

# Watching Brief

## Volatility in Chinese Power Supply

28 September 2021

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### The Situation

Over the last month, and especially in the last two weeks, many Chinese provinces have adopted mandatory “ordered power supply” measures. In lay terms, this means power curbs and power rationing for electricity customers. Certain classes of power customer (particularly large industrial power users) have had their power disconnected entirely for stretches of 4 to 10 days, while others have faced curbs on their power usage during certain times of the day. This has primarily affected steel, cement, aluminium, and chemical fibres manufacturers. Some provinces have experienced power shortages so severe that residential consumers have had their power cut. By Monday afternoon, 27 September, Chinese media were reporting as many as 19 provinces had been affected by some form of power rationing.

### The Causes of the Power Rationing

There are several different drivers leading to this current state of power cuts and power rationing. They are summarized as follows:

1. There exists a shortfall of power supply in some provinces due to coal generators unwilling to operate in the face of expensive fuel coal prices and no mechanism for cost recovery.
2. Some provinces are off-track for meeting their annual energy control objectives for energy consumption and energy intensity (called the “dual-control” objectives for short) and have adopted power rationing as a short-term measure to get back on track for those objectives.
3. There is a fundamental capacity undersupply in some provinces i.e., local demand exceeds local available capacity, or the region was dependent on imports that have become unavailable due to one of the first two reasons.

Different parts of the country are experiencing some or all of these conditions. High coal prices region-wide mean most provinces are affected by the first issue, while some unfortunate regions are affected by two or all three simultaneously (see Figure 1).

### Discussion of the Various Causes of Power Curbing in China

#### *Coal-fired Generators Unwilling to Operate*

Over the last week, provinces all over China have begun reporting power cuts from their grid operators, accelerating a trend that had already been occurring in some parts of the

country since late August. The grid companies have responded to complaints from customers by saying that they have no power to dispatch, because demand is high, and supply is tight. Supply is tight, because coal generators all over the country are refusing to operate their plants at loss, in consideration of the high price of fuel.

Coal prices have soared in recent months and weeks, not just in China but around the entire region. Spot prices at Chinese ports in Qinhuangdao and Guangzhou have reached exaggerated levels usually not seen except for extreme cold snaps in the middle of the winter. Chinese domestic coal is also much more expensive than usual, with the major provincial indices for 5500 kcal coal all showing significant premiums versus last year, trading on 27 September for more than 1400 RMB/tonne. The options for imported coal are no more attractive, with Australian coal (Newcastle 6000) trading 205% higher YoY and Indonesian Argus 4200up 233% YoY on 27 September.

China Electricity Council has cited a “perfect storm” of factors leading to these high domestic coal prices, including coal mines halting production following safety incidents, applications for expansion of coal production being slow to get approved and ramp up, administrative reviews in Inner Mongolia related to anti-corruption proceedings that implicated several coal companies, international shipping affected by a typhoon in Southeast Asia, skyrocketing futures prices, an extended summer cooling season in southern China, and stockpiling for winter heating in northern China.

Against these soaring prices, coal generators have reduced their on-site inventories to a week or less. Some are idling their plants or only operating at a minimum capacity factor, as they are currently incurring losses on all their generation. The current on-grid coal tariff mechanism does not allow a sufficiently large fuel cost adjustment such that the generators could cover their losses on fuel. We believe this to be the primary and most relevant factor currently contributing to power shortages across China.

Figure 1: Chinese Provinces and their Power Rationing Status, 27 September 2021



Note: Chongqing, Sichuan and Inner Mongolia were rationing power in late August, but it's unclear from Chinese media whether they still are now.

Source: The Lantau Group

## Related Media Coverage:

### Caixin (Chinese):

[www.caixin.com/2021-09-27/101778593.html](http://www.caixin.com/2021-09-27/101778593.html)

### Caixin Global (English):

[www.caixinglobal.com/2021-09-27/key-apple-tesla-suppliers-halt-production-amid-china-power-crunch-101778303.html](http://www.caixinglobal.com/2021-09-27/key-apple-tesla-suppliers-halt-production-amid-china-power-crunch-101778303.html)

### Bloomberg Quint:

[www.bloombergquint.com/china/china-media-say-steps-being-taken-to-cool-prices-energy-update](http://www.bloombergquint.com/china/china-media-say-steps-being-taken-to-cool-prices-energy-update)

### Wall Street Journal:

[www.wsj.com/articles/china-power-outages-pose-new-threat-to-supplies-of-chips-and-other-goods-11632769617](http://www.wsj.com/articles/china-power-outages-pose-new-threat-to-supplies-of-chips-and-other-goods-11632769617)

## *Dual-control Objectives*

On 18 September, the NDRC released its “Plan for Improving Energy Consumption Intensity and Volume”, which has been treated as a provincial “report card” of the various provinces’ progress toward their energy consumption and energy intensity reduction goals. A province’s status with regard to these goals was indicated by a stoplight system, with green indicating minimal problems, yellow indicating moderate concern, and red indicating that the province was severely falling short of its energy goals. Provinces ranked “dual red” (i.e., missing their goals for both power consumption and power intensity) included Qinghai, Ningxia, Guangxi, Guangdong, Fujian, Yunnan, and Jiangsu. Other provinces with only one red indicator like Hubei were still bundled together into the so-called “Tier 1” urgency class for dual-control measures. Based on these scores, some provinces began curbing power to certain high-intensity industrial and commercial power consumers. In Jiangsu, malls were asked to open later by half an hour to conserve energy, while in Guangdong, industrial users were informed they would have their power shut off for several days to a week or longer to reduce consumption volume.

We believe the implementation of the ‘dual control’ policy response is a secondary cause compared to expensive coal. Were it simply a case of provincial power authorities trying to get back on track for their dual-control report card, we do not believe the power rationing would extend all the way to residential consumers, such as has been reported in Liaoning (which had no “red lights” on its dual-control report card). Power curbing efforts motivated by the results of the dual-control report card have featured prominently in Chinese media explanations, with coal prices mentioned secondarily, but we believe these two should be reversed.

Logically, short-term power cuts would not have much of a long-term effect on easing “dual-red” problems, as the too-high consumption will still exist once the power is turned back on. Furthermore, provincial-level power dispatch curbing does little to control industrial power intensity, as it decreases both power usage and industrial output. The true grassroots-level work to get a dual-red province back on track with its power consumption and intensity goals involves identifying specific manufacturers that have exceeded industry benchmarks for power consumption/intensity and imposing penalties until they reform into compliance. This work is already being done at the grassroots level in Liaoning, Guangdong, and other provinces, and has been covered by Chinese media.

Notably, renewable energy does not count against the overall provincial consumption quota, so provincial dispatch centres can still try to secure additional renewable electricity volumes from other regions in order to supply end-users (as long as the province’s minimum RPS targets have already been met).

## *Lack of Capacity*

To some extent, lack of generating capacity is affecting power shortages too, although this may be difficult to differentiate from coal generators unwilling to operate. In the Central Grid, for example, power supply can be observed to be often tight during periods of peak demand, first demonstrated by power shortages in Hunan last winter and seen again with Hubei’s power shortages earlier in the summer of 2021. Despite the Central Grid’s large oversupply of nameplate capacity, poor hydro conditions over the last year will have reduced real dispatchable capacity significantly. In Yunnan, major aluminium companies have reported controls on their electricity consumption going all the way back to May, indicating very tight power supply preceding both the “dual control” measures and the recent spike in coal prices (again attributable to poor hydro performance in Yunnan). In Liaoning, poor wind generation last week exacerbated the shortfall already caused by expensive coal. Overall, however, this factor is secondary to the first two factors described above. After all, for the most part, China’s huge fleet of

coal-fired generation capacity has operated at levels far lower than full output for many years running. This surplus capacity is still sitting unused now, indicating unwillingness to pay the currently much higher prices for coal.

### *Northeast China Has Been Hit Especially Hard*

The three provinces that make up Northeast China (Liaoning, Jilin, Heilongjiang) have been the hardest hit by the power shortages, evidenced by the fact that this is the only region where residential power consumption is also being curbed. Chinese media platform Caixin reported on the evening of 27 September 2021 that coal generators in the region were operating at just 50% capacity, some with only 2 days of fuel inventory. One Caixin interviewee working at a coal plant in Liaoning stated that at current coal prices, their plant is running a loss of 7 RMB cents/kWh. That same interviewee revealed the NDRC is arranging emergency coal supplies of 10 million tonnes to be distributed to generators in the region. A large plant may hope to receive 100,000 tonnes, sufficient for approximately 20 days of generation.

In addition to the coal generators unwilling to operate, Northeast China also has to contend with a high degree of exposure to intermittent wind generation, with nearly 30 GW of installed capacity across the three provinces. Under normal conditions, the wind fleet should be able to generate around 10 GW, but when wind conditions are very poor, such as was experienced last week from September 23 to 25, wind's contribution to the grid may drop to several GWs or even hundreds of MWs. During that period, despite having already trimmed some 5GW of peak demand, the grid was still undersupplied, and more extreme measures were taken to protect the grid, including power cuts to residential users.

Despite the local power shortage, the Northeast Grid has continued to meet most of its contractual obligations for power exports, transmitting some 4.8 GW to the North Grid (mostly to Shandong) via the Lugu and Gaoling UHV lines.

## Relief for Generators May Be on the Horizon

On 23 September, industry media reported that the NDRC and NEA had dispatched inspection teams to various provinces to work on two separate items: ramping up coal production domestically and reviewing the application of the coal on-grid tariff mechanism. Both items speak to the need to provide economic relief for generators, both by expanding the supply of coal and by evaluating the cost-recovery mechanism for coal generators. The emergency coal supplies being dispatched to Liaoning appear to be related to this action.

By 26 September, a new tariff adjustment had been announced for Guangdong Province. By official mandate, monthly trading prices in the wholesale power market saw their upper limit adjusted, allowing volumes of power to temporarily trade a rate 10% higher than the current coal on-grid benchmark (from 0.453 to 0.4983 RMB/kWh). Additionally, (and crucially) *these costs will be borne entirely by the end-user*, marking the first instance where end-users in China have been expected to absorb fluctuations in the price of fuel (versus, e.g., the generator itself or the grid company). It is important and notable that the effort to provide cost-recovery relief to coal-fired generators in Guangdong took the form of a market action, rather than a direct bailout or subsidy to the generator.

It remains to be seen whether this trading tariff hike will be sufficient to incentivize Guangdong generators to procure coal and ramp up operations again, but the mandate also contains language indicating that further adjustments are possible. We expect to see similar policies adopted in other provinces struggling with high coal prices and idling

generators. We note that a 10% hike to Liaoning's current on-grid coal tariff would yield a premium of 3.75 RMB cents, insufficient to cover the losses reported by the coal generator in the Caixin interview above.

These measures will do little, however, to address the power rationing mandated by the dual-control policies, which end users will likely have to learn to live with in the short run, even if coal prices settle or generators gain adequate relief via the higher market tariffs.

## Commentary

This is the first case we know of where power consumers in China were asked to accept higher power costs to keep their lights on. In the past, these higher costs would have been assumed by the generator or grid company, never by the power consumers (who enjoy some of the lowest power tariffs in East Asia, particularly for industrial and commercial users). In a long-term strategic sense, requiring end-users to pay more for power (particularly coal power) is a positive step for China's decarbonisation goals. More expensive coal-fired power motivates end-users to invest in energy efficiency, reduce energy intensity, and build onsite generation and storage. Expensive coal power stimulates demand for relatively cheaper wind and solar, creating the economic incentive and conducive conditions for renewables developers to build more. As long as the industrial segments affected by the higher power prices can afford to pay higher tariffs without outsized impact to their profitability, higher coal tariffs should be seen as a powerful and effective tool to shape energy markets, not just for addressing the current coal supply crunch, but also for driving forward its long-term environmental and energy goals.

It is also significant how China is showing off its new capacity to meet market problems with market actions. As China's power market continues to liberalise, episodes such as these will present new and unprecedented challenges to the power sector, already straining under the internal growing pains of transitioning from its past era of heavy regulation to a future era of relative liberalisation. Without the wholesale markets, there's no question that Chinese policymakers would be forced to adopt a more heavy-handed regulatory fix to the current issues. It remains to be seen whether a 10% increase in monthly settlement prices will be sufficient to resolve the generation shortfall, but it's a watershed moment that they're even giving it a try.

**The situation is changing rapidly and we understand that companies with exposure to Chinese power markets are concerned about what this means for your bottom line. TLG is ready and available to discuss what this means for your operations and help you with strategies to mitigate your exposure.**

## About the Author:

**David Fishman** has 7 years of experience in the Chinese power sector, with 5 of those years focused on nuclear power. At TLG, he is a project manager handling China energy sector work in the solar, wind, nuclear, and storage industries. David joined TLG by way of TLG's acquisition of Nicobar Group, a nuclear power specialty consultancy based in Shanghai. This acquisition has formed the basis of TLG's Shanghai team and marks our increased commitment to serving the needs of our customers in Mainland China.

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