CHINA

Blue Sky energy transition

The bedrock of China's energy strategy in recent years has been transitioning its economy away from heavy coal reliance, and to curb pollution in its larger cities under its 'Blue Sky' policy. While policymakers in Beijing have taken significant steps to bolster the use of renewables, they view gas as the backbone fuel for economic development in the coming decades. *Joe Murphy* reports.

Gas is seen as the backbone fuel for China's economic development in the coming decades, with imports forecast to reach 310bn cm in 2035, up from only 119.3bn cm in 2018, rising to 316bn cm in 2040 and 340bn cm in 2050

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The construction of new gas infrastructure and power generation over the past decade has already had a radical impact on China's energy mix. Chinese gas consumption peaked at 283bn cm in 2018, surging by 18.1% year-on-year and up from a mere 82bn cm in 2008. But this growth has far outstripped domestic supply, which topped out at 161bn cm last year, only double its level a decade earlier. As such, China has become more reliant on imports. With this trend set to continue over the coming decades, the question is: 'Where will this extra gas come from?'

CNPC's latest 2050 outlook report, published in August 2019, forecasts that demand will reach 610bn cm by 2035, 641bn cm by 2040 and 690bn cm by 2050. Meanwhile, Chinese output is anticipated to reach above 300bn cm in 2035, rising to about 325bn cm in 2040 and 350bn cm in 2050.

As China's national oil and gas company, it is difficult to determine what extent CNPC's estimates reflect realistic forecasts or policy goals. In either case, its guidance sees the share of imports required to help meet national demand expanding from around 43% in 2018 to 49% by 2035. This share will remain at just above 50% up until 2050. In terms of volumes, this means China will have to source some 310bn cm of gas from overseas in 2035, from only 119.3bn cm last year. Overseas shipments will continue rising, albeit at a slower rate, reaching 316bn cm in 2040 and 340bn cm in 2050.

Output disappoints

Imports could reach even greater heights if domestic production growth does not live up to expectations. CNPC forecasts that conventional gas extraction will begin to level off in the 2030s, with the growth in overall output driven by increased shale gas, tight gas and coalbed methane (CBM). However, so far, China's development prospects for these resources have disappointed.

In the case of shale gas, the government initially aimed to bring annual production to 60bn cm by 2020 and 100bn cm by 2030. But these targets were later abandoned and the 2020 goal was halved to 30bn cm. Even this objective looks overly ambitious, given that output reached only 10bn cm last year. Production at the Fuling project, accounting for the bulk of national shale output, has been flat in 2019, totalling 4.1bn cm in the first eight months of the year. Its operator Sinopec had hoped to produce 10bn cm in 2020.

There are also concerns that Fuling's moderate success cannot easily be replicated, as other early-stage shale projects in the same Sichuan Basin as Fuling have vastly different geological characteristics. Limited infrastructure and water shortages in some promising but remote shale areas also present a challenge. Even so, CNPC's figures suggest Beijing is still betting on shale as a driver of growth. A bullish report by China's Academy of Engineering released in September 2019 even forecast that production could hit 280bn cm by 2035. Meanwhile, China has struggled to make its CBM projects commercially feasible, because of low domestic prices.

Coal strikes back

Gas demand forecasts could also disappoint if efforts to phase out coal falter. Currently the world's biggest coal consumer, China should see consumption of the fossil fuel fall by 18% from 2018 to 2035, and by 39% from 2018 to

2050, according to CNPC. Between 2018 and 2050, the company estimates that coal's share in the country's total energy mix will fall from 59% to 40.5%, as more gas, nuclear and clean energy-based capacity is brought onstream.

These goals may be overly ambitious, however. There is considerable pushback from the country's power industry, which called on the government in March 2019 to approve the construction of an additional 300–500 new coal-fired plants by 2030, amounting to a capacity addition of 1,300 GW. The coal industry serves as the key source of government tax income and is an important provider of employment. This translates into political power.

In the shorter term, while the government's push to banish smog from cities has seen it convert millions of coal-fired boilers to natural gas in recent years, the transition has sometimes been badly managed. Energy supply shortages have been a recurring theme, with gas demand sometimes outpacing even the rapidly expanding import sector's ability to cope. In the winter of 2017–2018, for instance, millions of homes converted to gas were left without heat, prompting the government to order regional authorities to slow down the pace of coal-to-gas conversions. This has sapped gas demand growth this year, with the National Energy Administration (NEA) predicting in early September 2019 that consumption would rise only 10% this year.

Furthermore, despite gas gaining ground, it is important to note that coal is still set to remain a staple source of energy for China for decades – predicted by CNPC to account for a third of primary energy use in 2050. This raises doubts about how effective China's efforts will be in tackling pollution.

Import options

The risk of slower demand growth on one hand, and the phase-out of coal losing momentum on the other, make forecasting China's future gas needs difficult. But assuming CNPC's predictions materialise, the next question is: 'What options does China have for increasing imports?'

Turkmenistan is currently China's single largest supplier, delivering close to 38bn cm last year via the Central Asia-China Pipeline (CACP) system. A further 7.1bn cm of gas came from Uzbekistan and 6.4bn cm from Kazakhstan, almost all via CACP. A further 3bn cm was piped from Myanmar, with remaining supplies – over half of imports – met with LNG.

Regardless of how China chooses to raise its intake of foreign gas, a significant expansion in its import infrastructure will likely be required. As of last year, the Chinese-operated CACP system was operating at 93% of its 55bn cm/y capacity, prompting speculation that Beijing may finally embark on construction of a long-delayed fourth 30bn cm/y string to remove bottleneck risks.

All three contributors to the pipeline's flows – Kazakhstan, Uzbekistan and Turkmenistan – have ambitions to export more gas. Turkmenistan has an agreement with place with China to eventually ramp up deliveries to 65bn cm/y, and has ample reserves to back up this plan. Until now, China has been reluctant to buy more Turkmen gas to avoid relying on a single supplier for more than a third of its imports. But soaring demand over the next few years, and an increase in purchases from other suppliers, should alleviate this concern. Both Kazakhstan and Uzbekistan have contracts to boost annual gas shipments to China to 10bn cm. The former already has output spare to meet this level, although the latter is struggling with domestic gas shortages and transmission losses.

Meanwhile, China's pipeline from Myanmar can currently supply up to 12bn cm/y of gas. This should see greater utilisation in the coming years depending on how quickly Myanmar's production ramps up (as there have been delays at several key projects).

A further 38bn cm/y will be supplied from Russia via the Power of Siberia pipeline, due to start up in December 2019, under a 30-year contract penned in 2014. Even assuming that Power of Siberia, the expanded CACP system and the China-Myanmar pipeline are all running at full capacity by 2035, this still leaves a supply gap of 102bn cm – most of which is likely to be filled by LNG. In other words, China's imports of the super-cooled gas – which soared by 51% last year to 53.9mn tonnes (around 73.3bn cm) – could reach as high as 175bn by 2035 if no other pipeline projects are advanced.

Russia versus LNG

China could expand its Central Asian import capacity beyond the fourth CACP string, but while Turkmenistan, with its 19.5tn cm of proven reserves, would be able to provide the necessary volumes, no plans are currently afoot. Central Asian gas arrives in China in its remote and restive north-western Xinjiang Province. Beyond supply risks, this gas has to travel 5,700 km across China to reach Beijing and other industrialised areas in its east.

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Photo: Shutterstock

China is likely to eventually sign additional import agreements with Russia, but how quickly this could happen is difficult to determine. After all, it took CNPC and Russia's Gazprom more than a decade to finalise terms for supplies via the Power of Siberia pipeline project. The two sides agreed on the broad outline of an arrangement for an extra 30bn cm/yr in 2014 via the proposed Power of Siberia 2. This pipeline would run from Russia's Altai region, across its narrow border with China between Kazakhstan and Mongolia. This is Russia's preferred option, as it would allow Gazprom to tap existing production capacity in Western Siberia and minimise its costs. China does not view this choice as expedient, however. The Altai pipeline would also enter the country in Xinjiang, creating the same issue with distances and supply risks as CACP.

As such, China appears to have mooted an alternative project. Following talks between CNPC and Gazprom in September 2019, Russian President Vladimir Putin ordered Gazprom head Alexei Miller to consider a pipeline through Mongolia, noting that the option had Chinese backing. Unlike the Altai option, supplies through Mongolia would only have to travel 4,800 km to reach Beijing. How negotiations for this option proceed will ultimately determine how China's rising gas import requirements will be shared between Russia and LNG. ●

Blue Sky policy

18%

Targeted reduction in PM2.5 levels* in 338 large-sized cities

10%

Reduction target for volatile organic compound (VOC) emissions

15%

Reduction in nitrogen oxide (NO_x) emissions

***atmospheric particulate matter with a diameter of less than 2 micrometres; all reductions are from 2015 baseline**

Source: Latest 2018–2020 action plan under China's Blue Sky policy, published July 2018