

China Watching Brief

Measures to Accelerate and Deepen Power Sector Reforms Announced in China

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The Situation

On 12 October 2021, China's top economic planner the National Development and Reform Commission (NDRC) held a press briefing to announce major changes to the power pricing arrangements for coal-fired power, as well as the way in which commercial and industrial power customers buy power. While the timing for these changes was obviously influenced by the recent power shortages, their content goes far beyond any short-term measures focused on resolving the current power supply issues. These new regulations represent a large step in China's power sector liberalisation journey, with significant potential knock-on effects for its decarbonisation goals as well. This round of reforms is at least as important as the watershed "Document No. 9" released back in 2015, if not more.

The regulatory notice, NDRC Notice No. 1439, effective October 15, contains four major announcements:

1. **Coal offtake into wholesale markets:** All coal-fired generators are now required to sell 100% of their power into the wholesale markets, with the 'on grid' pricing for coal being set according to the 'base + float' coal price mechanism. For now, it appears renewable energy will continue to be benchmarked to the 'base' price portion applicable to coal fired generation.
2. **The on-grid price of coal allowed to rise further:** The 'base+ floating' coal price mechanism used in the wholesale market will see its **float range extended**. The float component may now fluctuate as much as 20% higher or lower relative to the base price. For energy intensive industries, there is *no* upwards cap on the float range. This policy does not apply to the spot market.
3. **C&I customers must now procure power in the wholesale markets:** The flat 'catalogue' tariff for commercial and industrial (C&I) users is to be cancelled in all regions. C&I power customers are now expected to procure their power via open market channels (either via direct participation in the open markets or via power aggregators/retailers). All customers of voltage level 10 kV or higher are urged to enter the wholesale market immediately, while other customers (lower than 10 kV) are instructed to enter the market as soon as possible. If power consumers have not identified a power supplier via an open market channel, they will continue to purchase power from the grid company during the transition period, with prices now based on wholesale rates. The grid company must give the power users at least one month's notice before switching from the catalogue rates to the wholesale rates. For users already trading in the open market, if they turn to the grid company for last-course power supply, they will have to pay 50% more than other power customers for the same power.
4. **Residential and agricultural sectors are exempt:** The above provisions do not apply for residential or certain special customer groups (including agricultural, public welfare, education, government services), who will continue to use the listed catalogue tariffs.

China's 'base + float' coal price mechanism was released in 2019, replacing the 'coal benchmark' that had been used previously. While the "base" component was fixed at the same level as the old coal benchmark, the "float" component was intended to provide flexibility (to rise up to 10% or fall up to 15%) in response to fluctuations in the price of fuel. Despite consistent rising coal prices throughout 2021, the +10% 'float' was not activated until the end of September.

Since August 2021, Time of Use tariffs have been mandated as a tool for demand shifting and reduction of peak load in all provinces across China, with certain requirements for the minimum difference between peak and off-peak power pricing. These 'Time of Use' tariffs will still be maintained for trading in wholesale markets and will be organized in the power purchase contracts, although the regulation here didn't offer complete details about how those would be applied.

What does it mean that coal-fired power must be entirely offloaded in the wholesale markets? And why is it important that the tariff cap has been raised?

This measure would appear to be the end of any kind of guaranteed offtake for coal-fired power in China. Under dispatch regulation pre-2018, all coal-fired power plants in China could look forward to a guaranteed number of offtake hours annually, regardless of the cost competitiveness of the power generated. Critics of the policy correctly pointed out that this incentivised approval of unnecessary and excessive coal capacity, blocking renewables from getting onto the grid and contributing to their curtailment. Although renewable energy was supposed to enjoy priority dispatch according to the Renewable Energy Law, it was not followed strictly. In 2019, renewables began to receive their guaranteed dispatch and coal generators were squeezed out of the dispatch queue instead. Forcing 100% of coal generation to be sold into the market strips away any guaranteed dispatch privileges that may have existed. Coal generation that is unable to secure dispatch hours will increasingly face pressure to close, and the incentives for the previously rampant overbuilding have disappeared.

Accordingly, for the first time ever, *all* coal-fired power is going to be fully exposed to the wholesale markets. It will be priced at the base coal price plus some float range (which may now rise as much as 20% versus the base price). For instance, a coal generator in Guangdong, where the base price of coal-fired power is 0.453 CNY/kWh, could now theoretically sell its power for as high as 0.5436 CNY/kWh, if the price of fuel rises and a higher tariff is required to keep generators profitable. Power consumers exposed to wholesale market prices will absorb these costs directly. Back in late September, Guangdong Province hiked its wholesale on-grid coal tariffs by 10%, which was the maximum allowed under the policy effective at that time, in an attempt to provide greater economic incentive for generators to produce power. If the price of coal continues to rise, generators may now look forward to a further raising of the tariff cap, all the way to 20% higher than the base price.

Besides this, energy intensive power consumers have no price cap in the wholesale markets. Thus, generators and high-intensity power customers are allowed to settle at any price agreeable to both parties, which might be handy in future periods of extreme power scarcity.

Under this pricing scheme, solar, wind, and nuclear power, which are benchmarked to the base price of coal, but not exposed to the float component, should become the cheapest available power in the wholesale markets, under current conditions (except where hydro is plentiful). The longer this situation maintains, the more power consumers will gravitate toward the cheapest available power, stimulating demand for the capacity that produces the most affordable and stable tariffs.

In summary, these reforms provide cost-recovery relief for desperate coal generators in the short-term but could have undesirable consequences for them in the mid- to long-term. Without their guaranteed operating hours, older, smaller, less efficient, or sub-optimally located plants will likely find it challenging to compete in the open power markets. Even if coal prices return to stable and more affordable levels, the coal capacity oversupply means some generators are going to fall out of the dispatch merit order.

What does that mean, that the catalogue price has been cancelled for C&I customers?

In recent years in China, power customers have had two main ways to procure power: via the wholesale markets, where the power purchase price is decided via bidding or direct negotiation, or from the grid company/power retail company, where the power

price is fixed according to a schedule of rates set at the provincial level. These catalogue rates vary by voltage level, customer class, and time of day. By cancelling the catalogue rates for two of the customer classes, (commercial and industrial users) these power consumers are now required to go through the wholesale markets for all of their power consumption. For power customers that were not yet using the wholesale markets, and that don't intend to, the local grid company has been instructed to purchase power on their behalf as an agent, and then sell the power to consumers via this channel. In a practical sense, those companies will see little change to the way they buy and consume power, except that the tariff offered by the grid company will become more cost-reflective (and as a result, likely more volatile). Other C&I power users who were previously buying their power via power aggregators or wholesalers will see something similar. As their aggregator is going to be exposed to higher price volatility, the terms of the contract signed between aggregator and power user will have to become more flexible. In the short term, power consumers accustomed to paying predictable catalogue rates for power will have to make themselves comfortable with more volatile (and generally higher) power prices. Over the mid- to long-term, industrial and commercial power users will influence the shape of the wholesale markets by virtue of their market behaviour. Their choices about the type of power products, type of contracts, and of course the price they are willing to pay, will have a direct impact on the types of generation assets added to the system.

What's the big picture here, and why is this happening now?

Taken together, these policies represent a huge step forward toward liberalised power markets, where power consumers influence the supply and pricing of power products by making economic choices, and power generators subsequently invest in new capacity based on the demands of power consumers. The opening-up of the Chinese power sector has been a long-stated objective for policymakers, but no clear description of what the next steps would entail existed, never mind a clear timeline for implementation. That uncertainty may now have been cleared up with these new regulations.

The timing, of course, is clearly related to the ongoing coal supply crunch and resultant power supply shortages that have been making news in and out of China for the last few weeks. Policymakers may have been content with a slow, measured rollout of market reforms a few months ago, but that sentiment seems to have changed drastically when the lights started to go out in factories across the country. Besides being very embarrassing, the widespread breakdown of power security served to highlight just how vulnerable the Chinese power sector was in its half-liberalised state, a chimera of wholesale power markets with controlled outcomes, of fairly freely-traded coal but regulated on-grid pricing, of consumers paying the same catalogue price for coal power and wind power alike, despite their vastly different generation costs. In its fragile in-between state, caught between the efficiency and controlled outcomes of centralization and the efficiency of the market's 'invisible hand', this kind of issue was bound to appear sooner or later. Once it did, and began wreaking havoc, it became very clear that the time to take the deeper plunge into market reform had arrived.

A few years ago, aggressive power market liberalisation in China would have meant exposing renewable energy to price competition for which it was not yet prepared. But that was a few years ago. Now, renewables are much more competitive, especially compared to some of the older, less efficient coal plants in the fleet. Current coal scarcity and pricing shocks aside, the long-term trend for coal prices is expected to be rising, while LCOE for newbuild renewables is forecast to fall (aside from the current high development costs for solar PV due to skyrocketing costs of silicon). Going forward, market-based competition among fuel sources should result in increasingly attractive competitive outcomes for renewable energy. China taking this large step forward on its pathway to power market liberalization, can be seen as a catalyst for an equally-large step forward on its pathway to power sector decarbonisation.

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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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Going forward, what are we watching for?

A few key questions to guide our ongoing observations of the market, and why they matter:

- **How frequently will the float pricing component be revised in the future?** Clearly there were many missed opportunities to adjust the float price in the weeks and months leading up to September 30, at which point the situation was already so dire for coal generators that many were simply refusing to generate. More than a failure of the mechanism to work as intended, this was a failure of those in charge of administering it, apparently reluctant to pass extra costs on to power consumers. In the future, we hope to see consistent efforts to evaluate and revise the on-grid coal price, ideally on a monthly basis, if not even more frequently, to ensure prices in the wholesale markets are as cost-reflective as possible.
- **When will it no longer make sense for the coal base price to serve as the on-grid benchmark for renewables and nuclear?** If coal prices maintain their high volatility and LCOE for renewables drop, there may pressure for renewables to delink from the coal on-grid tariff and use something else as a benchmark, or perhaps even trade freely in the wholesale markets with no reference benchmark at all. This scenario becomes more likely to emerge if something causes LCOE of renewables and coal-fired to diverge significantly and irreversibly, like sustained decline in solar technology costs, or long-term high coal prices.
- **How will generators and power plant developers respond?** If the economic forces in the wholesale markets are working the way they should, we could see a surge of wind and solar development, with developers looking to take advantage of strong demand. Of course, it will take time for developers to get comfortable with the new tariff structures, but the general direction appears favourable for renewable energy development. On the other hand, factors such as uncertainty about forward cost curves of mono/polysilicon or a belief that coal prices will come down rapidly (or even that an overcorrection could lead to a glut of coal) could also lead to developer hesitancy.
- **How long until capacity markets emerge, and what effect will they have?** The regulation does make a brief mention of "exploring the establishment of a capacity market" as a key future area of investigation for sector planners. As we move into a new era of China power, where overbuilding is no longer incentivised, supply/demand fundamentals are likely to get tighter, variable generation draws closer to 20% of the capacity mix, and non-economic [coal-fired] generating assets may be dropping out of the market, a capacity market to incentivise strategic flexible or peaking assets will become necessary.

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