

The impact of increased coal power capacity in Chinese power system



Author

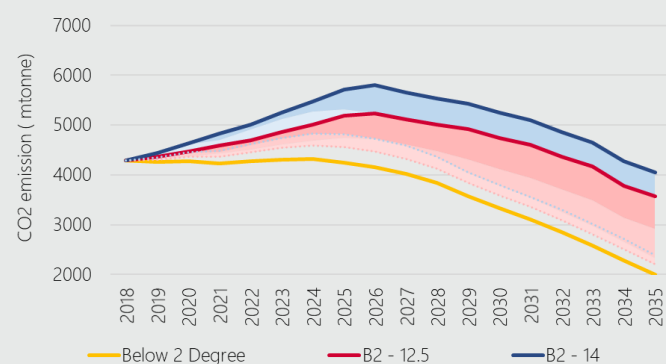
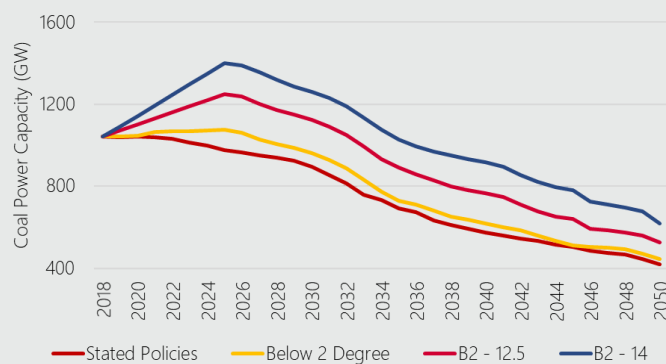
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Background

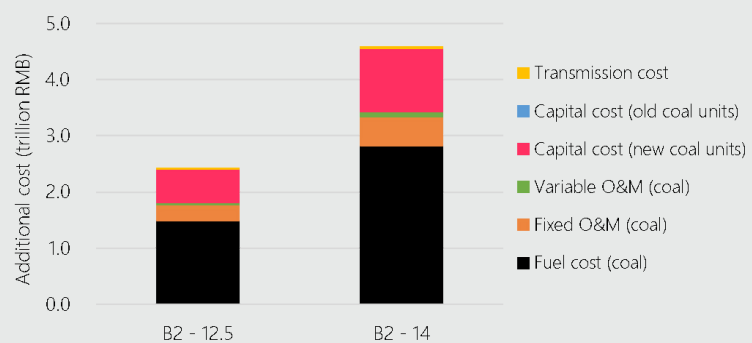
The installed coal power capacity in China amounted to 1,040 GW by 2019. Although China's coal-fired plant fleet is among the most efficient, cheapest and new in the world, the government has clear goals to control the coal consumption under 4.2 billion tonnes by 2020, as well as to comply with the CO₂ emissions reduction commitment in the Paris Agreement. The report *China Renewable Energy Outlook 2019* (CREO 2019) is the flagship publication of the China National Renewable Energy Centre, and analyses the 2050 transition roadmap to achieve a clean, low-carbon, safe and efficient energy system. This present study is complementary to CREO 2019, aiming to investigate the impacts of adding more coal power capacity during the 14th Five-Year period under the four different scenarios:

- Stated Policies: Coal power peaks by 2020; ~30 GW new coal power capacity installed annually in 2021-2025
- Below 2 Degree: Coal power peaks by 2025 at ~1,100 GW; higher power demand compared to Stated Policies
- B2 – 12.5: Coal power reaches 1,250 GW by 2025; rest the same as Below 2 Degree
- B2 – 14: Coal power reaches 1,400 GW by 2025; rest the same as Below 2 Degree

Modelling results



"The figure at the right hand side shows the additional investments from 2019 to 2050 in the power sector with 12.5/14 GW coal capacity in 2025. As more coal power is installed in the system, more capital needs to be invested. In addition, more fuel cost is spent on ensuring profitability of the power plants."



Conclusion and suggestions

- A larger 14th Five-Year target for coal power will postpone the national carbon emission peak from 2024 to 2026, implying China will face bigger stress to fulfill its commitment to the Paris Agreement, i.e. peak by 2030.
- CO₂ emissions of the power sector in B2-14 will increase by 20% compared to B2 from 2021 to 2030, provided the annual utilization hours of coal power plants are between 3,000 and 4,000. In overall, the additional emissions will potentially last until the new plants retire which will increase CO₂ emissions by 40% from 2018 to 2050. Adding large amounts of coal power further intensifies competition among all the coal power plants.
- It will also create/result in overcapacity, and investments might end up stranded in the magnitude of RMB 1 to 5 trillion. Considering how wind and solar power will be more cost efficient compared to coal in the future, the coal power fleet would need substantial subsidies to survive in such a situation.
- Hence, the analysis suggests to maintain the total coal power capacity within the 13th Five-Year target, i.e. 1,100 GW, and to strictly control the investment of new coal power plants.