

How do Enterprises Achieve Carbon Neutrality? A Case from China

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Abstract

In order to realize the goal of the Paris Agreement, Chinese enterprises in different sectors have announced to make contributions, demonstrating the determination to adopt more rigorous policies and measures to achieve a peak in carbon emissions by 2030 and carbon neutrality by 2060. China's pledge to carbon neutrality not only has a profound impact on its economic reforms, but also spurs the country to be more proactive in global climate governance.

Keywords

Carbon Neutrality; Decarbonization Strategies; Emission.

1. INTRODUCTION

Climate change is inseparable from the greenhouse effect. For the past 100 years, average temperature in the Arctic has increased by approximately 5°C, which significantly reduces the area covered by the ice cap. Many coastal regions would be submerged and many pacific island countries would also disappear if the sea level rises. The Intergovernmental Panel on Climate Change (IPCC) proposes special report on global warming of 1.5°C: "In case the global climate warming continues at the current rate, the global warming of 1.5°C will be reached at a certain time during the period from 2030 to 2052. At the end of this century, the global warming will be approximately 3°C."

2. BACKGROUND OF CARBON NEUTRALITY

2015 Paris Agreement specifies the objective of realizing net-zero emission in the second half of this century (Biesenbender, S. 2015). According to the Paris Agreement, the increase in global average temperature will be held well 2°C above pre-industrial levels at the end of this century (Figure 1, black line). Chairman Xi Jinping promised to accomplish the strategic objective of "China will take stronger regulations and initiatives, and we aim to have CO₂ emissions peak before 2030 and achieve carbon neutrality before 2060." Thus, what is Carbon Neutrality? Carbon Neutrality refers to the realization of "zero-CO₂ emission" by offsetting CO₂ emissions through forest planting, energy conservation and emission reduction and other forms, as per total emission of greenhouse gases produced, directly or indirectly, in a certain period, as measured and calculated by enterprises, groups or individuals (Fusaro, P. C. 2010).

China needs a more aggressive pathway than the Paris Agreement to be carbon neutral by 2060, that is 1.5°C pathway. On top of the baseline target of the Paris Agreement, efforts are made to limit temperature increase to 1.5°C by end of this century, carbon emission peaking by 2025 under 1.5°C pathway (ahead of 2030 commitment); the 2060 carbon neutrality target (i.e.,

zero net carbon emissions (all GHGs)) can be achieved, with net zero CO₂ emissions by 2050 (Figure 1, green line).

3. CURRENT GHG EMISSION AND CARBON PRICE SITUATION IN CHINA

At present, our CO₂ emission has ranked the first in the world and takes 28% of global emission. Current situation about Greenhouse Gas (GHG) emission in China is: large amount of total GHG emission in fast acceleration, and high CO₂ emission strength of unit GDP. CO₂ emission and climate change have become the environmental problems at a level beyond general level, and have brought to the sustainable economic and social development in China the realistic threats which continue and show a constantly intensifying trend, causing a severe situation. Almost half of China's carbon emissions today come from the energy sector; steel and building materials account for another third (Figure 2).

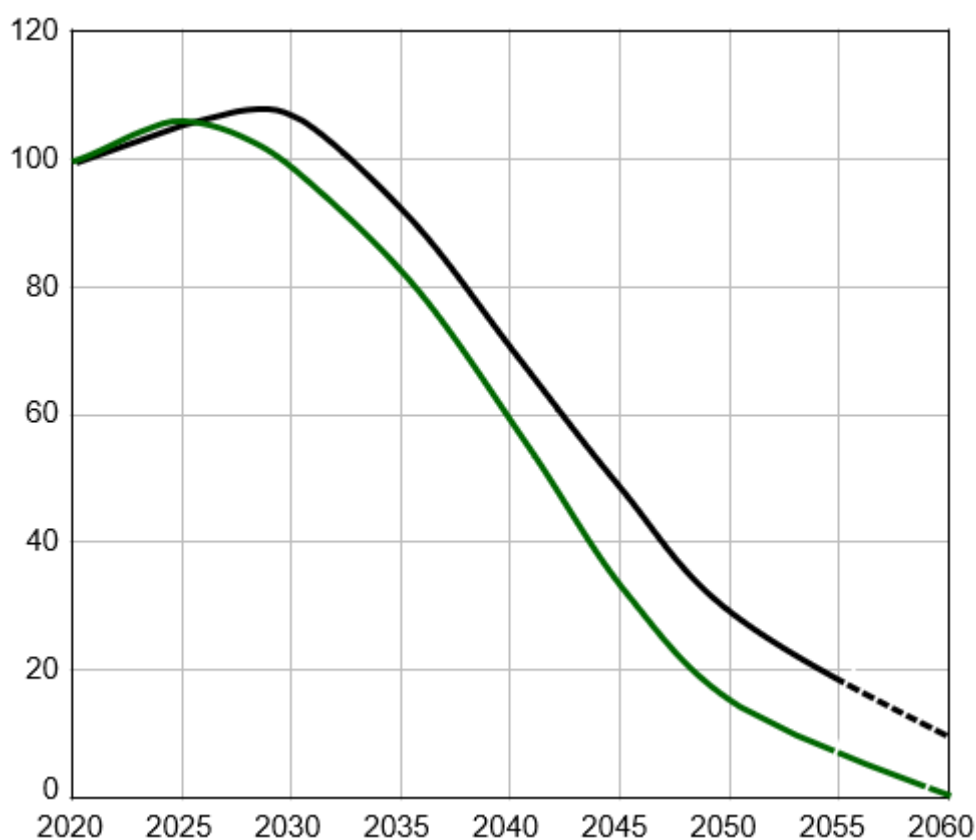


Figure 1. GHG Emissions (100M tCO₂)

Source: Report from Institute of Climate Change and Substitute Development, Tsinghua University.

It can be included that energy mix restructuring is critical to carbon neutrality. Carbon emissions from energy (including both electricity/heat generation and the other primary energy use of other industries) will continue to rise modestly, driven by economic growth, and will peak in 2025. After reaching the peak, the main driver of emission reduction will be energy mix restructuring, with carbon emissions from energy consumption down >85% by 2050; industrial processes will need to reduce carbon emissions by ~80% by 2050.

In addition, more efficient power use and 80% renewable fuels as basis for achieving the 1.5°C pathway. Under the 1.5°C pathway, energy demand structure will be improved, graph 1&2 indicate the end-use energy demand structure and power generation structure in China.

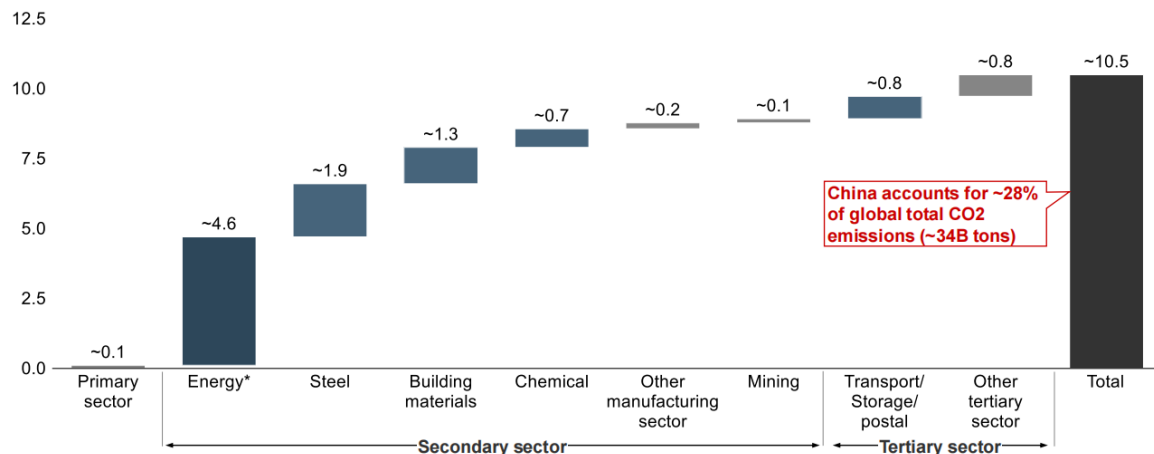


Figure 2. China's CO2 Emissions (2020, B ton)

Source: BP Statistical Review of World Energy 2019; Analyst Report

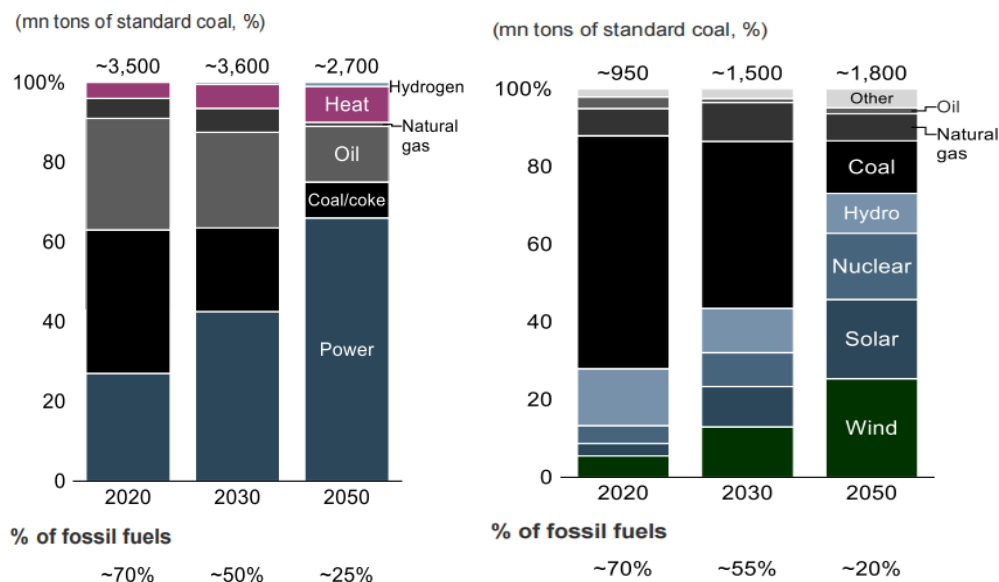


Figure 3. End-use Energy Demand Structure and Power Generation Structure in China

Source: Sector Research Report; Lit Research

Furthermore, China's current carbon price is far below EU level (~200 RMB/ton), the industry research report records that China's present pilot price is far below EU level. Allowance price varies widely from 20 to 80 RMB/ton across pilot regions, which driven by local emission reduction cost, and easiness of gaining allowance approval (Chart 4). Current estimates are that the China allowance price (cost of carbon) will rise to RMB200-300 by 2035. With lessons of low EU allowance price during financial crisis, which failed to drive carbon reduction, and considering local economic development needs, China's allowance price is expected to rise steadily and slowly driven by both regulations and market. Also, Carbon border adjustment mechanism (carbon tariff) being promoted by EU will have a direct impact on exportation related companies in all industries.

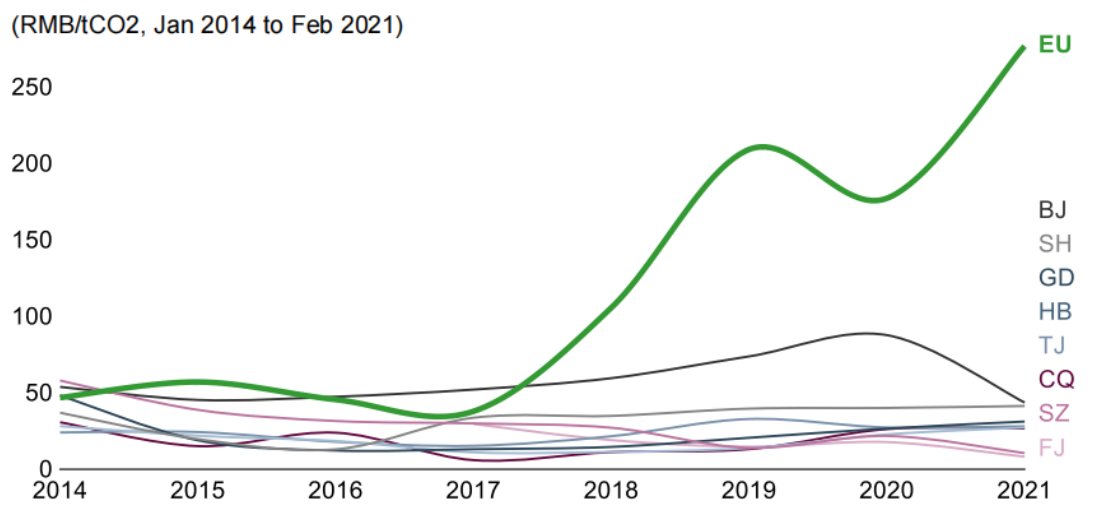


Figure 4. 2019 Pilot Emission Trading Market Price

Note: Prices are from ICE, using the average trading price for each trading month

Source: Industry Research Report; Expert Interview.

4. IMPACTS OF CARBON EMISSIONS ON INDUSTRIES

Carbon reduction impact on industrial goods industry are obvious, like steel, cement, chemical and transportation industry. For steel industry, upgrade processes (waste heat recovery, slag recycling), which contribute 10% carbon reduction in short term; technical transformation and process upgrade for significant carbon reduction in mid&long term period. For cement industry, clean energy will be instead of thermal coal as fuel of rotary kiln. Chemistry field phases out outdated capacity, and lift the utilization of feedstock coal and thermal coal by upgrading processes and retrofitting equipment in short term; in long term, it will change process route to reduce the use of coal as feedstock. Transportation industry may focus carbon reduction efforts on road transportation (~ 80% of carbon emissions): electrification of passenger and light freight transport, and hydrogenation of heavy freight transport; and explores other low-carbon fuels that are technically and economically feasible (e.g. hydrogen, biomass fuels).

5. PRESSURES ON EMISSION REDUCTION FACED BY CHINESE ENTERPRISES

Initially, US has constantly proposed the energy acts involving collection of carbon tariff, for example, both the Clean Energy Act in 2009 and the American Power Act in 2010 require the products entering US to be granted with carbon emission quota (Haal, C. A. S., Klitgaard, K. 2018). Trade sanctions with collection of tariff have been imposed on the countries rejecting the standard of pollution emission reduction since 2020. Secondly, in the international context, the standards regarding environmental protection and energy efficiency on the imported products will be gradually improved, while the so-called green trade barriers will be established, so that the enterprises shall see clearly the challenges faced as early as possible; Carbon tariff is launched in Europe. Thirdly, carbon footprint accounting has been applied in over 2500 commodities from UK Pepsi, French Danone, Tesco, IKEA, B&Q and multiple enterprises in PV industry. Two years ago, Wal-Mart also required its 100,000 supplies to complete the carbon footprint accounting, which means that a great number of raw material enterprises, manufacturers, logistics providers and dealers in China will inevitably perform the carbon footprint accounting and undertake their responsibilities for emission reduction, otherwise, they cannot receive orders from transnational corporations.

6. DECARBONIZATION STRATEGIES FOR CORPORATIONS IN CHINA

Companies should decarbonize existing businesses and develop new businesses based on regulatory understanding and industry benchmarking. That means companies need to understand regulations and industry benchmarks to define decarbonization aspiration. For existing businesses, on one hand, carbon emission reduction becomes an integral part of business operations. In particular, companies might increase share of renewable power consumed, and concentrate on carbon emission trading (and consideration of Scope 3 emissions). On the other hand, companies should focus on proactive improvement of business model, such as energy efficiency in operations, transport and logistics system improvement. For new businesses, “Green” business transformation should be proposed. To illustrate, participating in industries supply into energy transition sectors, diversifying customer mix to less carbon intensive, and building new businesses.

Business leaders should embrace changes and deliver 4 key initiatives to tackle decarbonization. Firstly, launching a carbon audit to map current carbon emissions of the business in scope 1,2 and 3. Fully understand carbon neutrality’s impact on the industry and its up and downstream, evaluate the challenges and opportunities the business faced in strategy, operations, supply chain and capital market etc. Secondly, taking into consideration of company’s business and carbon emission status, company should proactively evaluate the financial impact brought by upcoming regulations such as carbon trading, government carbon neutrality plan etc. Thirdly, to define the strategy of carbon reduction, company should not only ensure their future strategy meets the requirement from government, but plan forward and try to develop competitive advantages riding on this trend. Finally, engaging ecosystem partners in developing sector-wide reduction target and roadmap, and join hands to prepare for the changes related to carbon neutrality.

Winners develop sustainability strategies that have offensive and defensive elements, thus, enterprises need to identify what are their decarbonization shields? Swords refer to areas where they want to be ‘distinctive’ – going far beyond regulatory requirements and driving bold changes to address the industry’s main challenges and differentiating vs. competitors in doing so (Casazza, J., Delea, F. (2003). These are topics we will proactively engage on with customers and build our compelling communication around. By contrary, Shields mean areas where they want to set high industry standards (‘leading’) – being at par vs. competition (‘proactive’) or complying with regulations (‘compliant’) to protect against downside risks. They will not engage with customers or proactively communicate broadly on these topic.

7. CONCLUSION

This paper puts forward six methods and recommendations for corporations to achieve carbon neutrality. To begin with, to study on forest planting for carbon sink and emission reduction; secondly, selecting of low carbon supplies; the third step is to pay attention to carbon capture technologies of CCS (Carbon Capture and Storage) and other different industries; then, try to achieve energy conservation & emission reduction and low carbon energy conversion; furthermore, enterprises may investment and purchase clean energies; the last point is to offset through carbon trade.

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