Paris Energy Club

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A summary of remarks

Session 1 - The transportation sector – the future of transportation fuels

The transportation sector - across all transport modes - remains largely dominated by oil with road vehicles continuing to be powered almost exclusively by internal-combustion engines (ICEs) fueled by petroleum products. However, signs of changes are ubiquitous – from continuing improvement in fleet-wide fuel economy, to alternative fuels, to rapidly evolving technology for electric cars. In the latter field, while long-range electric vehicles and plug-in hybrids remain very much in play, the smart car market is growing rapidly, with the extraordinary emergence of Tesla having the most serious impact on traditional automotive. Progress is expected to be even more spectacular when looking at the way digital technologies will drive mobility in the future. There are already examples of innovation such as the one supported by the so-called GAFA (Google, Apple, Facebook, Amazon) that are making their mark on the way people travel, particularly in urban cities. Despite the huge uncertainties associated with disruptive technologies and innovation industries, the potential threat to oil is real and could be far-reaching.

Total demand of energy for transportation is 2400 Mtoe (million tons of oil equivalent). 92 % of demand is met by oil products. The annual growth in the demand for oil transportation fuels was (from 1980 to 2013) Diesel oil: 3.3 %; Gasoline: 1.4 %; Kerosene: 1.4 %; Others: 0.7 %.

The determinants of transportation demand are: population, income, the impact of oil substitutes, oil demand and motorization. The rapid growth of vehicle fleets in developing and transition countries is of course the main factor in the rising demand for motor fuels. The total number of vehicle fleets will multiply by a factor of 2 or 3 in the next 40 years.

Standards: Improvements in consumption standards have a large impact on consumption units. In the US, the average fuel economy standard will be 35.5 mpg (6.5 l/100 km) in 2016, close to the average for new car in Europe in 2006. In Europe, reaching the standard set for 2020 (95 g CO_2/km) is a real technical challenge.

Gasoline-fueled engines will improve slightly in the future with:

- New combustion processes (direct injection, lean burn engines, CAI)
- Downsizing and/or cylinder deactivation
- Variable compression ratio (VCR)
- Variable valve train (VTT)

Diesel-fueled engines will improve slightly in the future with:

- New combustion processes (HCCI, very high pressure injection)
- Variable compression ratio (VCR)
- Variable valve train (VVT)

After-treatment will reduce pollutant emissions with new technologies:

- Particulate filter
- Oxidation catalyst improvement
- Selective catalyst reduction of NOx-adsorber.

Alternative solutions to combustion engines are under development: dedicated engines (Natural Gas Vehicles, Di Methyl Ether, Hydrogen), electric vehicles (Batteries, Fuel cells).

Hybrid vehicles are also under development of course. Unit consumption is as follows:
Hybrid VS Gasoline -35 % on average (- 25 to 50 %)
Hybrid VS Diesel-20 % on average (- 17 to 34 %).

The targets are to stabilize carbon emissions from 2020 and to halve emissions by 2050 compared to 2005.

Session 2 - The new geopolitics of energy

This has emerged in the wake of the dramatic shift in energy investment and trade of recent years with a consequent reshaping of international politics. The question was discussed as to whether or not OPEC (and Saudi Arabia) can regain their role as global swing producers in the face of shale oil's incremental economics, lean structure and flexible business model.

2.1 - Situation in Southern Europe, Russia and Central Asia

Focus shifted to the complex dynamics in Eurasia. "East of Baku", China and Russia are calling the shots and wondering what the Western world could do to balance Beijing and Moscow, hopefully through win-win propositions to reduce geopolitical tensions.

The relationship between Europe and Russia is of course deeply affected by the Ukrainian conflict. The European natural gas market is in a state of deep and protracted depression. Russian gas plays a significant role in the EU gas market (30%) while EU provides +40% of Russian gas revenues. A break-off would benefit almost everyone (such as the US, China, the Gulf States), except Russia and EU. Facing lower prices and economic/financial sanctions, Russia has no investment capabilities to maintain a Europe-oriented power margin.

Turkish stream

Russia to China

Russia to China: Central Asia will play a key role in the supply of hydrocarbons to China … There will be a "Pan-Asian global energy bridge" from the Persian Gulf to China. Kazakhstan, Turkmenistan and Uzbekistan are very important for China's energy security. China to reduce dependence on ME oil, avoid "Malacca Dilemma" and address Xinjiang's unrest.
Kazakhstan and Uzbekistan's uranium deposits for China's 30 new nuclear power plants.

A showdown between Moscow and Beijing over Central Asia?

Some of Eurasian energy projects

- China's energy "Silk Road" over Central Asia
- $45 bn Southern Gas Corridor by 2018
- Russia's "Turkish Stream" project
- Iraq's Kurdish gas from early 2018
- Iran is back in the oil and gas game
- East Mediterranean's geopolitics and gas
- Turkmen gas to the Caspian and Afghanistan
- EU's Energy Union
- Turkey as an energy bridge

Key messages for the Southern European, Central Asia area

- The game, players and rules have changed.
- Energy security of Eurasia from Lisbon to Shanghai requires new approaches or serious adaptation of the old ones
- A potential security and economic crisis in the making
- Volatility not only in prices but also in social security
- More western attention to balance Beijing and Moscow
- Keep investors happy as there are many other new attractive destinations
- Develop win-win propositions for all in order to reduce geopolitical tensions.

2.2 – Situation in China

President Xi's "One Belt One Road" strategy – probably one of China's most important foreign policy initiatives – and its declared ambition of contributing to the development of China and the rest of the world in the areas of energy, trade and culture are important. The energy security implications of the initiative (the energy connectivity along both the Silk Road Economic Belt One and the 21st century Maritime Silk Road call for major investments in energy infrastructure), could lead to a more assertive role of China in global energy security.

The discussion moved to China under a number of headings: Political, Economic, Civilian, Military.
The dominant issues in China are now more political than economic. Anti-corruption is the key and the struggle against corruption intensifies. Political China still outweighs Economic China.

China in 2014. China's GDP in 2014 is Rmb63.64 Trillion; it is above US$10 Trillion for the first time (using official exchange rate); GDP growth is at 7.4%, the lowest in China since 1990; but still the highest among major economies in the world.

China's foreign direct investment is as follows:

- Outbound FDI: US$140 Billion
- Inbound FDI: US$120 Billion
- Net Outbound FDI: US$20 Billion

China is becoming a net exporter of FDI for the first time in modern history.

Chinese travelers going abroad: 110 million travelers.

The New Normal. What is the New Normal? Is it mainly the slowing down of the GDP growth rate, e.g. the new 2015 target of 7%? Or does it involve a new growth model of China? Does it involve continued reform both in the political and economic spheres? Is it a pre-determined paradigm, or is it an evolving concept, ever ready to embrace new elements whenever they come along? Is it a reactive, crisis management tool, or is it a pro-active, self-initiated new strategy?

We discovered the 4 Comprehensives:

- Comprehensively building a moderately prosperous country
- Comprehensively deepening reform
- Comprehensively promoting the rule of law in the country
- Comprehensively ruling the party on strict principles

What will happen in China in 2015? Probably Xi Jinping will consolidate his power in the army, in the party and in the government. He will probably become a paramount leader, maybe a real emperor. Xi Jinping had an official visit in May in Russia and will visit the US and the UN in September. The celebration of the 70th anniversary of the victories of the Second World War is likely to be marked by a huge military parade on 3 September 2015.

The "One Belt" and "One Road" are becoming familiar terms. One Belt is the Silk Road economic belt (overland road). One Road is the new 21st Century Maritime Silk Road. Their development is enabling stronger links to be forged with neighboring states - 53 countries (or more) along the One Belt and One Road.

New financial institutions have been set up to promote its success: the Asian Infrastructure Investment bank (AIIB); the Silk Road Fund; the China-ASEAN Fund; the BRICS Development Bank; etc.
Regarding AIIB, China has singled-handedly lined up 57 countries to join the bank, despite strong opposition by the USA. All ten ASEAN countries are members as well as many other Asian and European countries, including all the Western European countries and all the Nordic countries. Egypt, South Africa and Brazil also joined as well as 4 of the G-7 countries, including UK, Germany, France and Italy. The major exceptions are USA, Japan, Canada, but Japan and Canada are expected to join before end of June) and at the last minute, the USA sent a presidential envoy (Treasury Secretary Jacob Lew) to Beijing and changed from "opposition" to "cooperation" with AIIB.

The formal launch of AIIB should take place before the end of 2015. The total registered capital of AIIB stands at US$100 Billion. AIIB is focused on infrastructure and connectivity in Asia, within the energy sector among others.

As commented, the transition from traditional China to global China needs: high-speed railways; infrastructure, connectivity. The new Global China will diversify and reinforce its relations with a number of areas: the Middle East, Africa, Latin America, OECD countries. China needs to grow its FDI with more Chinese tourists and more Chinese students abroad

As a sign of the new power of China, in April Chinese naval ships evacuated 571 Chinese nationals and 233 foreign nationals (from Canada, Egypt, Ethiopia, Germany, India, Ireland, Italy, Poland, Pakistan (171), Romania, Singapore, UK and Yemen) from Yemen to Djibouti.

What will happen in China in 2015? Political China still trumps Economic China. The anti-corruption campaign is intensifying in the army and in State-owned companies and may affect Shanghai and other key regions. There will be a final assault on the remnants of resistance or non-cooperation in various circles of power. The New "Emperor" is pushing beyond the point of no return in terms of consolidating his control of the military, the party, the government and State-owned companies. There will be the military parade on 3 September 2015 to celebrate the 70th anniversary of the Victory in the War of Resistance against Japanese aggression (and Victory in the Second World War in general). The New Normal will remain the mantra on the economic front, resulting in GDP growth hovering around 7%. 2015 will be a year of major transition in China.

After 2015 there will be a transition from "Political China" to "Economic China". The Chinese economy will find itself a new direction and will put less emphasis on the "New Normal".

There could be

- Education reform
- Healthcare reform
- Better handling of environmental challenges
- Increasing productivity and efficiency as a result of fast-improving infrastructure and connectivity

Innovation and creativity will become more important. There will be a shift from Made-in-China to Designed-in-China. The internet revolution will continues to transform China in multiple ways.

China will move to be the center of the world. China will probably be the largest economy in the world and could become… the leading champion of free trade. Rmb will become a global reserve currency and there will be a rebalancing of power between China and USA.

The USA may export oil and gas to China. The first shipment of LNG may be on its way to China.

China in 2021: the First Centennial (the founding of CPC). China in 2049: the Second Centennial (the founding of PRC).

Implications for Global O&G

- Energy will become more strategic and geopolitical;
- China emerges as a net winner (relative to either the US or Russia);
- Russia will go east, and more so in the future;
- China will provide a major stabilizing effect in the global energy sector, providing long-term, widespread, steady and increasing demand for O&G;
- Politics and geopolitics aside, major O&G producing countries will work on their own behalf to corner demand from China.

Energy Highlights in 2014

- Total Energy Consumption: 3.85 Billion tons of standard coal (y.o.y. increase of 2.7%)
- Crude Oil
  - Total consumption: 518 Million tons
  - Y.o.Y increase: 2.8% (w/o considering increase in oil reserves)
  - Total net import: 308 Million tons
  - Dependence on import: 59.5%
  - As a percentage of the total energy consumption: 18.5%
- Natural Gas
  - Total consumption: 180 Billion cubic meters
  - Y.o.Y increase: 7.4%
  - Total net import: 59 Billion cubic meters
  - Dependence on import: 32.2%
  - As a percentage of the total energy consumption: 6.3%
- Coal
  - Total consumption: 24.6 Billion tons
  - Y.o.Y increase: -0.5% (first decrease since 2000)

- Pipelines
  - China-Kazak oil pipelines: 30 Million tons
  - China-Central Asia gas pipelines: 30 Billion cubic meters
  - China-Russia oil pipelines (East): 15 Million tons
  - China-Myanmar oil pipelines: 22 Million tons
  - China Myanmar gas pipelines: 12 Billion cubic meters
  - China-Russia gas pipelines (West): planned at 30 Billion cubic meters
  - China-Russia gas pipelines (East): planned at 38 Billion cubic meters
  - etc.

Price of Oil

- The Sweet Side
  - A drop in oil price by each US dollar means a saving of US$2.1 Billion
  - A drop in oil price by US$50 would mean a saving of US$105 Billion
- The Bitter Side
  - Much of China's imported oil is the equity oil from Chinese investment in various oil projects abroad. Their revenue and profits suffer accordingly
  - Most of the Chinese investments in major oil projects in recent years are now out of money
  - A damper on Chinese eagerness for investment in overseas oil projects?

Some conclusions about China: Being Philosophical about Oil Prices

- You have to be philosophical about the price of oil
- If you cannot control the oil price, you have to go along with it
- Securing availability of oil is more important than guessing at the price of oil
- Ironically, China's strength and as well as fragility as far as oil is concerned is that it has the largest demand for oil
- Oil is long-term. The short-term volatility of oil price will be offset by the long-term supply and demand considerations
- Oil should be a commodity, not a geopolitical or ideological weapon.

Session 3 – The impact of low oil prices on the industry.

We then focused on how Big Oil is coping with the price collapse. In past depressed oil market environments, IOCs bought their way out of trouble through mergers. Until recently this was considered unlikely to happen again on the grounds that the last such mergers – at the end of the 1990s and early 2000s – failed to create new opportunities for long-term growth. But Shell's just-announced acquisition of BG has come as no surprise to the better informed. In any case, this is the most significant response yet to the oil price collapse and could set in motion a series of other mergers as IOCs seek to keep paying dividends they may no longer afford. Indeed, reducing capital investment, embarking on a new round of cost-cutting, and either turning to the debt market or selling assets, are all measures that are no longer sufficient.

The current situation is linked to the increase in the production of shale oil in the US. US oil production in 2014 was 11.7 Mb of which Light Tight Oil production came to4.9 Mb/d. US production increased by 1 Mb/d in 2012, 1.3 Mb/d in 2013 and 1.6 Mb/d in 2014. Tight oil production grew much faster than conventional oil. 60% of US oil demand (19.1 Mb/d) was met by domestic production in 2014.

In a rapidly changing business environment, new oil and gas projects must respond to:

- No tolerance for accidents and environmental impacts
- Higher expectations towards acceptability of O&G operations
- Strong human resources competition & local content requirements
- World political instability
- Importance of new players
- High cost environment eroding profitability
- Resources abundant but increasingly difficult to develop.

The new strategy of a company must cover: Safety, Delivery (Executing projects on time and on budget - Growing production with major project start-ups), Costs (Increasing Opex savings; Enhancing capital discipline), Cash (Strong cash flow growth driven by accretive start-ups - Dynamic portfolio management).

Cost inflation over the past decade has been dramatically impacting O&G companies' profitability.

Reducing costs is a priority for the companies, which have launched major initiatives.

Objectives are to control CAPEX, decrease OPEX and maintain low technical costs while not compromising on safety.

These efforts will shape the way future developments are conceived:

- Development in sequence
- No gold-plated approach / "good enough" design
- Innovation used as a key driver for lowering costs.

Long term oil demand growth: an additional capacity of 50 Mb/d new production is needed by 2030, driven by declining rates and demand growth. 20% of the new volumes require a price greater than 90 $/b in a 2014 cost environment.

Marginal supply requires high tech, continuous innovation and significant investment.

So long term prices are likely to recover.

Paris COP 21: what is at stake at the Paris December climate summit? At the upcoming climate summit, we concluded that a lasting agreement will predictably hinge on whatever direction the US and China might have agreed. Therefore, any such an agreement is likely to be weak. We also expected that a no-deal scenario could have serious consequences for investment in renewables and low-carbon energy technologies.

2015 is an important year in the development of climate change policy, following the IPCC Reports of 2014. Policies will get more momentum, but not enough to make credible the 2010 Cancun (post Copenhagen) objective to keep the global average temperature rise below 2 degrees C.

The process was given political credibility by the joint statement from Presidents Obama and Xi Jinping last December in which both countries committed (without detail) to reach a point where CO2 emissions would fall. Under various scenarios this might be between 2030 and 2040.
The meetings in Lima early in this year laid out the process leading up to the Conference (COP) of UN parties to the original Framework Convention on Climate Change (FCCC) to be held in Paris in December this year. The process is being designed to avoid countries having to make legal commitments on emissions, while providing a legal framework for a process in which each country "volunteers" a contribution to the global goal.

During the year, each country will submit its own voluntary commitment: the so-called nationally determined contribution (NDC). If these are greatly out of line there will be pressure applied in Paris to revise them.

The Paris meeting will also provide for some kind of review by 2020 (probably after the next round of IPCC Reports) but there will be arguments about how the review will be structured, probably to avoid seeming to imply that any country is making commitments to the others in a legal sense, or subjecting itself to judgement.

There will probably be some kind of legal document which defines the process, and links back to the 1992 FCCC.

On previous form, much of the detail will be carried over to subsequent meetings, particularly on more technical issues to do with submission of data, measurement and deforestation.

The main point about 2015 on climate policy is that policies will continue to strengthen, but it will not be clear how far and how fast they will go. It is in 2020 that we are most likely to see a real toughening of policies, given that progress meanwhile is unlikely to be very good.

There will be an effort in Paris by the countries most affected by climate change – flooding etc. – to extract money from developing countries. There are already commitments in this direction which have not been followed up.