

## **Managing near-term gas scarcity and long-term LNG demand Uncertainty in China**

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### **Near-term Gas Scarcity**

The effective implementation of converting decentralized use of coal to gas in North China and the gas supply disruption from Central Asia in 2017 have completely changed the gas landscape in China. Strong push for coal-to-gas conversions will continue in the coming years, albeit at a more cautious pace; unpredictable disruption for pipeline gas imports and domestic gas production may occur. To mitigate the gas supply disruption and the highly seasonal gas demand, massive effort has been rolled out to resolve physical gas infrastructure bottlenecks and build up gas storage facilities to increase the resilience of meeting growing gas demand in China.

Physical infrastructure will take time to take shape, so natural gas will remain as a scarce resource in China, at least in the near term. Logically a scarce resource has a high economic value and should be diverted to the most valuable sectors. But the rigid gas pricing mechanism and opaque allocation system are not able to send the right pricing signal to allocate the valuable gas resource within China. Moving to a location-based market pricing is a fundamental solution to resolve this, but this aspiration can only be achieved in the long term. In the next few years, there are at least a few near-term actions to help to mitigate the allocation issue and reduce the economic cost of gas under-supply.

- Local governments could facilitate gas trading among bulk gas purchasers. For example, given the over-supplied situation in the power sector, switching away from gas during winter season make perfect economic sense. Gas-fired power plants could re-sell their allocated gas/LNG volume to city gas companies at a margin, and trade their “allocated” power dispatched quantities to other power generation sources such as hydro/solar/wind power imports from inland provinces, nuclear and large clean coal-fired power plants. Such negotiation for gas and power contracts will need to be facilitated by the provincial governments. In China, the Fujian government has already facilitated such on-selling of their allocated LNG quantities of CCGT plants to city gas companies in Fujian. The provincial and central natural gas and power exchanges have also established the necessary

platforms to do these, but the local governments will still need to give approval and encouragement for such activities.

- Industrial gas end-users' prices are rigidly regulated based on different levels of consumption. However, the value of gas to different users must differ significantly as some may be easy to switch to alternative fuels and some may be able to shut down for a short period of time. Ways to incentivise demand response from industrial end-users will be helpful to mitigate gas shortages. For example, city gas companies can include contractual clauses to provide discount to different tiers of end-users who are willing to be disrupted to different extent. For this year, it may be worthwhile for the city gas companies to start calling the top twenty large industrial gas users in their franchised region to see whether they could shift some of their manufacturing production in winter time to autumn; reward could be offered for those who are willing to do so, including less price hike in winter months or cash rebate.
- The existing gas allocation system for domestic gas production and pipeline gas imports among the provinces is also too rigid as most are pre-determined and do not fluctuate much at different gas demand level. The relevant government agencies and the Chinese National Oil Companies (NOCs) could possibly work out whether there are more efficient ways to increase the flexibility of allocating gas among the provinces, although this can be a very tricky task given the delicate politics among the provinces in a gas under-supplied world. Tweaking the provincial city-gate gas pricing mechanism and facilitating more gas trading across provinces in gas/energy exchanges could be possibly part of a packaged solution in the near term.

Furthermore, effective communication among different stakeholders along the gas value chain as well as within the organization of the large gas end-users in advance of and during a gas supply disruption will be important to minimize the risk of panic buying and reduce the economic cost of gas shortage. It will be useful for provincial government agencies, upstream gas suppliers and city-gas companies to start engage large industrial users on guidelines and basic steps to increase the resilience of gas use, such as identifying critical production and services that have to be maintained, reallocation of internal resources to ensure safety cover, and the degree of flexibility on short-term fuel switching, etc.

### **Long-term LNG Demand Uncertainty**

The near-term gas scarcity seems to have created a perception that China has an unquenchable need for more LNG imports. This may be true – the inherent gas demand is indeed huge in China. The share of natural gas in primary energy consumption is still only seven percent, much lower than most other countries;

and less than forty percent of the population has access to natural gas. To illustrate the potential size, in Beijing, if the city converts all its heating needs to gas, the total annual gas demand would be around 60 billion cubic meters (equivalent to about 44 million tonnes of LNG), and Beijing only accounts for about three percent of GDP and less than two percent of total population in China with most heavy manufacturing plants having moved out of the city.

But many long-term development could curb or even reduce the surging LNG demand, especially if LNG prices move up in the future. Just as recent as 2015, news headlines on an over-supplied gas market in China with Chinese National Oil Companies not taking their full take-or-pay LNG quantities were common.

Just to name a few big uncertainty on long-term LNG demand in China.

- Unlike crude oil reserves, China still has plenty of gas reserves. BP statistics reported that China has 5.4 trillion cubic meters proven gas reserve as of 2016, equivalent to around 40 years of production at 2016 production level; and US EIA reported that China has over 30 trillion cubic meters of technically recoverable shale gas in 2015, almost twice as much as US shale gas reserve. Even though the track record of shale gas exploration and production in the past decade is not promising, one should not simply dismiss the potential of bringing those shale gas out of ground in the long term.
- The various actions to bring the 38 billion cubic meter per annum of Russian gas from East Siberia is well under-way, and could start to flow to North China around 2020. This comes at a time when pace of switching from coal-to-gas in North China could materially slow down.
- Debate to use large centralized “clean” coal for heating and power is coming back strongly. It makes sense for improving the “cost effectiveness” and increasing “energy security” in the system; on “environmental sustainability”, “clean” coal is said to be able to reduce non-carbon air pollutants (NO<sub>x</sub>, SO<sub>x</sub> and particulates) emission to a level as low as gas plants, but carbon dioxide emissions will be higher; and
- Huge coal gasification projects in coal-rich provinces could also come back in another wave, potentially labelled as another method to centralize the efficient and “clean” way of utilizing the domestic coal resources to increase energy security. The economics could also work in a high gas price environment, and the large coal producers would use it as an effective strategy to get into the gas business and maintain their share in the energy sector.

As China has opened up its LNG importing licensing to many more private companies, the interesting dynamics of the Chinese players may also lead to over-contracting of LNG. It is not hard to imagine a situation which Chinese city gas and power companies to come out and sign up multiple inflexible LNG contracts for their own customers while the Chinese National Oil Companies may also sign up contracts in a belief that they could on-sell all to the city gas and power companies. The risk of getting to such bad outcome is particularly high as information disclosure in China is not good, and large Chinese companies tend to be pushing for expansion to gain market share.

With all these uncertainties, flexibility has high value.

- Both Chinese National Oil Companies and new LNG buyers should carefully evaluate the value of paying slightly higher prices for flexible LNG contracts with no high take-or-pay clauses; and rigid destination clauses should not be included as those could be very costly in a world of unexpectedly low LNG demand.
- For large Chinese LNG purchasers, using a portfolio of long-term, short-term and spot LNG contracts instead of mostly long-term contracts will provide diversification value in an uncertain world.
- For new LNG buyers (like the city gas companies and power generators), forming partnership to procure LNG can be a very sensible option given the diversification benefit as one particular province/region may end up with expectedly low LNG demand for a few years due to the change of economic structure, shift in fuel mix policy and/or weather (which can affect heating and cooling demand as well as hydro-power generation).

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In the biweekly blog, we will also provide a few key news clip with hard numbers related to gas and power sector development in China in the past two weeks.

## **Crunching the Numbers**

### **40**

PetroChina is negotiating with city gas companies to increase winter gas price by 40 percent for its LNG and unconventional gas sale, almost doubling the amount of increase from last year. This means around 2.8 RMB/cubic meter at city-gate

for buyers in South China and East China. Excluding taxes and converting to USD/mmbtu, it translates to around USD 10/mmbtu. If Chinese LNG importers are the marginal purchasers as experienced last year, USD 10/mmbtu will be a useful reference price for Asian spot LNG in winter; and price may go higher than USD 10/MMBtu if gas shortage situation is severe and panic buying occurs again. Nonetheless, given the number of eager LNG sellers in the market, maybe some are willing to sell well below USD 10/mmbtu. No wonder that so many Chinese companies have been working so hard to figure out ways to import their own LNG. The missing puzzle is the access to domestic gas infrastructure, but this problem is slowly getting resolved. One good example is that CNOOC is going to open its LNG terminals in Guangdong for “third-party” access, albeit only for those who own a stake in those LNG terminals. This is still a major step forward as it means that Shenzhen Gas, Guangzhou Gas, Hong Kong and China Gas and a few others could have access to the deep-water LNG terminals in Guangdong, and start importing standard LNG cargos for their customers.

## **1**

The Chinese government is in the final stage of studying the formation of **1** national pipeline company that would control the pipeline transmission assets of the three National Oil Companies (NOCs). It seems that the three NOCs will still have stakes in the national pipeline company, meaning that it is unlikely to be a complete ownership unbundling. With the NOCs still having stakes in the national pipeline company, clear and stringent ring-fencing framework needs to be formulated to avoid preferential treatment on accessing the latest pipeline information and capacity for the stakeholders of the national pipeline company. Without a robust ring-fencing framework, achieving a genuine non-discriminatory pipeline access is impossible in the long term. Devising an appropriate and robust ring-fencing framework is a big challenge and requires material resources to be put in for regulatory monitoring. That is one of the key reasons that most developed gas markets in the world (such as UK) has 100 percent ownership unbundling for transmission gas pipelines; and the owners of the transmission pipelines could not participate in both the upstream and downstream gas business. Nonetheless, given the complexity and legacy issues in the Chinese gas sector, forming one legally independent pipeline company is still one big step in the right direction. Hopefully, an increasingly better “third-party” access regime could be formed over time. That would remove one major barrier for private investors and capitals to invest in upstream assets as well as large gas storage facilities.

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The Chinese Commerce Ministry has announced that it may impose **25** percent of tax on US LNG imports, while it has purposely excluded “crude oil” in the list. One has to wonder why LNG but not crude is included in the list. Ultimately, China needs much more LNG than the current level, plus the LNG market is not as liquid as the crude trading market. Nonetheless, there may be good reasons from the Chinese government’s perspective. Unlike crude, China does still have huge gas reserves. Maybe the Chinese government have already put together plans to incentivise more upstream gas investment. It is likely that multiple policy paper would be released from Beijing related to plan/target for upstream gas E&P and the reform on the gas sector. The Chinese National Oil Companies will have to ratchet up upstream gas E&P activities; and maybe there would be some “real” reform on the pipeline access regime that could incentivise more private and foreign companies and capital to the upstream gas business. And of course, curbing the rapid gas demand growth has been ongoing. One clear signal is the wording of “in principal, no gas-fired combined heat and power plants should be built” in the latest document released by the State Council; there is also much stronger push to switch the decentralized use of coal to centralized use of clean coal (i.e. electricity). Partly driven by the switch from decentralized coal to electricity, maybe and just maybe, electricity demand growth can continue at a rate of high single digit in the coming 3-5 years – this would have major implication on renewables curtailment, renewables subsidy payment delay and the ongoing market reform. It would be amazing if China manages to simply grow out of its over-capacity problem again, without fixing the real issues in the electricity sector.

We will turn to the Chinese electricity sector in next blog.