



China

Limiting Coal Consumption in China

Activity	Limiting coal consumption at 4.2 Gt/year and the share of coal-based energy in the energy mix at 62% by 2020.
Country	China
Sector(s) involved	Energy
Time frame	2014–2020

Case summary

In 2014, China launched the New Energy Development Strategic Action Plan (NEDSAP 2014–2020) setting a target to limit coal consumption at 4.2 Gt/year by 2020, which is estimated to represent 62% of the energy mix. The Plan is a Low Emission Development Strategy designed through a country-driven process and rooted in China's priorities, such as improving local air quality and addressing water scarcity issues.

The ambition to limit coal consumption in China comes out of a commitment at the highest political level, contributing to the achievement of China's Copenhagen pledge of 40–45% reduction in carbon intensity compared to 2005 levels by 2020 and its Intended Nationally Determined Contribution (INDC) goal of peaking CO₂ emissions by 2030 at the latest.

In addition, capping and decreasing coal consumption is a high priority in China's 13th Five Year Plan, which will be officially released in March 2016 at the annual National People's Congress.

According to a recent study by Greenpeace (April 2014), cumulatively, the coal control measures could result in a reduction in coal consumption of approximately 350 million tonnes (MT) by 2017 and 655 MT by 2020, compared with business-as-usual growth. This translates into an estimated reduction in CO₂ emissions of about 700 MT in 2017 and 1,300 MT in 2020.



Tiger Leaping Gorge – Yunnan, China ©iStock.com/aphotostory

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Background

With limited oil and gas stocks and abundant coal reserves, coal has been the backbone of China's energy supply (65-70%) to meet its rising energy demand. From the 1980's up to around 2005, China accounted for 50 - 80% of global coal consumption, half of which fired its thermal power generation units, while the rest was primarily used by energy-intensive industries. There has been a gradual decline in coal's contribution to China's overall economic growth over the last decade, owing to increased efforts in promoting energy efficiency, clean energy solutions, and a diversified energy mix.

In 2014, China launched the Energy Development Strategic Action Plan (NEDSAP 2014-2020), setting a target to limit coal consumption. Shortly before the launch of the NEDSAP, the State Council, China's cabinet, had included setting a national coal cap as a key component of the draft Air Pollution Prevention and Control Law (Zhao, undated). However, the Amendment of Air Pollution Prevention and Control Law, issued on 30 August 2015 did not mention any cap on coal, instead emphasising the promotion of an energy transition (interviews).

The primary factors that made it possible for the Chinese Government to declare peaking of coal consumption include:

- » **Decelerating GDP Growth:** The slowdown in the Chinese economy since 2012 (from over 10% between 2000 and 2010 to around 7.7% in 2013) lessened the demand for power.
- » **Declining Energy Intensity:** During the 11th Five Year Plan (FYP, 2006-2010), energy intensity of GDP declined by 19%. The 12th FYP (2011-2015) aims to further reduce energy intensity of GDP by 16%.
- » **Deteriorating Local Air Quality and Water Resources:** Burning of fossil fuels has led to deteriorating air quality and severe air pollution episodes in major Chinese cities in the last 2-3 years. Furthermore, depleting ground water tables (especially in areas with numerous thermal power plants) have become a recent driver for suppressing thermal power generation and promoting resource efficient industrial processes.
- » **Increased Competitiveness of Renewable and Nuclear Energy Sources:** Having recourse to mature and the latest technologies in hydro and wind sectors, as well as to recent technological advancements in solar and nuclear-based energy, non-coal energy costs have declined considerably over the last few years.
- » **Expanding Services Sector:** China, known as the manufacturing hub of the world, is now witnessing an increase in the share of the service sector's contribution to the GDP. Given that the service sector is less energy intensive, even a marginal growth in this sector could result in significant reduction in China's total energy intensity.

Activities

China has launched a long list of initiatives and targets for its future energy strategy as it looks to modernise its energy structure and minimise coal use. Some of the initiatives and activities being planned and undertaken as part of the NEDSAP and other key policies aimed at energy transition to achieve the peaking of coal consumption include:

- » **Extensive analysis on clean energy alternatives:** Extensive research on the deployment potential of cleaner energy sources including hydropower, nuclear, renewables and natural gas has been conducted. In addition, different scenarios for future GDP growth, and the relationship between the economy and energy demand, were analysed to define the goals and timeframes of reduced coal consumption, and the respective means for achieving it. Besides promoting non-fossil technologies, China has put emphasis on developing and upgrading clean coal technologies (coal conversion technologies like coal to gas, coal to liquids, etc.), which will maintain a reduced - yet assured - demand for coal in the country.

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- » **Promotion of Renewable Power Sources:** The 13th FYP (2016-2020) aims at significantly scaling-up renewable energy sources. Renewable energy targets are being defined for provinces with the objective to reduce the use of coal as primary energy source. As per NEDSAP, the share of non-fossil fuels in the total primary energy mix is to rise to from 9.8% in 2013 to 15% by 2020, with an indicative 20% share by 2030.
- » **Promotion of Gas-Based Power Generation:** Replacing coal by gas for power generation is another strategy being adopted by the Chinese Government in the near-term. The 13th FYP aims at replacing coal in parts by gas to increase the share of gas-based energy to 8% in the energy mix. Consequently, emphasis has been given on a significant increase in domestic gas exploration and consumption and on the import of liquefied natural gas (LNG). According to NEDSAP, the share of natural gas is to rise to more than 10% by 2020.
- » **Enhanced Nuclear Power Generation:** As per NEDSAP, new nuclear power plants would be constructed after appropriate feasibility studies. Installed nuclear power capacity will reach 58 gigawatts and those under construction will top 30 gigawatts by 2020.
- » **Emissions Trading Scheme (ETS):** Pilot emissions trading schemes that cover several provinces and aim to dis-incentivise carbon rich technologies have been being implemented since 2011. The ETS in China is expected to become the second largest regulated carbon market after the EU-ETS. The seven established emissions trading schemes cover about 7% of China's total GHG emissions. As of August, 2015 the total trading volume of 7 pilots is 40.77 Mt, and the total value is 1.224 billion RMB (Jin, 2015). The following table gives an overview of the trading pilots:

Pilots	Covered sectors	Threshold (tons)	Covered entities	Percentage of covered emission, %
Shenzhen	Industrial sectors (Power, Manufacturing, etc)	3,000	635	54
	Buildings	10,000	197	
Shanghai	Industrial sectors (Stell, Chemical, Petrochemical, Power, etc)	20,000	191	57
	Non industrial sectors (Airports, Ports, Hotels, etc)	10,000		
Beijing	Power, Heat supply, Cement, Petrochemical, other industrial sectors, Service	10,000	415 (2013) 543 (2014)	49
Guangdong	Power, Cement, Petrochemical, Steel	20,000	184 (2013) 193 (2014)	50
Tianjin	Power, Heat supply, Chemical, Petrochemical, Steel, Oil and gas production	20,000	114	60
Hubei	Industrial Sectors	60,000 tee*	138	35
Chongqing	Industrial Sectors	20,000	242	NA

Source: Jin, September 2015 *(Comprehensive Energy Consumption)

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Drawing on lessons from the provincial trading mechanisms, a national-level ETS is planned for 2018 to further upscale cleaner technologies.

- » **Carbon Tax:** China is exploring opportunities and mechanisms to implement a carbon tax in addition to the ETS to further lower the profit margins of the thermal power generators and thereby reduce coal consumption.

Institutions involved

- » **National Development and Reform Commission (NDRC):** NDRC is the primary authority to formulate and implement strategies and plans of national economic and social development, to carry out research and analysis on the domestic and international economic situation and to put forward targets and policies concerning the development of the national economy. Accordingly, NDRC is playing a leading role in defining and implementing the overall climate change policy, industry policy, supporting energy efficiency, energy conservation and renewable energy policies (including tariff policy) in light of the coal capping targets and timelines.
- » **National Energy Administration (NEA):** NEA is responsible for formulating and implementing energy development plans and industrial policies promoting institutional reforms in the energy sector (including coal, oil, natural gas, nuclear power, new and renewable energy, etc.), promoting energy conservation and comprehensive utilisation of resources in the energy sector, and guiding scientific and technological advancements through R&D.
- » **Ministry of Environmental Protection:** Responsible for developing and organising the implementation of national policies and plans for environmental protection.
- » **Ministry of Industry and Information:** Main functions include defining China's industrial planning, policies and standards (energy efficiency and conservation) and to promote the development of major technological equipment and innovation concerning the communication and other sectors.
- » **Ministry of Housing and Urban Development:** Primarily responsible for the administration of construction projects in China and for establishing national standards of construction. The ministry also has a key role in the implementation of energy efficiency and conservation programmes.
- » **State Council:** The State Council in China has a comprehensive role in the coordination of the processes promoting use of non-fossil energy options leading to energy transition.
- » **Over 20 leading government think-tanks, research institutes, and industry associations** in China, such as the Energy Research Institute, the Chinese Academy of Environmental Planning, the National Climate Change Centre, Institute for Energy, Environment, and Economy at Tsinghua University etc. were involved in conducting the background study for the China Coal Consumption Cap Plan and Policy Research project which was aimed at creating a roadmap for adoption of a national coal cap in China's 13th Five Year Plan.

Cooperation with

The Natural Resources Defense Council (NRDC) and World Wildlife Fund (WWF) supported the China Coal Consumption Cap Plan and Policy Research project.

The German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) supported the introduction of a cap on coal use in the province of Jiangsu via its International Climate Initiative (IKI), in particular the project "Low Carbon Development Achieved Through Energy Efficiency Measures in Jiangsu Province", implemented by GIZ. The Jiangsu cap and reduction plan is expected to be announced soon. It will be based on the reported 2013 consumption data and start from the year 2017 onwards.

Finance

The New Energy Development Strategic Action Plan is a domestically funded initiative. Key sources of finance include the Clean Energy Fund, the Chinese Development Bank, fiscal appropriation by the government, investment by state-owned enterprises, public private partnerships, a public finance platform, etc.

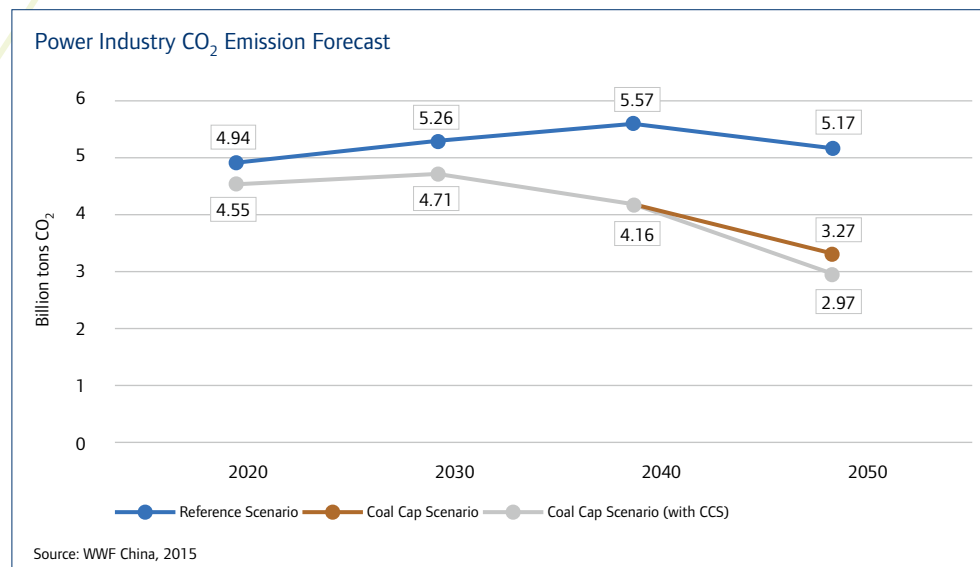
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Impact of activities

The expected impacts are:

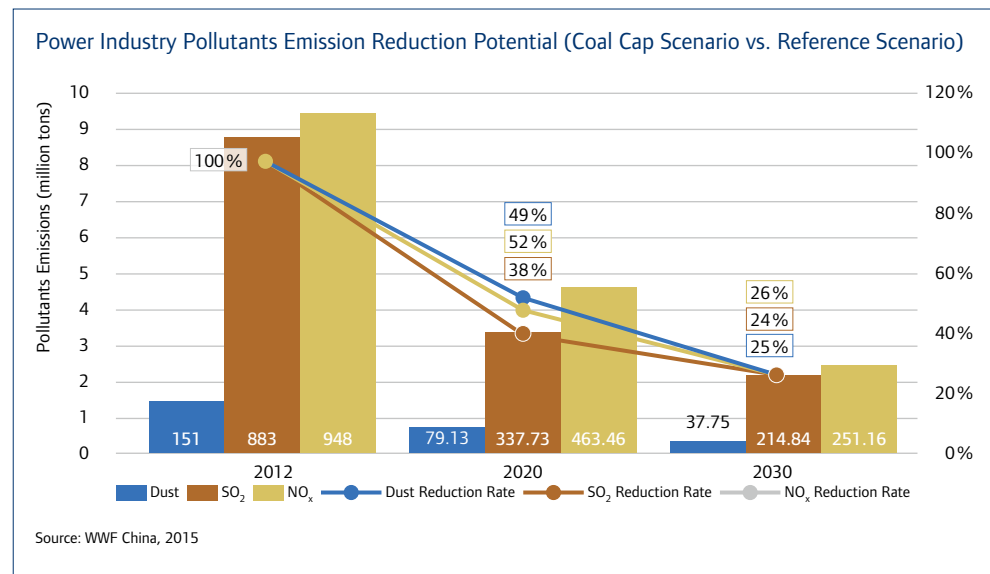
- » **Energy Security:** A diversified and low-carbon energy mix in China will lead to improved energy security. This will be achieved through the development of all sources of renewable energy, including nuclear power.
- » **Environmental Impacts:** Reducing the use of coal in the Chinese economy will have multiple co-benefits. According to the Greenpeace China Programme (2008), environmental and ecologic losses from coal use and exploitation add up to 7-9% of the annual GDP. Capping coal consumption will also lead to improved local air and water quality in the country in addition to reduced GHG emissions.
- » **Improved Health Impacts:** According to a recent study by NRDC and WWF, the air quality improvements from a national coal cap policy would save approximately 49,000 lives per year in 2020, 89,000 in 2030, 80,000 in 2040 and 51,000 in 2050, leading to economic benefits of \$6.2 billion, \$11.4 billion, \$10.2 billion and \$6.5 billion respectively. These benefits result from improved air quality, decreased incidence of lung disease in coal miners, etc.
- » **Restructuring of the Economy:** Government policies are directed towards a reorientation of the economy structure by decreasing the share of energy-intensive industry and enhancing the role of the services sector. Accordingly, a series of market-based fiscal measures and economic reforms are being initiated to spur this shift.
- » **Reforming the Power Sector:** Plans on reforming the power sector to make the prospective national ETS and the operating pilot ETS a more effective tool to cut emissions by reducing coal consumption is on the priority list of the government. This is likely to be done by making the power generation system far more sensitive to a carbon price and liberalising the heavily regulated power sector. Setting up spot electricity trading platforms to let big consumers settle prices directly with generators rather than with grid companies, and requiring generators to prioritise low-emission energy could be other features of the reform process. The figure below depicts the impact of ETS on the power sector in the context of the coal cap measures in China:



Source: WWF China, 2015

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Source: WWF China, 2015

Why is it good practice

- » **Comprehensive approach with high-level political ownership:** The set of measures being undertaken to achieve the goal of reduced coal consumption by 2020 is driven by the socio-economic and environmental concerns and priorities of the Chinese Government and population. The process is endorsed at the highest political level by several state entities and ministries.
- » **Country driven and embedded in national priorities:** Adopting an aggressive approach towards downsizing coal demand, the overriding priorities of the government like energy security and improved quality of public life, are being ensured by promoting alternate energy sources in an ambitious manner. Supporting strategies and activities are integrated with the national planning processes and policy goals of the country.
- » **Coordination across key ministries and stakeholders:** All relevant ministries, economic sectors and stakeholders are part of the process. An enabling environment has been created for the private sector (through policy support and market instruments) to implement clean energy projects. Trust has been built between all stakeholders; policies and measures aimed at capping coal consumption have been supported and accepted by corporates and the general public. Of the seven ETS pilots launched in 2011, five pilots have now completed a trading cycle. Over 2000 entities are participating in the ETS and the pilots have had 96-100% compliance from companies because the penalties for non-compliance are severe (Lengthorn, 2015).
- » **Long-term vision combined with engagement at all levels:** The regional strategies (e.g. regional carbon markets, environmental management measures, etc.) are being extrapolated to the national level for effective and enhanced results. Further, the initiatives are analysed in the near-, medium- and long-term in order to prioritise actions according to the anticipated results. The aggressive promotion of - and investment into - clean energy solutions, and a phased but ambitious approach in replacing coal-based energy is an example for this strategy.

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Success factors

It is too early to say if the policy decision to limit coal consumption will be successful. However, the activities and initiatives being planned and implemented towards achieving this goal certainly pave way for an effective, low-emissions development strategy. The following factors are contributory in this context:

- » Rigorous analysis of the technical possibility of such a decision.
- » Repeated consultations with multiple stakeholders, particularly the provincial governments to create strong political will and public acceptance.
- » Provisions for an enabling policy environment and incentives along with the development of a clear roadmap and definition of strategies with expected outcomes, resulting in a holistic and inclusive approach.
- » An effective blend of command and control procedures with market instruments in the overall climate change policy and strategy.

Overcoming barriers/ challenges

Financial

What were the main barriers/challenges to delivery?
How were these barriers/challenges overcome?

Aligning the financial markets to support the alternative options that lead to a reduction of coal consumption poses structural hurdles and acceptability challenges.

Detailed analyses were undertaken before deciding on the cap on coal consumption. In addition, financial institutions and investors have begun to seek improved and transparent disclosures from industry on strategies for meeting the environmental parameters, future capital expenditures (in light of reduced power demand), and economic risk monitoring and mitigation measures. This is complemented with streamlining policies and environmental and sustainable development guidelines for investment.

Economic

Coal is the most competitive energy option for China. Adopting alternative, more expensive energy options is not economically rational.

Introducing the ETS and the consideration of further tax levies on coal gave strong economic signals that made coal less competitive. In addition, provision of support to renewable energy options has made alternatives more attractive.

Political/Regulatory

Capping coal consumption is a bold political decision that brings along potential ramifications for the larger economy and leaves stranded assets behind. To shield the economy from potential negative impacts, a range of options for energy efficiency and alternative energy sources needed promotion, involving multiple stakeholders. This posed significant regulatory challenges.

The cap on coal was decided subsequent to rigorous analysis, consultations with provincial governments, and different ministries. Promotion of alternative options and energy efficiency is integrated into the national planning process, i.e. the five-year plans, which are already in place and are being scaled-up. Through the provisions of the ETS, flexibilities have also been introduced for industry.

Lessons learned

- » An integrated approach trying to combine the interests and mandates of all relevant stakeholders is critical to the success of any policy goal.
- » The strategies developed to achieve the goal should be based on the long-term socio-economic and political goals of the country.
- » Clear and effective incentive mechanisms are critical for consistent engagement of the stakeholders, who may be negatively impacted by the new/proposed strategies.

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How to replicate this practice	Capping of coal use has an impact on almost all sectors of the economy. Accordingly, strategies towards achieving this goal call for action of diverse sectors and actors at all levels. However, it must be preceded by careful and rigorous technical analysis and consultations with all relevant stakeholders. Moreover, the previously demonstrated experience with promoting alternative options that could be adequately scaled-up in time is also critical. Without having developed a robust policy environment and market for energy efficiency and renewable energy options, capping coal consumption, even if it is technically feasible, may not be good practice.
Contact for enquiries	» Ms Gao Hui, Climate and Energy Programme Officer, WWF China, hgao@wwfchina.org
Further key resources	<ul style="list-style-type: none"> » Tsinghua University (Undated), China and the New Climate Economy: A New Climate Economy Case Study, available at newclimateeconomy.net/content/china-and-new-climate-economy » The World Bank / Development Research Centre of State Council, the Republic of China (2013), China 2030: Building a Modern, Harmonious and Creative Society, available at www-wds.worldbank.org/external/default/WDSCContentServer/WDSP/IB/2013/03/27/000350881_20130327163105/Rendered/PDF/762990PUB0china0Box374372B00PUBLIC0.pdf
Website(s)	» www.nrdc.cn/coalcap/index.php/English/index
Case study author(s)	<ul style="list-style-type: none"> » Nimisha Pandey, Fellow, TERI » Swati Agarwal, Research Associate, TERI
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