In the longer term, of course new shale producers are expected to emerge but perhaps not on the same scale or at least not at the same speed as in the US which has a unique combination of favourable above ground factors whether in terms of regulations, level of competition, availability of infrastructure or others.

What about the 'demand' side of global energy? How is that going to change in the decades ahead?

Developed countries remain major energy consumers – they consume nearly 50% of global crude oil supply – although their demand for energy is barely growing.

The rapid growth in energy demand is being driven by developing countries, and it will continue to be driven by them.

Largest crude oil producers, 1990–2015



Source: IEA Monthly Reports

China, of course, continues to use more and more energy even though its rate of economic growth is slowing: the economy is still growing, but at a slower rate than before, not surprisingly given the economic rebalancing. And China's energy mix is changing accordingly, with gas becoming increasingly popular.

India is the 'wild card' in global energy demand. India is expected to have a bigger population than China within the next few years and its demand for energy is going to be substantial, other things being equal. Some of the big questions are around India's energy efficiency. Industrial processes are now more efficient, so we shouldn't expect India's energy consumption to exactly replicate the Chinese energy consumption experience. Nonetheless, increasing energy demand from India will be one of the key factors driving global energy demand in the years ahead.

The US is much less dependent on the Middle East for its energy supplies than in the past. How do you think this is going to affect the way in which the US engages with the Middle East?

I don't subscribe to the view that because the US is less dependent on Middle East oil it is going to care less about what happens in the region. The oil market is global with prices based on global supply and demand so if, for example, there are significant supply disruptions in the Middle East these can translate into higher oil prices which in turn will affect the US economy, irrespective of how much oil the US is importing from Saudi Arabia or its neighbours.

Furthermore, look at the other, non-energy-related interests that the US has in the Middle East: its support for Israel, its fight against terrorism, and its recent diplomatic agreement with Iran, in addition to the investment of American companies in the region (in both oil and non-oil sectors). These issues will ensure that the Middle East remains important to US foreign policy interests.

Is OPEC still relevant to the oil market?

We can stop thinking about OPEC when oil ceases to be an important part of the global energy supply mix. Until then, what OPEC does will continue to matter, albeit of varying degrees.

Current low oil prices have caused problems for many OPEC members, but they have succeeded in shutting down a lot of shale oil production and some of the more expensive conventional oil exploration projects – and that is very much in line with OPEC's interests: to limit future non-OPEC supply growth.

Historically, OPEC has not typically acted in a coherent manner, but it has been able to act cohesively at times. For example, in 2008 it agreed and implemented two cuts in its members' oil production and succeeded not only in ending a sharp fall in prices but also in pushing them back up to around \$100/B. We certainly should not rule out the possibility that OPEC will act in a cohesive manner again in future. ■



Dr. Carole Nakhlé

Dr. Carole Nakhlé is the founder of Crystol Energy and an international expert in energy economics. She has worked for major oil and gas companies, such as ENI and Statoil, and for policy makers and international organisations.

She lectures in energy economics at the University of Surrey in the United Kingdom and has written for the Carnegie Middle East Centre and the Lebanese Centre for Policy Studies.

More information about Dr. Nakhlé and Crystol Energy is available at www.crystolenergy.com