Global Energy Monitor

CREA
Centre for Research on Energy and Clean Air

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China Dominates 2020 Coal Plant Development

AGGRESSIVE PURSUIT OF COAL PUTS 2060 CARBON-NEUTRAL GOAL AT RISK

Summary

While appetite for new coal power investments is slowing throughout most of the world, it is on the rise in China. In 2020, China built over three times as much new coal power capacity as all other countries in the world combined – the equivalent of more than one large coal plant per week. In addition, over 73 gigawatts (GW) of new coal power projects were initiated in China, five times as much as in all other countries, while construction permits for new coal projects also accelerated.

This is according to the latest Global Coal Plant Tracker (GCPT) update by Global Energy Monitor (GEM) and the Center for Research on Energy and Clean Air (CREA), a survey of global coal-fired units through December 31, 2020. Key findings include:

- China commissioned 38.4 GW of new coal plants in 2020, over three times the 11.9 GW commissioned in the rest of the world.
- China's coal fleet grew by net 29.8 GW in 2020, while in the rest of the world net capacity decreased by 17.2 GW.
- China initiated 73.5 GW of new coal plant proposals in 2020, over five times the 13.9 GW initiated in the rest of the world combined.
- Chinese provinces granted construction approval to 36.9 GW of coal power projects in 2020, over three times the capacity permitted in 2019 (11.4 GW).
- China now has 247 GW of coal power under development (88.1 GW under construction and 158.7 GW proposed for construction) – a 21% increase over end-2019 (205 GW), and nearly six times Germany's entire coal-fired capacity (42.5 GW).

The high level of coal plant development in China is notable given President Xi Jinping's recent pledge for the country to be carbon-neutral by 2060. Despite the pledge, the growth in coal plant development has been enabled by lax central government oversight, including the loosening of restrictions on new coal plant builds and permits across most Chinese provinces.

Yet the Chinese government appears to be signaling that control may soon be tightened: A recent, unprecedented report by the powerful Central Environment Inspection Group criticized the country's National Energy Administration (NEA) for allowing large increases in coal power and heavy industry capacity in eastern provinces where expansion was supposed to be strictly controlled under air pollution and other policies, and failing to prioritize clean and low-carbon energy transition. The degree to which the central government strengthens regulation and enforcement, and how much coal power it will plan for in the country's next Five Year Plan (2021–2025), remains to be seen.

Introduction

A large uptick in commissioning of new coal power plants in China in the second half of the year (H2) drove the global coal fleet to grow again in 2020, after decreasing by 2.9 GW in H1 2020. The 12.5 GW increase in 2020 puts the world's operating coal fleet at 2,059 GW.

China commissioned 38.4 GW[1] of new coal plants in 2020, making up over 75% of the global total (50.3 GW). Outside China, less than 12 GW was commissioned and, taking into account closures, the global coal fleet outside China declined by 17.2 GW in 2020.

In addition to dominating commissioning, China was also home to 85% of proposed new coal fired capacity throughout the globe in 2020 (73.5 of 87.4 GW).

Coal development in China has grown as provinces use coal proposals to stimulate their economies in the wake of the economic slowdown from the covid-19 pandemic. The growth has been enabled by the central government, which has loosened restrictions on new coal plant permits and increased lending to grow the national economy, including for coal-intensive megaprojects.

While encouraging coal plant development, the central government also recently pledged that China will aim to reach net zero carbon emissions by 2060. To meet this goal, recent analysis led by CREA found China's operating coal fleet should fall by nearly 40%, from the current 1,095 GW to 680 GW by 2030.

Instead, coal and power interests are pushing to increase the country's coal fleet into the 14th Five Year Plan (FYP 2021–2025), potentially adding over 200 GW of new coal power at an estimated investment of US$200 billion.[2] China's carbon neutrality pledge increases the likelihood that these new coal plants, if built, will face a declining market for coal power and shortened lifetime. Already the average operating hours for the country's coal fleet is on the decline, driving down profits and pushing several Chinese power companies into bankruptcy.

With the 14th FYP expected to be finalized this year, the central government must soon choose between allowing a new wave of coal projects to be used as domestic stimulus or aligning China's power sector with President Xi's 2060 carbon neutrality goal.

In a hopeful sign that the central government may rein in coal development and prioritize clean energy, the Central Environment Inspection Group recently issued an unprecedented, highly critical report of the National Energy Administration (NEA) for lax enforcement of the country's environmental standards and restrictions on coal development. The move suggests controls on new coal plants may soon be tightened, retirements accelerated, and some already permitted projects suspended or cancelled – although whether and at what scale remains an open question. The NEA is required to submit a "rectification plan" within 30 days that will provide the first indications.

[1] Our estimate of 38.4 GW newly commissioned coal power in 2020 is 16.9 GW less than China's National Energy Administration estimate of 55.3 GW newly commissioned thermal power in 2020. The main difference appears to be when a coal plant was reported as commissioned: we estimate a 41.7 GW net increase in China's coal fleet in 2019 – in line with marking a plant as commissioned after completing its 168-hour trial operation – while the China Electricity Council only reported a 29.9 GW increase in thermal power in 2019, suggesting many coal plants that completed a trial operation in 2019 were were not reported as commissioned until 2020. The remaining 5.1 GW difference is likely due to the fact that Chinese power statistics do not differentiate thermal by type (e.g. coal, gas, biomass, etc.) and the GCPT database does not include coal-fired units under 30 megawatts.

[2] Based on a coal plant construction cost of US$800/kilowatt, as estimated in IEA's World Energy Outlook 2020 for China (page 418).

The Global Coal Fleet Grows Again

In 2020, 50.3 GW of global coal power capacity was commissioned while 37.8 GW of global coal power was retired, causing a net increase in the global coal fleet of 12.5 GW (Figure 1, solid gray line).

China commissioned 38.4 GW[1] of new coal plants in 2020, making up nearly 80% of the global total (blue bars). The country also retired 8.6 GW of coal power in 2020, leading to a net 29.8 GW increase in China's coal fleet.

Meanwhile, most countries have been scaling back their coal plans (green bars), leading global coal power capacity outside China to decline since 2018—a trend that accelerated in 2020 (dashed grey line).

FIGURE 1. China grows the global coal fleet

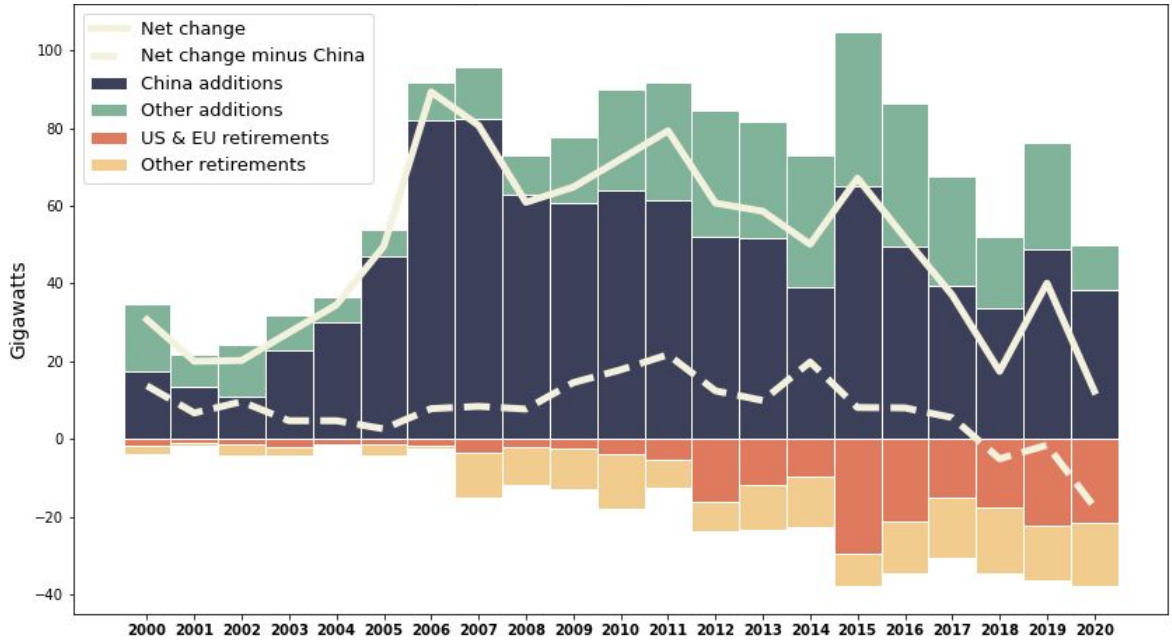

Figure 1. The net change in 2000–2020 global coal power capacity (solid line), and the net change without China (dashed line). Country-by-country additions (positive) and retirements (negative) are shown with coloured columns.
Source: Global Coal Plant Tracker, January 2021.

Excluding China, the global coal fleet declined by 17.2 GW in 2020, led by retirements in the U.S. (–11.3 GW), European Union (–10.1 GW), and UK (–3.3 GW).

Still, meeting the Paris climate goal of a 50 to 75% reduction in coal power by 2030 means OECD nations should phase out their coal fleets this decade, given their role as historic emitters.

Countries like the U.S., Japan, and Poland are nowhere near on track for such a reduction, with the latter two countries constructing new coal plants.

Outside China, there was a marked slowdown in 2020 commissioning. India, notably, grew its coal fleet by only net 0.7 GW in 2020, after adding an average 15.0 GW a year from 2010 to 2019.

Growing Proposals and Permits

China was also home to 85% (73.5 GW) of the 87.4 GW of proposed new coal fired capacity throughout the globe in 2020, comprising 34.0 GW of new coal proposals and 39.5 GW of coal proposals that had been shelved or cancelled but were reactivated in 2020. The 73.5 GW of initiated proposals is a 20% increase over new coal proposals in 2019 (61.5 GW) and three times the 18.0 GW proposed in 2018 (Figure 2).

FIGURE 2. New coal proposals on the rise in China

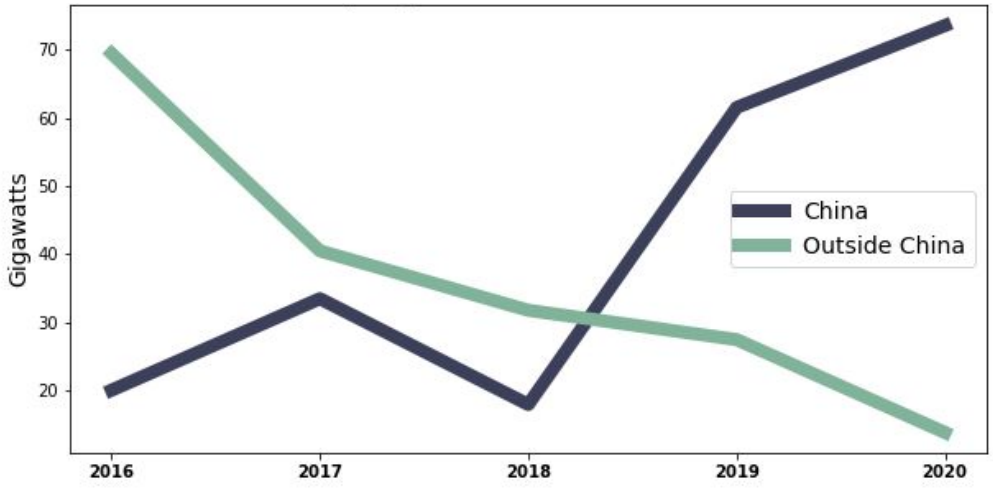

Figure 2. New coal plant proposals have been increasing in China (dark blue line), and decreasing outside China (green line). New coal plant proposals combine both newly proposed projects and projects that had been shelved or cancelled, but were revived.
Source: Global Coal Plant Tracker, January 2021.

Coal plant proposals in the country have been ramping up since 2019, when the central government began loosening its restrictions on the development of new coal plants.

Provinces often propose and build new coal plants to generate economic activity and stimulate GDP growth through construction, as well as support related sectors such as coal-intensive heavy industry and domestic coal mining.

In 2020, 36.9 GW of coal power was permitted for construction in China, exceeding the previous three years combined (28.5 GW permitted from 2017–2019).

Construction also began or resumed on over 31.5 GW of coal power capacity in 2020 in China, an amount larger than the entire coal fleet of Indonesia (30.3 GW). In total, China has 88.1 GW of coal power under construction.

TABLE 1. Coal-fired capacity (gigawatts) in China by plant status and year

Status	2016	2017	2018	2019	2020
Newly Commissioned	49.4	39.5	33.5	48.9	38.4
Newly Permitted	54.3	15.5	1.7	11.4	36.9
Started/resumed construction	45.6	23.8	66.6	16.6	31.5
Newly proposed	20.9	33.5	17.9	61.5	73.5

Table 1. Resumed construction refers to construction projects that were suspended and then revived.

In 2020, new coal plant development was particularly concentrated in Inner Mongolia and Shaanxi, both regions with large domestic coal mining and a combined coal fleet (136.5 GW) larger than the entire European Union (121.4 GW).

Together, Inner Mongolia and Shaanxi made up one-third of construction starts in 2020 (5.8 GW in Inner Mongolia and 4.4 GW in Shaanxi), and over half (51%) of the 2020 permits issued for coal power capacity, totaling 10.0 GW in Inner Mongolia and 8.6 GW in Shaanxi.

Coal Plants as Economic Stimulus

The growth in coal plant development in China is often based not on demand, but on misguided economic incentives from the central government.

In 2016, new coal plant permits were restricted throughout most of the country by the central government, following a 2014–2016 province-level permitting boom that threatened to overwhelm the country's 2020 coal power cap of 1,100 GW.

Yet as the economy slowed in 2019, the central government began increasing the number of provinces allowed to greenlight new coal plants, reaching 25 of 31 provincial grids by 2020. The central government also expanded local lending quotas in 2020 and encouraged investment to offset the economic impact from COVID-19.

The increased investment also included clean energy, and in 2020 China added up to 119 GW of wind and solar power to the grid, an all-time record and over double the amount installed in 2019 (56 GW).

Yet reforms discouraging coal power use have been incomplete and uneven across the country, resulting in high levels of commissioning for both renewable and coal power – effectively resulting in an "all of the above" power strategy.

The increase in both coal and renewable power capacity has decreased the operating hours for coal generators. Since 2015, the average utilization rate of the country's coal plants has been 50% or below, compared to a high of 61% in 2011.

Recent electricity shortages in several provinces in Central China highlighted an apparent paradox – the country has far more capacity than it needs, but grid management issues and grid bottlenecks still led to electricity rationing in December 2020, because power plants were inoperational or unwilling to generate at a time of high coal prices, and there was insufficient transmission capacity. Yet the episode is increasing pressure on the planning agencies to

allow a further expansion of coal-fired capacity in the next five years.

The decline in coal plant use has lessened profits for coal plant owners. In 2018, an estimated 50% of the country's coal fleet faced net financial losses, pushing some Chinese power companies to bankruptcy.

Any new coal plants in China will be commissioned within an already oversaturated market, and face a shortened lifetime given the country's carbon neutral goals.

Carbon Neutral Goal

In September 2020, Chinese President Xi Jinping announced that the country would aim to be carbon-neutral by 2060.

The president also said that China would strive to peak carbon emissions before 2030, upping its Paris climate commitment of peaking emissions "around" 2030.

Instead of taking the pledge as a signal to wind down coal plant development, however, coal and power interests are pushing instead to increase the country's coal fleet through the next Five Year Plan (2021–2025), reaching up to 1,300 GW.

Allowing for such a large increase in the coal fleet through 2025 or beyond would necessitate steep and unprecedented drops in the country's carbon emissions to meet its carbon neutral goal. Preliminary analysis for achieving the 2060 carbon neutral target suggests China's power sector should decarbonize by 2050, to allow time for electrification of the industrial and transport sectors.

To decarbonize the power sector by 2050, a recent study by the Center for Research on Energy and Clean Air and the Draworld Environment Research Center found that China's coal fleet should fall 38%, from the current 1,095 GW to 680 GW by 2030. The decrease would be in line with a linear reduction in the country's power sector emissions from 2020 to 2050.

To start, over 110 GW of coal-fired capacity in China could be retired immediately with no disruption to power supply, according to a recent study by the University of Maryland.

The 14th FYP is expected to be finalized this year, and will offer clarity on how quickly and aggressively the country plans to decarbonize the power sector and reduce emissions.

If the central government allows for current levels of coal plant development to be maintained, it will at best divert important resources away from its clean energy transition, and at worst make China's carbon neutral goals difficult if not impossible to achieve, given the scale and rate of emission cuts that will be required.

Background on Global Energy Monitor

Global Energy Monitor is a nonprofit research organization developing information on fossil fuel projects worldwide. Through its Global Coal Plant Tracker (GCPT) project, Global Energy Monitor has provided biannual updates on coal-fired generating capacity since 2015. GCPT data is used by the International Energy Agency (IEA), the OECD Environment Directorate, UN Environment Programme, U.S. Treasury Department, and World Bank. GCPT data is licensed by Bloomberg LP and UBS Evidence Lab, and is used by the Economist Intelligence Unit and Bloomberg New Energy Finance.

Background on Centre for Research on Energy and Clean Air

Centre for Research on Energy and Clean Air (CREA) is a new independent research organisation focused on revealing the trends, causes, and health impacts, as well as the solutions to air pollution. CREA uses scientific data, research and evidence to support the efforts of governments, companies and campaigning organizations worldwide in their efforts to move towards clean energy and clean air, believing that effective research and communication are the key to successful policies, investment decisions and advocacy efforts. CREA was founded in December 2019 in Helsinki and has staff in several Asian and European countries.

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