

Friday 20 April 2018

Summary of Discussion

1. Energy market developments

China

China's thirst for energy has caused an increase in the country's CO2 emissions, which surpassed US emissions as of 2006. The Chinese authorities have repeatedly stressed their ongoing commitment to global efforts to reduce greenhouse gases, while the country is promoting energy efficiency and savings as a key component of the country's energy and environmental policy.

China's economic, energy and environmental policies are interlinked and one of the speakers believes that Chinese energy policy is pursuing three different mixes. The first mix covers fossil fuels and renewables. While fossil fuels will continue to dominate the Chinese energy mix, considerable efforts are being made to encourage investment in renewables.

The second mix is within the structure of renewables itself, with wind, solar, etc. China is now the world leader in solar PV and nuclear is receiving particular attention, resulting in its rapid growth. This is a mix of renewables, as opposed to relying on just one.

The third mix is based on the geographic diversification of import sources. China imports roughly 6% to 8% of its energy needs. Its crude imports, for example, are highly diversified and sourced from the Middle East, Russia, the United States, Latin America and Africa. The energy mix system has seen rapid growth in China.

In 2017, China's economic growth was 6.9%, with oil and gas demand rising by 3.5% and 17% respectively. Chinese gas demand growth (which was driven last year by industrial demand, followed by power generation), will continue to be in the double digits, due to the structural nature of industrial demand growth, with implications for both the LNG market and the Russian pipeline.

During the most recent session of the National People's Congress, discussions took place on the possible creation of a ministry of energy, but the government eventually decided to maintain the current structure, with the energy administration remaining part of the NDRC, while resources and environmental aspects were consolidated. One of the participants believes that China will play a much bigger and more important role in the global picture through what I call geo-economic changes, the One Belt One Road initiative.

China is reinforcing its role in the energy sector, having launched an International Energy Exchange for future contracts, but this is just a beginning. The country is also pushing the use of the Chinese yuan instead of the US dollar in oil pricing for supply to China. The Xinjiang region has the largest national petroleum reserves, at around 30 million tons of SPR and many

commercial refineries are currently under construction. China will use this national oil base as a pilot RMB-denominated area.

Oil markets

IEA expect an average annual growth rate of 1.2 million barrels a day (mb/d) of oil in 2018, starting at 1.5 early this year and expected to slow to 1 mb/d. China and India account for almost 50% of global growth. China's oil demand growth is slowing substantially, with gas and electricity taking up some of the growth in oil demand, while India's oil demand will continue to accelerate. China has already exceeded the US in terms of net imports of crude and this gap will widen further due to increased production by the US combined with increased imports by China. By 2023, India is projected to catch up with and overtake the US.

At the sectoral level, petrochemicals are expected to drive oil demand growth over the coming years, in particular in the US (mostly ethane-based petrochemical industry) and China (where naphtha is dominant as petrochemical feedstock). Ethane and naphtha account for 25% of global oil demand growth; US and China will be the dominant source of growth in petrochemicals.

The story of future oil supply is largely dominated by the US. Over the next three years until 2020, IEA expects US, Canada, Brazil and Norway to provide almost all demand growth, with US providing 80% of the total. Non-OPEC supply will grow by 5.2 mb/d, while OPEC growth will be about 1.2 mb/d, with Venezuela being the biggest concern.

The first big wave of US light tight oil growth (the shale revolution) from 2004 up until 2014 led to a price collapse and halted LTO growth. With prices up again, US tight oil started to grow again and is expected to show rapid growth over the coming six years, particularly in the first three. According to IEA, US output will grow by about 3.7 mb/d by 2023.

This robust and rapid growth in North America will bring with it the inevitable question of takeaway capacity. Will US infrastructure be sufficient to deliver the transport for such rapid growth? One of the speakers referred to IEA analysis on this issue in its Oil Market Report. According to this analysis, there will be a very difficult situation in Canada, while the obstacles will be fewer in the US, where the Agency expects a highly consistent build-up of pipeline capacity, leading to larger crude export capacity from the US (with Corpus Christi expected to be the largest oil export hub in the US).

The rapid increase in US light tight oil fits well with the market environment as there will be increasing demand for low-sulphur oil products (with the enforcement of IMO regulations in 2020), as well as huge demand growth in the Chinese petrochemicals sector.

At a global level, imports will increase, but despite this fascinating story of US production growth, the Middle East will continue to be the largest net exporter of crude oil by far, sending out more than 20 mb/d and covering the vast majority of Asian import demand needs. However, in the Middle East, production growth alone will not be able to cover the increase in Asian demand, which will also be met by the import of crude oil from other regions.

In the downstream, considerable growth in refinery capacity is expected over the coming years in the Middle East. This will be faster than China or India and will therefore change how oil is traded over the coming years.

When talking about demand growth, a factor that should be borne in mind is the depletion of oil fields, which represents more than 3 mb/d per year, equivalent to the size of the entire North Sea, making investment in the upstream sector a must. But the trend is worrisome; upstream

spending decreased drastically in 2015 and 2016 and 2017 was almost flat, while only modest growth in upstream spending is expected in 2018. The concern is not only about the size of upstream investments, but also about the destination of such investments; indeed, a large amount of upstream spending is focused on short-cycle projects, mostly in US light tight oil, so that could be a concern over the coming years, particularly if demand continues to grow solidly.

OECD stocks, the matrix for OPEC and non-OPEC production agreements, were low, at about 30 million barrels at the end of February (with the balance of oil products actually in deficit). The compliance rate of OPEC countries is 163% and the assumption is that excess stocks must have run dry. So, what happens next? This means that OPEC is producing a lot less than OPEC, in spite of very robust growth from the United States. If this continues, we expect to see destocking of more than 0.5 mb/d over the rest of the year. It is against this backdrop that OPEC will discuss how to proceed with the production cost agreement at its June meeting.

European Gas Markets

Providing more than 30% of European gas supply, Gazprom is the world's largest gas company and its leading gas storage operator. It is also the biggest transporter at the global level (China being second). Unlike the unbundled system in place in Europe, Gazprom operations are bundled.

Gazprom has the ability to modulate gas supply volumes to the market and is therefore also able to control price movements in either direction. We are used to this in the oil market with OPEC but may not want to see the same in the European gas market. Looking forward, such a strategy could be implemented by Gazprom this summer. It can either flood the market, reduce prices and thereby postpone further LNG plants going ahead, or it can, as we have seen so far, limit its gas supplies, enjoy higher prices and thus allow new FIDs to go ahead.

One of the speakers argued that gas markets actually work quite well, and have been able to solve most of the problems with only a few gas issues occurring over the last two years. Markets do need however to be regulated, and regulation should be thought of as part of the system. Thus far, markets work but are not universally viewed as competitive. Lack of competition is the main issue and source of risk.

2. Middle East

Saudi Arabia

The Saudi energy mix is heavily reliant on oil, and is one of the few energy mixes in the world that is relatively undiversified.

Electricity consumption is driving Saudi energy demand and gas is increasingly used for power generation, Saudi Arabia being one of the largest gas producers in the world with some 100 bcm extracted per year. Gas powered capacity is 51 gigawatts, with oil accounting for the remainder, highlighting the huge potential for diversification of the Kingdom's power generation mix. While many countries are aiming to reduce the share of oil used in power generation to meet CO2 emissions reduction targets, in the case of Saudi Arabia this is not necessarily driven by climate considerations (the Kingdom has not ratified the Paris agreement), but rather by the desire to free-up more oil for export.

To extend the diversification of its domestic electricity sector mix, Saudi Arabia may wish to further increase its gas generation capacity, which would force the Kingdom to contemplate gas imports¹, raising an energy security concern. One way to address such a concern is to develop nuclear power as part of the Kingdom's future domestic electricity supply, as other countries have done previously. Throughout the load curve, the baseload would be nuclear, while the flexibility to meet increased demand in summer will still probably come from gas and, to a lesser extent, from oil. Saudi Arabia is planning to build some 16 reactors by 2040, at an estimated cost of USD 100 billion. The kingdom is also looking to deploy solar energy on a larger scale. The Kingdom's currently installed solar energy capacity is just 35 megawatts, an infinitesimal amount for a country that is blessed by consistent sunlight. SoftBank, a Japanese bank, plans to invest USD 200 billion into Saudi Arabia's electricity sector in order to install 200 gigawatts of solar and concentrated solar capacity.

Nuclear development raises a financial challenge given the magnitude of investment announced, at a time when oil rent and GDP have been decreasing. There is of course the long-awaited Aramco IPO, and the public investment fund that can contribute to the financial effort required, but the Kingdom will also need to reduce the amount of energy subsidy it absorbs; around USD 40 billion per year.

For the Kingdom, the path followed by UAE is quite an interesting example as they are investing in nuclear power plants while investing massively in large CSPs; one of the biggest in the world, which would produce electricity that can be stored for three to four hours past the peak for around \$73 per megawatt hour. According to IRENA, there is huge untapped renewable potential in the region and obviously nuclear will compete with CSP in Saudi Arabia to a large extent.

On the theme of energy consumption in Saudi Arabia, the Kingdom is probably one of the few countries in the world where the potential for energy efficiency is very high, and quick and tangible results could be achieved if a very serious energy efficiency strategy is implemented.

The planned changes to the Saudi energy mix are part of the new reform programme and Vision 2030, and there is therefore a need to analyse what we can expect in the future from the economic transformation of Saudi Arabia.

There is a need to unpack what is happening in Saudi Arabia into different components in order to gauge the chance that this economic transformation programme has of succeeding. The different components are 1) diversification that leverages oil and other minerals, 2) financial diversification, 3) leverage expenditure, 4) territorial diversification, 5) 'promotion' of the private sector, 6) international orientation and 7) labour issues.

1) The diversification into industry, both downstream and upstream of oil has been happening for a long time, having been the basis of the Saudi strategy for economic development since the 1970s and the beginning of the period of the five-year development plans. This strategy has accelerated since the beginning of the 2000s with Saudi Aramco integrating downstream and is now growing exponentially to cover increasingly important projects (Sadara, the joint venture with Dow Chemical, PetroRabigh, etc.). Saudi Aramco and SABIC are jointly investing in new technology to convert directly from oil to petrochemicals, and both companies are investing abroad, in the United States and in Asia. SABIC is also making significant investments in Europe.

¹ Saudi Arabia doesn't import natural gas at present.

The IKTVA (in-kingdom total value added), a new programme launched by Saudi Aramco pushing investors to provide services and tools for the oil industry in the kingdom, has so far been very successful and has attracted considerable investment. Outside the hydrocarbon sector, Saudi mining company Ma'aden is implementing two large projects (phosphates and bauxite aluminium) and other projects in other minerals.

2) The second component is financial diversification, with the creation of a large sovereign fund. An existing entity, the Public Investment Fund, has been mandated to transform itself into the sovereign wealth fund, managing all state holdings and ownership of assets in the economy, including Saudi Aramco. With this capitalization, the PIF will be able to borrow and leverage its existing assets and invest in other assets, thus pursuing a strategy of portfolio diversification. As a consequence, government revenues will depend less and less on oil and progressively more on income from investments.

3) The third component is leveraging expenditure, using the purchasing power of the Saudi economy to attract more investment.

The first example is tourism with its three different segments; a) religious tourism, b) domestic tourism (more entertainment, parks, etc.) to attract nationals to go on holiday (and spend) at home rather than going abroad, 3) foreign tourists, who are likely to remain a minority, although they are emphasised in some territorial diversification projects.

Another avenue for local content development could come from the linking of the solar energy deployment planned in the Kingdom to the local production of photovoltaic panels.

4) Then there is territorial diversification. The city of NEOM is probably the best example to use to illustrate this aspect. Saudi Arabia is very much concentrated along its central axis (Jeddah, Riyadh and Dhahran) and a location like NEOM (northwest of the country) provides access to huge and very significant market.

5) With regard to the promotion of the private sector, its role appears to be almost exclusively viewed as an investor in projects promoted by the government. As of today, none of the announced privatisations (catering services of Saudi Arabia, various airport activities) are being pursued. And any sign of the private sector taking on the role of entrepreneur and not simply financial investor, is not happening.

6) Then there is a strong international focus, seeking close integration with foreign companies, most of which are American. This is done through equity acquisition by the PIF, which has invested in the likes of Uber, through partnership of foreign companies with Saudi state-owned companies.

7) The other component of the Saudi economic transformation is employment opportunities, for women in particular. This marks a significant shift and has the potential to dramatically change the picture. However, the previously mentioned industrial and financial diversification cannot be expected to create many opportunities for young Saudis, and there has not been any organic or convincing policy on expatriate labour.

Opinions are divided on whether or not this combination of policies will succeed and to what extent. It is clear, however, that the political climate in the region is highly problematic for Saudi Arabia, with recent developments in Yemen and Syria, the rift with Qatar, and may even pose a major threat.

3. Oil and gas industry: responding to structural shifts and environmental challenges

The session looked at the transformational strategies being deployed by National Oil Companies, with the example of ADNOC and Chinese companies.

ADNOC

The ADNOC transformation is fairly ambitious, with significant efforts to rationalise costs and optimise production. Historically, ADNOC was a conglomerate of some 18 different companies, all very different entities with very different structures and partnerships. These were run with significant technical support from partner investors in the concession.

Following the drop in oil prices, ADNOC embarked on a transformation, moving from a house of 18 different brands to what would be known as a branded house, a single corporate entity. Names of the entities (the ADCOs, the ADMAs, the ZADCO and so) are disappearing, to be replaced by ADNOC Onshore, ADNOC Offshore and so on. That is from the branding standpoint, but to summarise, today ADNOC produces about 3 million barrels per day and about 920,000 barrels a day of refining capacity. The Borouge field processes about 4.5 million tons of polyolefins per year and the country aims to triple petrochemical production by 2025 to 25 million tons per year, making Ruwais the largest integrated refining and chemical site in the world.

The strategy is currently structured around three axes; 1) a more profitable upstream with a significant effort to streamline costs, 2) a more valuable downstream, and 3) a more sustainable and economic gas supply (gas imports from Qatar via the Dolphin pipeline are not considered to be sustainable due to recent political developments).

The 2030 strategy that has been presented over the last couple of years offers smart growth both upstream and downstream. Market access and linkages with countries with growing demand have been among the drivers behind the redistribution of concessions in 2017 (mainly onshore) and 2018 (mainly offshore).

Developing internal talent and in-country value, and conducting the country's digital transformation are among UAE's key initiatives. The entire UAE is undergoing this digital transformation and it is the only country in the world to have appointed a minister for artificial intelligence.

For the first time, ADNOC has announced the Capex programme for the next five years, some 400 billion dirhams, or around USD 109 billion. The company has also announced a new strategy for partnerships through which integrated services are provided. Other areas for partnership are storage, pipelines and refining.

ADNOC is also rethinking its financing strategy, finding smarter ways of financing, and then managing the whole portfolio of assets and capital to lock and maximise value.

Upstream, six blocks have recently been offered for exploration. Oil production capacity by the end of the year will increase from 3 million to 3.5 million barrels per day in terms of capacity. ADNOC has also announced unconventional gas resources that could expand gas production and therefore enhance gas self-sufficiency. Regarding on-tap gas resources, ADNOC is also looking at going into sour gas while finding a smarter way to manage sulphur and sell it in the markets.

A special vehicle, called ADNOC International, will be looking at partnerships outside of UAE, with the understanding that ADNOC will not go into upstream outside of UAE, a segment in which Mubadala, one of the sovereign investment funds of UAE, is involved, with investments in companies such as OMV, Cepsa, etc. However, ADNOC would be going into the refining and downstream sectors.

The first IPO within ADNOC Distribution in the retail sector (10% of total capital) was launched last year on the Abu Dhabi market ADX, the largest IPO in ADX of the last 10 years. It generated approximately USD 1 billion in income from the shares, with the caveat that ADNOC will always remain 100% government-owned.

Chinese oil companies

The Chinese NOCs have experienced some difficulties in the past. The CNPC leadership team was changed wholesale as part of anti-corruption measures, leading to the company's absence from the international picture for almost the last five years. However, the giant is likely to awaken as of next year,

CNOOC acquired Nexen, a Canadian oil company developing energy resources in the UK North Sea, offshore in West Africa, the United States and Western Canada. The acquisition was criticised, but CNOOC saw the move as a good deal as the acquisition was made using mostly cash (around \$10 billion of a total \$17 billion).

A number of non-NOC companies have entered the picture, such as the Beijing Gas Group, which bought into VCMG in Russia two years ago, in a deal paying USD 1.1 billion for 20% of the oil field, with very good results. Chinese energy company CFC also bought into blocks in UAE and Abu Dhabi together with CNPC. The company also announced the acquisition of a 14.2% stake in Rosneft.

There was also expression of doubts on the potential development of unconventional gas in China, arguing that the conditions that made shale gas a success story in the US are far from being met in China. Indeed, operations are far more difficult to handle in China due to regional landscapes (mountains, small villages and forests, water availability and transport, etc.). The oil and gas shale cost reductions that were possible in US will therefore be difficult to implement in China, where shale gas, even if it is extracted, will not be economically competitive, and for that reason more gas imports from Russia and from Central Asia will be required to meet Chinese gas demand.

Looking at spending in research and development among the major companies, CNPC features among the top spenders. CNPC's technology centre is highly advanced and, according to one of the speakers, the rest of the world grossly underestimates Chinese capabilities. One of the speakers highlighted the talents of CNPC's leadership, while lamenting that its full potential is being constrained by government-imposed management controls.

The Paris Energy Club is a biannual forum of energy experts, from the energy industry, governments, international organizations, financial institutions and consultancy firms, who engage in in-depth discussion on current energy-related issues. Discussions held during the Club's meetings are conducted under the Chatham House Rule. Views expressed by participants of the meeting do not necessarily represent the opinions of the organizers.