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# Gradual Reform across the Value Chain

China Oil & Gas Reform Series I

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100

Making another century of impact

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# Reform Opinions and Implications

Welcome to Deloitte's series on China Oil & Gas Reform. Over the coming months we will be reviewing each of these reforms in turn. A global trend of reduced commodity prices, the importance of environmental concerns and the technology imperative are driving China's oil & gas reform beyond its own domestic concerns.

China has been studying the sector for a long time as oil and gas assets are considered strategic assets of the country. Despite the importance and necessity of the reform it also comes with its own set of struggles, making it the most difficult task for the top authorities. There is an intertwined relationship between geopolitics and economics, volatile international and domestic market dynamics, and different interests of state ownership and private investors. So when China announced its long-awaited oil and gas reform summary - Opinions on China Oil and Gas System Reform ("the Opinions") - in May[1], it makes sense that the reforms will be gradual and pilot-based, containing a compilation of plans and programs already underway.

China's oil and gas reform aims to push market-oriented reform across the entire value chain. The key issues facing the sector are:

- Upstream: exploration and exploitation is the foundation of oil and gas industry, and it is the most capital intensive, lucrative and monopolized sector;
- Midstream: the separation of pipelines is the key issue;
- Downstream: reform of downstream sector is under great pressure, but the completion of the pricing mechanism and introduction of mixed ownership may be breakthrough achievements.

Although the detailed reform plan is yet to be announced, the Opinions outline eight tasks covering the entire oil and gas industrial chain:

| Task | Covered | Open Question |
|---|---|---|
| 1. Exploration and exploitation | Mineral rights bidding system; exit mechanism | Detailed requirements on exploration qualifications; quality of blocks released by NOCs |
| 2. Import and export management | imports management; exports policy improvement | export license to independent refiners |
| 3. Pipeline reform | Independence of pipeline, fair access to pipeline | Independent national pipeline company |
| 4. Downstream competition | Higher standard on quality, safety, environment and energy efficiency; stimulate natural gas demand | City gas pipeline access and operation model (BOT?) |
| 5. Pricing mechanism | Oil product price system; natural gas price liberalization; trading platform; return on pipeline | Roles and responsibilities of multitude trading platforms |
| 6. SOE reform | Corporate governance; mixed ownership; restructuring | Timeline of restructuring and mixed ownership |
| 7. Storage | Social investment; crude oil storage; natural gas storage | Qualifications for gas storage infrastructure builder |
| 8. Environment and safety | Whole process supervision; safety system, risk management | ----- |

Source: Deloitte Research analysis

[1] China unveils market reform for oil and gas industry, Xinhua, 2017-05-22 http://news.xinhuanet.com/english/2017-05/22/c_136302954.htm

## 1. Exploration and exploitation

Traditionally, the government allocated upstream blocks based on applications from the four state-owned oil companies - China National Petroleum Corp (CNPC), China Petrochemical Corp (Sinopec), China National Offshore Oil Corp (CNOOC) and Shaanxi Yanchang Petroleum. The "Big Three" (CNPC, Sinopec and CNOOC) together owns 96.7% of registered exploration territory and 99.2% of registered exploitation territory[2]. This "elite club" has given a rise of inefficiency in resources allocation[3]. The latest data released by the upstream watchdog Ministry of Land Resources, showed that China's newly discovered proven oil in place was 914 million tonnes (6.7 billion barrels) in 2016, the first time in 10 years that annual newly discovered reserves were less than 1 billion tonnes. Hence, there is a need for new exploration.

According to the Opinions, government will open up the mineral rights by changing the registration system to a bidding system, relax the restrictions regarding the development qualifications of exploration and exploitation, increase the holding cost and strictly control the exit mechanism of exploration rights, and establish a mineral rights transfer system.

Three types of oil and gas companies are expected to gain access to exploration of onshore conventional oil and gas:

- provincial SOEs located in oil and gas resources-rich provinces;
- private oil and gas companies who owns overseas assets with overseas exploring experience; and
- oil service companies with domestic oil field service experience.

State oil companies may face higher costs in obtaining exploration right due to the rising competition. As reform goes on, they will need to be prepared for shareholder structure change, which will bring disruptions in production, operation and management for the organization.

Foreign oil and gas companies may set up JV with domestic players to participate in the exploration and exploitation of conventional resources, however, considering China's complex geological conditions and limited oil and gas resources, foreign participation in upstream sector will likely remain limited.

## 2. Import and export management

The reform of imports and exports will impact refiners the most. The government plans to develop a system to more actively monitor crude import by quota holders, both state-owned companies and independent refiners.

The imports restriction relaxation is already underway. Independent refiners were granted crude import quota and allowed to imports crude oil since 2015. Their participation in the market has been putting pressure on state-owned refineries, and pushing them to improve efficiency. However, under the new system, independent refiners may come under tighter scrutiny and supervision, including whether they are adhering to all taxation regulations.

The government also plans to improve the policy for exports. Currently, the oil product exports quota are confined to four state-owned companies – CNPC, Sinopec, CNOOC and Sinochem. Independent refineries are eager to restart product exports after they were denied to get export quota late last year.

China's oil companies export through two routes -- the processing trade route and general trade route. Under the processing route, exported oil products are tax exempt but highly restricted to the refined products using imported crude oil from specific refineries. Under the general trade route, which was resumed in January 2017, state-owned trading companies are free to export oil products from both internal and external refineries using domestic or imported crude, and a rebate on VAT and consumption tax can be claimed[4].

The imports and exports reform will trigger more market-driven changes in trade and sales markets and help to establish a market more accurately reflecting the oil prices.

[2] Impact of oil and gas market access reform on giant state-owned petroleum and petrochemical enterprises in China, Liu Yinghong, Xu Dong, Tang Guoqiang, Sinopec Development and Planning Department, PetroChina Planning and Engineering Institute, Natural Gas 2017-37 http://www.oilfun.com/industry-view/4954

[3] Economic Watch: Market reform allows private players broader participation in oil and gas sector, Xinhua 2017-05-23 http://news.xinhuanet.com/english/2017-05/23/c_136308501.htm

### 3. Pipeline reform

According to the Opinions, China aims to gradually separate the oil and gas pipeline business from state-owned oil majors and further open oil and gas pipeline networks and facilities for the third party access.

Separation of pipelines to break the monopoly is the most discussed topic in midstream reform.

The total length of China's onshore oil and gas pipelines is approximately 120,000 kilometres, including 23,000 km of crude oil pipeline, 21,000 km of refined products pipeline and 76,000 km of natural gas pipeline[5]. CNPC, Sinopec and CNOOC monopolise the market by possessing approximately 98% of the market shares[6].

Pipeline reform is already under progress as the oil majors have set up pipeline companies in anticipation of the separation. In November 2016 CNPC split its gas sales and pipeline business. However, we think the establishment of an independent national pipeline company is unlikely in the short-term as the implications are too significant.

Oil and gas pipelines, oil wharfs, liquefied natural gas receiving stations and the provincial and interprovincial networks are in a fragmented state, which has led to insufficient competition and wasted resources. Despite the challenges and slow pace, fair and open third-party access would be beneficial to allowing new capital to enter the oil and gas field.

Meanwhile, expanding the infrastructure access will lower the operator's cost. For example, granting third-party access to national oil companies' LNG terminals and opening up the pipeline network would enable gas operators to diversify their supply sources at cheaper prices, which is positive for demand. In short, creating competition will create efficiency.

### 4. Downstream competition

China is expected to deepen the reform of downstream competition to enhance the supply and production of high value products.

Government aims to set higher standards on product quality, safety, environmental protection and energy efficiency. It also plans to better control new entrants in the refining sector and speed up the phase-out of old capacity to reduce excess capacity.

The opinions also addressed the fair competition in the natural gas distribution market to boost the natural gas usage. In this regard, it is still an open question regarding whether the new plan will be applied to the city gas distribution market.

China's city gas distribution networks have been rapidly expanded over the last decade and will continue to expand with further urbanization. Numerous gas distribution companies were established, many owned or associated with central and/or local government entities, which enable and accelerated buildout of the networks. Annual sales volumes growth was 20% over this period, although growth rates have declined in recent years. Approximately 35% of medium and large-size cities (240 million people) in China had access to piped natural gas in 2015, leaving a large unserved potential market for city gas distribution.

Existing city gas distributors will need to prepare for increasing competition and adjust their business models as necessary.

4 Factbox: A tour of China's new oil and natural gas industry reform plan, Platts, 2017-05-23 https://www.platts.com/latest-news/natural-gas/singapore/factbox-a-tour-of-chinas-new-oil-and-natural-26742277

5 China's total mileage of onshore oil, gas pipes reaches 120,000 km , People's Daily Online, 2015-08-24 http://en.people.cn/n/2015/0824/c90000-8940666.html

6 China to push for reform on oil and gas pipeline operations, Xinhua, 2017-09-05 http://www.chinadaily.com.cn/business/2017-09/05/content_31594245.htm

### 5. Pricing Mechanism

China intends on improving the pricing mechanism of refined oil products while giving full play to the role of the market to determine prices and reserving the government's right to regulate the abnormal fluctuations in prices. A challenging task. It intends on promoting non-residential gas price liberalization, and fine-tuning the residential gas pricing mechanism. It also is encouraging the development of oil and gas trading platforms in order to eventually achieve market-driven prices.

The oil and gas markets in China are at different stages. The oil pricing mechanism changes more frequently than gas prices do and is therefore more reflective of global prices, though price movements are still determined by the government. The next step would be to reduce the role of the state in price setting, but this is unlikely to happen in 2017 and will only be achieved gradually[7].

The main constraint of China's natural gas development is price. Without taking account of environment costs, the price of natural gas is much higher than that of coal. In the gas market, the next steps will be reducing pipeline tariffs and removing cross subsidies among end users.

Establishing trading platform will increase competition among gas suppliers and gradually lower the gap between international gas prices and China's higher domestic gas prices. The establishment of the Shanghai Petroleum and Natural Gas Exchange in November 2016 and the Chongqing Petroleum and Natural Gas Exchange in January 2017 were key infrastructure enablers facilitating long-term market pricing. Gas purchased through the exchanges carried a 6%-7% price discount compared to regular domestic prices in 2016, as estimated by gas distributors[8].

### 6. SOE reform

China will continue pushing the reform of state-owned oil majors by introducing mixed ownership, improving corporate governance and streamlining operations, including going for mergers and acquisitions.

We expect increased restructuring and integrations in state-owned oil giants' specialized business as engineering companies and oil and gas equipment manufacturers are encouraged to work as independent enterprises. CNPC will spend the next 2-3 years restructuring its enormous services division and aim to set up three or four companies covering oilfield drilling, refinery engineering and financial services, with a target to list them on the stock market in the near future[9].

The mixed ownership reform is already starting to play out, but so far having a limited impact on the oil and gas market given that the oil giants are deeply entrenched in the upstream and midstream markets.

### 7. Storage and Distribution

Government aims to secure oil supplies and develop a storage system serving both government and private enterprises. It also seeks to improve the investment mechanism by encouraging private investment in storage capacities.

Following the Opinions, in a draft of new regulations published on July 19 2017, the government proposed to lower the minimum storage capacity requirements from 500,000 cubic metres (cm) down to 200,000 cm to distribute and store crude oil and from 200,000cm down to 20,000cm for distribution and storage of refined products. Experts and traders believe those requirements are in line with industry average[10].

Eased regulations for firms to enter the domestic distribution and storage industry may spur private storage capacity growth, as well as improve the liquidity needed to advance China's long-held plan to launch its own crude oil futures contract.

7 China changes track: analysing the Asian giant's oil and gas reforms, Offshore Technology, 2017-08-28 http://www.offshore-technology.com/features/featurechina-changes-track-analysing-the-asian-giants-oil-and-gas-reforms-5885236/

8 Fitch: China's Gas Reforms to Help Distributors; Connection Fee Risks Remain, Fitch, 2017-05-26 https://af.reuters.com/article/africaTech/idAFL4N1IS212

9 No big bang, but quiet reforms reshaping China's oil and gas sector, Reuters, 2016-05-11 http://www.reuters.com/article/us-china-reform-energy/no-big-bang-but-quiet-reforms-reshaping-chinas-oil-and-gas-sector-idUSKCN0Y22RH

# Global and China Economic Fundamental Drivers

**8. Safety & environmental protection**
China aims to enhance the safety and clean operation of the entire industry. It will strengthen the safety supervision of oil and gas development and utilization and improve the risk management.

The refining sector, especially the medium and small sized refiners, will be under tighter scrutiny. The government has started sending teams of environmental officials and experts to Shandong, where the most independent refiners locate, to make regular but unscheduled visits for environmental and safety check. Some 30 independent oil refineries and an unspecific number of chemical plants in Shandong have been shut since mid-July[11]. Some of them may not be able to resume operation as the upgrade costs would render them unable to compete with imports.

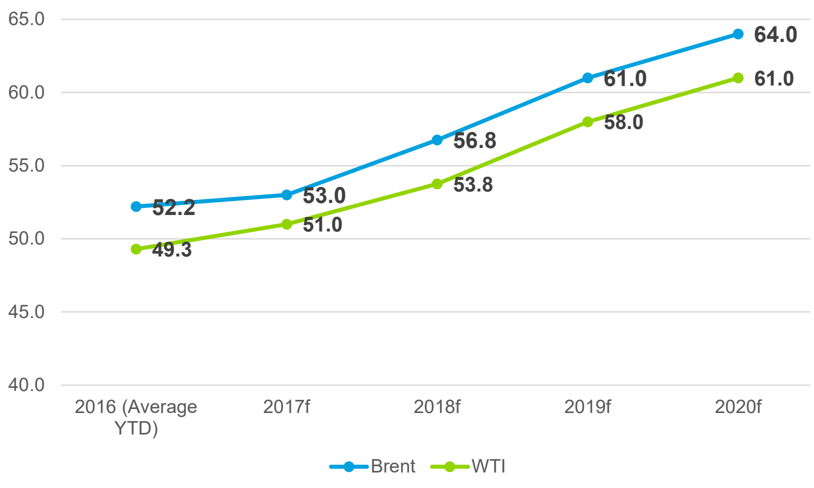
Understanding the economic fundamental drivers and their implications will help us anticipate how the oil and gas reform will evolve and at what pace. We think the low oil price environment and China's structural change are the two most critical drivers.

## Low oil price environment

While the timeline for the oil price to rebound is difficult to project, it is likely that the low oil price will be a new reality. This stimulates China oil and gas reform by:

- allowing crude imports of independent refiners;
- providing an opportunity for fuel pricing reform;
- bringing both opportunities and challenges to natural gas; and
- forcing Chinese oil and gas companies to emerge stronger.

**Bloomberg Consensus Brent and WTI Forecast (USD/BBL)**




Source: Bloomberg, Deloitte Research

[10] China drafts new rules for oil storage industry, Reuters, 2017-07-19 https://www.cnbc.com/2017/07/19/reuters-america-update-1-china-drafts-new-rules-for-oil-storage-industry.html

[11] China's war on smog chokes Shandong industries, smokes out fuel kiosks, Reuters, 2017-09-13 https://www.reuters.com/article/us-china-environment-shandong/chinas-war-on-smog-chokes-shandong-industries-smokes-out-fuel-kiosks-idUSKCN1BO0BO

The tumbling oil prices since the second half of 2014 sparked China's oil buying spree to fill its strategic reserves. The government began granting license and import quotas to independent refiners to allow them to take advantage of the low oil prices as well.

Under the current pricing mechanism, if international crude oil prices change by more than 50 yuan per ton and remain at that level for 10 working days, the prices of refined oil products such as gasoline and diesel in China will be adjusted accordingly. The government intends to closely monitor the effects of the current pricing mechanism and roll out pricing reform in response to changes in the global market.

As global oil prices continue to stay at a level below $50/per barrel, Chinese oil and gas companies are confronted with more challenges than their international counterparts because the production costs for many wells in China are above competing international production prices[12]. Against this backdrop, SOEs have to learn how to operate in a lower price environment, returning to a healthier focus on capital and operating cost discipline. In addition, SOEs will be more open to private investors to improve cash flow and efficiency.

## China's structural change

Although China's rapid growth in the past decade is unlikely for the next 10 years, it still has resilience thanks to the booming consumption and private investment.

The transformation to a consumption-driven model may not be able to offset the slowdown in investment, it is definitely altering the pattern of energy use. The residential and transport portion of energy demand will grow, while the proportion consumed by industry and the commercial sector will decline.

In the short to medium terms, the most pressing problem facing China’s economic transformation lies in de-leveraging consequences. The central government may reduce corporate debt via reforms by introducing mixed ownership. Meanwhile, as credit is becoming more expensive, business are seeking ways to squeeze more cash out of their operations to repay what they borrowed or to avoid taking on new loans.

[12] China – Oil and Gas, US Commercial Service, 2017-07-25, https://www.export.gov/apex/article2?id=China-Oil-and-Gas

# Outlook

Based on the above analysis of the macro trends, we see a positive outlook in the oil and gas sector. This view translates into the following sector outlook:

### Bigger role of natural gas

The reform will drive the growth of natural gas market for two reasons. One reason is economic since natural gas will become more affordable. Another is environmental. People living in China will benefit from increased natural gas consumption as it produces less pollution.

China plans to increase the share of natural gas as the primary energy mix from 6% to 8.3%-10% by 2020. To achieve this goal, the government has decided to launch the coal-to-gas program, open the infrastructure access to third parties, lower the threshold for storage capacity, and extend natural gas pipelines to all cities with a population of 500,000 residents[13]. It's expected that China's natural gas demand will grow at an average rate of 6% per annum over 2017-2026, with the fastest growth continue coming from residential users. A recent report from the IEA claimed that worldwide demand for natural gas is expected to grow and China is a key driver of increased demand. IEA predicts that natural gas consumption in China will, by 2022, be five times the current usage[14].

Oil and gas reform will lead to bigger role of natural gas as a transition fuel in China's quest for diversifying energy supply and addressing environmental challenges.

### Continuous overseas investment

China's overall energy demand will steadily grow at 2-3% annually by 2020, however, with domestic oil production declining, imports and overseas investment will inevitably rise further. In light of this, China will continue supporting national oil companies' investment in oil and gas fields overseas, as well as by offering loans to producer countries which are repaid with oil. China will learn from prior investments and take tighter controls on investment activities.

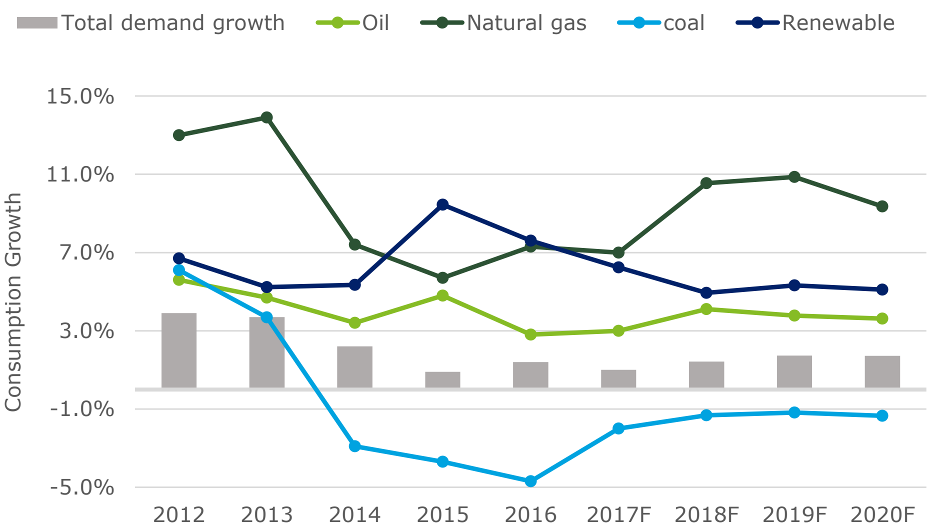
Chines oil companies, both state-owned and private, are very active in the "Belt and Road" initiative. For upstream, it will be the oil and gas oilfields. For downstream, it will be the refining, chemical, or marketing projects.

### Get smart with technology

The oil and gas industry, despite its age, is one of the most technology-driven industries. Horizontal drilling and fracking technologies have helped drive oil prices down from an all-time high of $145 per barrel in 2008 to about $50 today. Supply has become much more responsive to market conditions, undercutting OPEC's ability to influence global oil prices[15].

It was mentioned several times in the Opinions that China aims to improve supply, efficiency, and product quality. Technologies will help oil companies to boost productivity and flexibility:

**China's natural gas demand grows faster than oil, coal and renewables**




Source: NBS, NEA, EIU, Deloitte Research

[13] China plans to expand oil, gas pipeline networks, Xinhua, 2017-7-12 http://news.xinhuanet.com/english/2017-07/12/c_136438633.htm

[14] Gas 2017, IEA https://www.iea.org/Textbase/npsum/gas2017MRSsum.pdf

[15] The next energy revolution: The promise and peril and high-tech innovation, David G。 Victor and Kassia Yanosek, 2017-06-3 https://www.brookings.edu/blog/planetpolicy/2017/06/13/the-next-energy-revolution-the-promise-and-peril-of-high-tech-innovation/

- smarter management of complex systems allowing companies to become more efficient while drilling for oil and gas in ever more complex geological environments;
- data analytics makes it easier for companies to find oil and gas and manage production, "predictive maintenance" reduces unplanned downtime; and
- mobile apps and mobile payment provide a personalized and loyalty building shopping experience to customers at petro stations.

However, the transition won't be straight forward. As the technology revolution unfolds, it brings new challenges in terms of infrastructure, talent, and cyber security, which need to be addressed today.

**Slimmer but stronger SOEs**
A modern corporate system, which separates government administration from business operations and spinoffs social responsibilities, will allow SOEs to function as efficiently as other business entities.

Diversifying SOE's shareholder structure is one of China's key targets in 2017. The state-owned oil companies CNPC, Sinopec and CNOOC will see more re-organization as private investment comes in.

In addition, all three state-owned oil giants posted stronger than expect results in 1H 2017. They will be focusing on the corporate value and maintain the debt level at a reasonable level. These companies are holding abundant cash flow in the aim of responding to market changes and volatility.

# Conclusion

We are entering a period of lower economic growth and policymakers and business leaders need to manage the implications of a new world of cheaper energy. China's oil and gas reform will be a gradual process that balances the social needs with the economic needs. Eight tasks listed in the reform opinions are no news to the public, and some of them are already underway. Looking forward,  as more reform measures unfold, we expect a bigger role for natural gas, continuous overseas investment echoing the "Belt and Road" initiative, technology driven innovation, and slimmer but stronger SOEs.

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