

## Coal: Stranded Assets in China

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### Background and Definition

Stranded assets are “assets that have suffered from unanticipated or premature write-downs, devaluations or conversion to liabilities”, which could result from changes in a variety of factors including environment, resources, government regulation, technologies, and social norms. (Caldecott Ben, 2015; Caldecott et al., 2016). As the world is addressing climate change and the progress of fossil-fuel phase-out, coal resources could become stranded.

China is experiencing the economic “New Normal” with a slower economic growth and a transition from the heavy industry sector to the service sector. Thermal power plants operating hours remained at a low level below 5000 hours per year during the past five years. We define coal power stranded assets as the assets that have to retire ahead of their lifetime because of the competitive environment and other external conditions. Given the overcapacity of coal power plants and economic transition in China, the extra coal power plants will become stranded assets. With the ongoing power market reform in China, less-efficient coal plants will face increasing challenges of being phased out (Yuan et al., 2019). Over 50% of coal power companies are losing money in 2018 based on an China Electricity Council estimate.

It is very important to understand the current stranded assets of coal power plants in China and provide policy recommendations to tackle this potential issue. In the next section, we analyze the existing drivers for the coal stranded assets in China. Then we evaluate coal stranded assets in 2030 in China. Finally, we provide policy recommendations.

### Drivers of stranded assets in China

**Environmental Impacts:** Environmental pollution issues have drawn more and more attention in China. Chinese central and local governments have set many targets on the efficiency of and emissions from coal power plants. In 2015, the government required coal power plants in eastern, central, and western China to complete a low-emission retrofit by 2017, 2018, and 2020, respectively (NDRC, NEA and MEE, 2015). Since 2017, China initiated the national carbon trading program starting from the power sector (NDRC, 2017). As a result, coal power plants face a “double control”, both environmental pollutant and carbon emissions.

**Clean Energy Transition:** China has committed to achieve 50% of non-fossil fuel power generation by 2030 (NDRC and NEA, 2016), almost double from 28% in 2017. To achieve this goal, coal consumption in the power sector needs to be controlled and its clean and efficient use needs to be promoted. In addition, renewable energy development will also facilitate the clean energy transition, which also limits the development of coal power plants.

**Overcapacity:** Coal power overcapacity in China

has been widely recognized and China National Energy Agency has published several documents to reduce coal power overcapacity since 2018. During the 13th Five-Year Plan, China has stopped or postponed new coal power plant construction of 150 GW and phased out 20 GW less-efficient coal plants (NDRC et al., 2017).

**Power Market Reform:** “Opinions of Further Power Sector Reform” (Document 9) started the new round of power market reform in 2015 (the State Council, 2015). Eight provinces/regions have been identified to pilot wholesale markets to enhance the role of markets in resources allocation (NDRC and NEA, 2017). With the increase of market-based power transaction, coal power plants face growing pressure to make profits.

### Quantifying risks and stranded assets

Given the above external conditions, a lot of coal power plants bear a high risk of exiting the market and becoming stranded assets. We estimate coal stranded assets in 2030 under two different scenarios and evaluate the potential impacts on different stakeholders.

Under the reference scenario, where no further control policies are implemented, those new projects postponed or stopped during the 13<sup>th</sup> FYP will continue to be constructed from 2020 to 2030, and by 2030, total coal installed capacity reaches 1200 GW. If the entrance of new plants force old plants to exit the market, those old power plants will become stranded assets. In 2030, total value of stranded assets is estimated to be over 103 billion yuan.

Under the supply control scenario, where total coal installed capacity is constrained to 1100 GW by 2030 and stricter technical and environmental standards are implemented to force less-efficient plants to retire or retrofit into flexible operating plants. the total value of stranded assets could be 40 billion yuan, much lower than the reference scenario.

Under both scenarios, we broke down the stranded assets value into central, local, and bank stranded assets. We found that central stranded assets account for over 40% of total stranded assets, while local stranded assets account for less than 20% and banks bear the rest. As a result, coal power plants stranded assets will be mainly government-owned assets.

### Policy Recommendations

To address the stranded assets issue, we provide policy recommendations in three areas, energy policy,

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fiscal policy, and financial policy.

**Energy Policy:** Make maximum use of the existing fleet. More specifically, the government could introduce a capacity auction mechanism to provide proper capacity prices for new and old units. For coal plants with high flexibility, strategic contracts could be signed to use those plants as back-up plants and peaker plants. For inefficient capacities that will be phased out from the power system, the government could provide compensation based on the years of operation. The government should also facilitate back pressure retrofitting for cogeneration units with longer service life and heating

Stringently control new capacity and eliminate backward capacity. From 2020 to 2030, no new coal power projects should be approved and others that were suspended during the 13th FYP should be built in order. Newly built coal power plants should stringently follow the requirements (State Council, 2016), and all the projects shall be subject to provincial government approval based on China's coal cap project, and must not be registered under the industrial project for archival purpose. For backward fleets that cannot meet the energy efficiency standards, they should be shut down and phased out.

Implement power market reform and a national carbon trading mechanism. First, a power market should be established in order to enable effective price signals to play a decisive role in guiding power resource investment. In addition the government should turn the cost-compensated ancillary service compensation mechanism, which is now determined by the administration, to a market-oriented value compensation mechanism. Meanwhile, quantify the system value of the service, consider the opportunity cost of the ancillary service, and replace the planning mechanism by adjusting the market mechanism. When setting up the market, both energy price and capacity price should be taken into consideration. Establishing the national carbon market can release an external price signal to guide coal power unit retrofitting and phase out. The release of external price signals would encourage enterprises to adopt energy-saving and emission-reduction measures, guide the enterprises to exercise retrofitting of units or eliminating outdated units, guide the direction of power investment, and improve industrial upgrading.

Combine the market mechanisms and judicial disposition to assist the disposing of zombie enterprises. Governments at all levels should have a deep understanding of the company's situation and propose a plan of disposition. The more complicated and difficult ones, such as bankruptcy cases, shall be handed over to the local judicial authorities for standardized judicial disposal.

**Fiscal/state-owned asset handling policy:** Establish special funds to assist the resettlement of personnel from the phased out projects. Money for the special funds could be taken partially from the power industrial restructuring and upgrading fund. The funds can be used to provide subsidies to laid-off employees to start new business or provide one-time lump-sum compensation to them.

Adjust the value base of preserving and increasing State-owned Enterprises (SOE) assets and eliminate the impact of asset write-down. In conducting supply side reforms, the central SOE generation groups have withdrawn some ineffective or inefficient assets, causing asset writedowns, which may affect the assessment of preserving and increasing SOE assets. We suggest that the State-owned Assets Supervision and Administration Commission of the State Council's (SASAC) separate this part of the withdraw assets from the whole when conducting an assessment, adjusting the asset base and ensuring that the assessments not have a negative impact on the companies that are actively conducting supply side reforms.

**Financial policy:** Provide financial institution support to facilitate supply side structural reforms while ensuring that the power system is stably operated. Continue providing credit to those in-service units that meet the environmental requirements, actively contribute to power generation, and fulfill corresponding peak-adjustment tasks. On the contrary, companies that do not meet the environmental requirements, suffer long-term losses and have low market competitiveness should have related loans withdrawn by the financial sector in a timely fashion.

## References

- Caldecott, B. Stranded Assets and Subcritical Coal, The Risk to Companies and Investors, Stranded Assets Programme, SSEE, University of Oxford, May 2015.
- Caldecott, B., Kruitwagen, L., Dericks, G., Daniel J., Tulloch., Kok, I., Mitchell J. Stranded Assets and Thermal Coal An analysis of environment-related risk exposure, Stranded Assets Programme, SSEE, University of Oxford, January 2016.
- NDRC, NEA, MEE, Full implementation of the ultra-low emission and energy-saving transformation work plan for coal-fired power plants, 2015.
- <http://www.mee.gov.cn/gkml/hbb/bwj/201512/W020151215366215476108.pdf>
- NDRC, National Carbon Emissions Trading Market Construction Plan (Power Generation Industry), 2017. [http://www.ndrc.gov.cn/zcfb/gfxwj/201712/t20171220\\_871127.html](http://www.ndrc.gov.cn/zcfb/gfxwj/201712/t20171220_871127.html)
- NDRC and NEA, Energy Production and Consumption Revolution Strategy (2016-2030), 2016
- [http://www.ndrc.gov.cn/zcfb/zcfbtz/201704/t20170425\\_845284.html](http://www.ndrc.gov.cn/zcfb/zcfbtz/201704/t20170425_845284.html)
- NDRC et al., Opinions on Promoting Supply-side Structural Reform and Preventing and Resolving the Risk of Overcapacity of Coal-fired Power, 2017.
- [http://www.nea.gov.cn/2017-08/14/c\\_136525062.htm](http://www.nea.gov.cn/2017-08/14/c_136525062.htm)
- NDRC and NEA, Notice on Piloting the Construction of Electric Power Spot Market, 2017 [http://www.ndrc.gov.cn/zcfb/zcfbtz/201709/t20170905\\_860109.html](http://www.ndrc.gov.cn/zcfb/zcfbtz/201709/t20170905_860109.html)
- The State Council of China, Some opinions on further deepening of the reform of electric power system. China: The State Council, 2015.
- [http://tgs.ndrc.gov.cn/zywj/201601/t20160129\\_773852.html](http://tgs.ndrc.gov.cn/zywj/201601/t20160129_773852.html)
- Yuan, J.H., Guo, X.X., Zhang, W.R., Chen, S.S., Ai, Y., Zhao, C.H. 2019. Deregulation of power generation planning and elimination of coal power subsidy in China. Utilities Policy, 57,1-15.