

Briefing, August 2021

China's power & steel firms continue to invest in coal even as emissions surge cools down

New coal power and steel projects announced in China in the first half of 2021 alone will emit CO₂ equal to Netherland's total emissions, new mapping of the project pipeline shows. A total of 18 new blast furnace projects with a total capacity of 35 million tonnes per year and 43 new coal-fired power plant units were announced; if approved and built, they will emit an estimated 150 million tonnes of CO₂ a year. State-owned power and steel firms have continued to build and announce new coal-based projects, even as China's leadership has pledged to aim for carbon neutrality and called for strictly controlling "high-energy, high-emission" projects.

Power generation and steelmaking are the two largest CO₂ emitting sectors in China. They have also been the main drivers of the steep increase in China's CO₂ emissions since the end of COVID-19 lockdowns in early 2020, with thermal power generation [increasing](#) 15% and steel output 14% in the first half of 2021, compared with pre-pandemic (2019) levels.

In the past months, however, peaking carbon emissions and controlling financial excesses appears to have gained priority in Beijing over the stimulus-fuelled, post-covid construction boom, with our analysis showing slowing CO₂ emissions growth in the second quarter of 2021. Still, announcements of new coal-based capacity continued, showing the continued struggle between construction-fuelled economic growth and decarbonization.

The IPCC's new Sixth Assessment Report on climate science has starkly demonstrated the importance of peaking and declining global greenhouse gas emissions to curb the increase in global temperatures. As China has been the dominant driver of global emissions growth during this century, as well as during the past year, the success of China's efforts plays a crucial role in the global picture. China's ability to curb its CO₂ emissions growth and realize its emissions targets crucially depends on permanently shifting investments in the

power and steel sectors away from coal power plants and coal-based steelmaking toward zero-carbon power capacity, low-carbon steel and green hydrogen production.

How China's two largest emitting sectors continue to build coal-based capacity

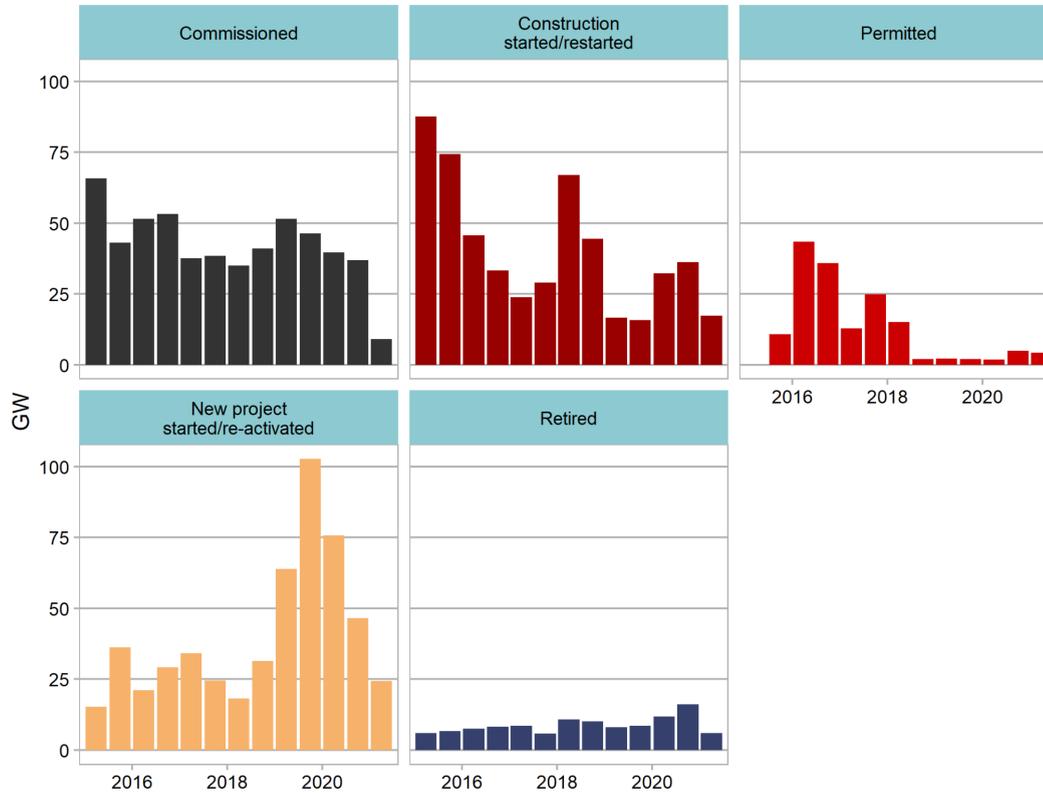
Centre for Research on Energy and Clean Air and Global Energy Monitor have mapped newly announced coal power and steelmaking projects to assess whether these sectors are shifting investments and new capacity to clean technologies after the country's carbon neutrality announcement.

On the power sector:

- 15GW of new coal power capacity started construction in the first half of the year and 24GW of new projects were announced or re-activated, led by coal-rich western provinces hoping to export electricity to the east. The volume of new projects represents a return to pre-COVID levels after new projects surged in 2020 but still amounts to almost one coal plant unit per week.
- However, clean energy installations fell also, meaning that the share of coal in new generation investments remained at the same level as in previous years. [Newly installed](#) wind, solar and nuclear capacity amounted to 10.8GW, 13.0GW and 2GW, a fall from 2020 and a far cry from the levels required towards the end of this decade to meet the emission peaking pledge.
- Zero-emission power generation covered only 30% of the increase in power demand from the first half of 2019 to the first half of 2021. In other words, investment in renewables and nuclear needs to triple just to cover the increase in electricity demand, at current growth rates. Yet, there is no clear increasing trend in the share of power demand growth covered by zero-emissions sources. Meeting the 2030 emission reduction target requires this share to exceed 100% by the end of the decade.

Coal power pipeline in China

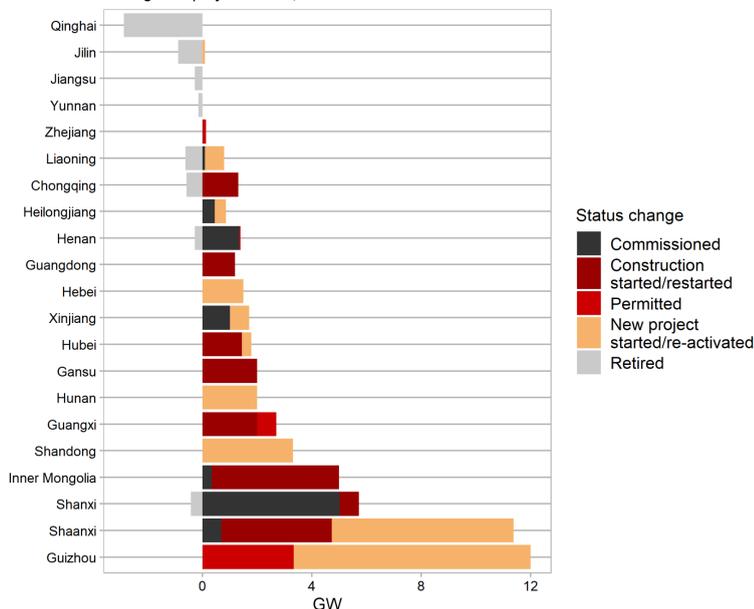
Changes in project status, half-yearly



New project initiations returned to pre-crisis levels after the surge in 2020.

Coal power pipeline in China

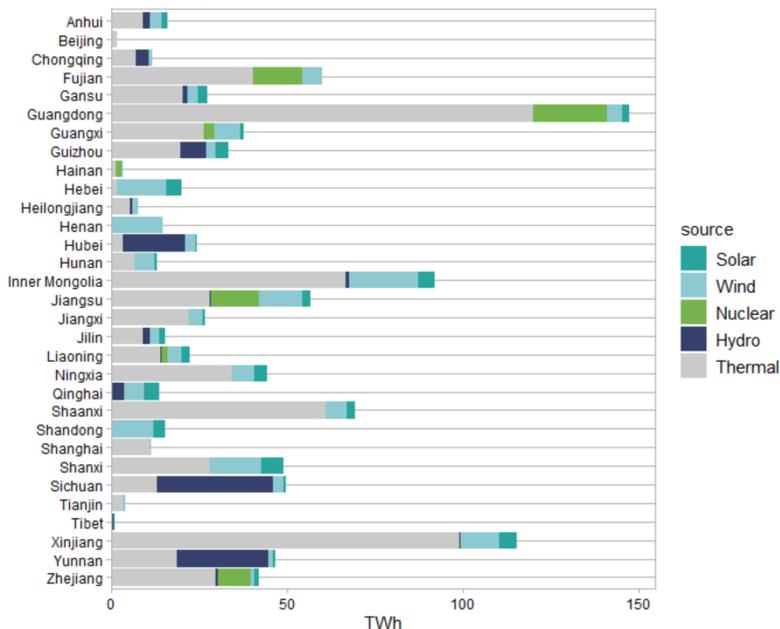
Changes in project status, first half of 2021



New coal power projects progressed predominantly in the inland provinces of Guizhou, Sha'anxi, Shanxi and Inner Mongolia, but plant commissioning and construction starts exceeded retirements in all but a handful of provinces.

Increases in power generation in China

2021H1 vs 2019H1



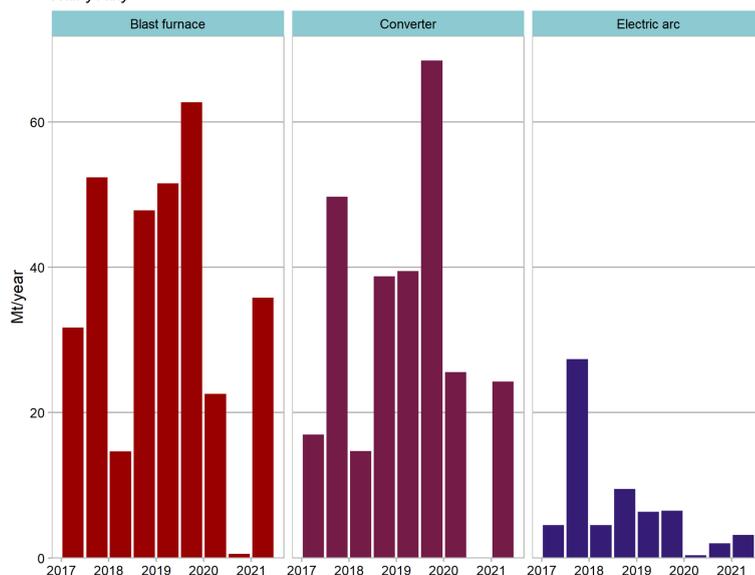
Increases in power generation were dominated by thermal power (coal and gas) in all provinces except those that had major increases in hydropower output (often related to annual variation in operating conditions).

On the iron and steel sector:

- 35 million tonnes of new coal-based ironmaking capacity was announced in the first half of 2021, more than in all of 2020. This locks the sector further into coal dependency and means stranded assets when the emission reduction targets are realized. A recent [draft](#) five-year plan sees steel sector emissions peaking before 2025.
- There has been no progress during the past 10 years in increasing the share of electric arc furnace or DRI steelmaking. Meeting the 2030 emission reduction targets requires this share to approximately double during this decade.

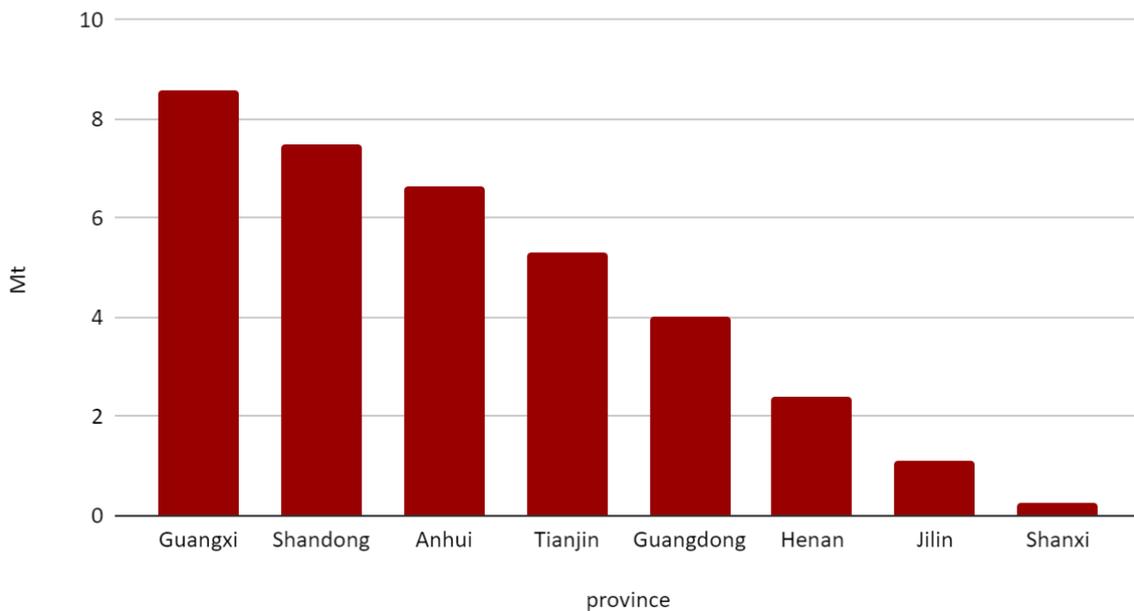
Newly announced iron&steel capacity by type

Half-yearly



New iron and steel capacity continued to be dominated by coal-based blast furnace capacity, and newly announced projects in the first half of 2021 already exceeded those during all of 2020.

Newly announced blast furnace capacity in 2021



Newly announced blast furnace capacity in the first half of 2021 was concentrated in half a dozen provinces, including the prosperous coastal provinces of Shandong, Tianjin and Guangdong, as well as the inland provinces of Guangxi, Anhui and Henan.

For the steel sector, the proposed emission target is for CO₂ emissions to peak by 2025 and then fall by 30% from their peak level by 2030. This is only possible through a major shift towards steelmaking from scrap and/or DRI iron making, as the scope for a further decrease in emissions per tonne in coal-based iron making is limited. This means in effect that blast furnace output has to fall by more than 30% by 2030 to realize a 30% reduction in CO₂ emissions.

Under China's iron and steel capacity control rules, new projects "replace" retiring capacity so total capacity doesn't increase, but old capacity ripe to retire gets replaced by brand new capacity. There is also a [major problem](#) of illegally built capacity, and supposedly closed capacity still being operated illegally, further undermining the effectiveness of capacity controls.

As demand for pig iron produced in blast furnaces is bound to fall steeply over this decade, replacing retiring blast furnaces with new ones risks creating an overcapacity situation,

with blast furnaces at risk of becoming stranded assets when steel prices fall and the operators of brand-new facilities face financial distress. This would then put pressure on the government to slow down the transition, or even institute a new round of domestic stimulus to support heavy industry.

The province with the most new steel capacity announced in 2021, Guangxi, has already been [reprimanded](#) for the excessive “high-energy, high-emissions” projects.

The emissions targets for the steel sector don’t include emissions associated with electricity production to power the mills. Decarbonizing the steel sector adds to the demand for increasing zero-carbon energy capacity to power EAF and DRI steelmaking and for green hydrogen production.

Emissions surge shows signs of cooling in the second quarter

CO2 emissions growth in China slowed down in the second quarter, indicating that the rapid emissions growth seen since the end of the COVID-19 lockdown in early 2020 could be coming to an end. CO2 emissions increased by approximately 1% in the second quarter compared with 2020, and by 5% compared with 2019. While emissions kept going up, the growth is a marked slowdown from the first quarter, when emissions were up 9% from 2019 levels.

The slowdown reflects recent steps the government has taken to control financial excesses and runaway steel production, including tightening credit to the construction sector and instituting controls on industrial output.

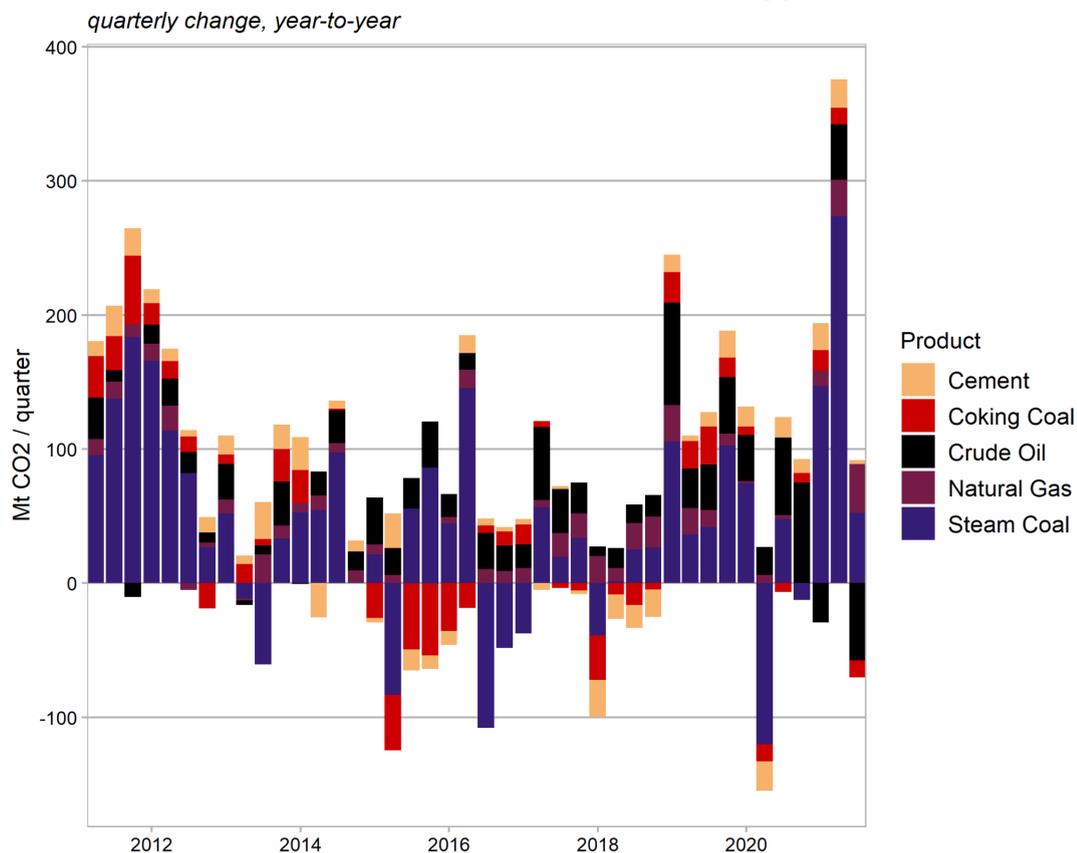
Initially, China’s CO2 emissions surged well above pre-COVID levels in the second half of 2020 and in early 2021, as the recovery favored the most energy- and carbon-intensive parts of the economy — construction and heavy industry. Yet in the past months, peaking carbon emissions and controlling financial excesses have taken the front seat in political rhetoric, and the construction boom appears to be cooling down.

In the second quarter, consumption of thermal coal increased 3%, compared to 20% annual growth in the first quarter of 2021. The production of coke fell by 1%, after increasing 9% in the first quarter, and consumption of oil products fell 3% in the second quarter, led by diesel which plummeted 16%, following increases of 17% and 12% in the

first quarter. Notably, consumption of fossil gas continued to boom, increasing 25% on year in the second quarter. Growth in cement production, another major source of CO₂ emissions, slowed from 47% in the first quarter to 1% in the second quarter.

While growth in fossil fuel consumption slowed down, it seems that wind and solar projects were affected by financial tightening as well, as newly installed capacity fell far short of expectations. Capacity additions only [amounted to](#) 23GW in the first half, much less than half the 90GW [target](#) for the year, and far below the 130GW per year [needed](#) annually until 2030 to meet energy targets.

China's CO₂ emissions from energy and cement



Growth in CO₂ emissions by fuel and process. Coal, oil and gas emissions refer to combustion emissions, while cement refers to the process emissions from cement production.

Outlook for the rest of the year

The key questions now are whether the government will welcome the cooling of emissions-intensive sectors or whether it will turn the tap back on, stimulating real estate and infrastructure projects and further driving up steel and industrial power demand. Permitting decisions on recently announced new projects will show whether continued investment in coal-based capacity is still allowed.

The steel sector looks likely to miss a late 2020 government target of limiting 2021 steel output to 2020 levels. Local governments have been imposing strict output restrictions which affected steel plant operations during the summer, but a recent Politburo instruction to avoid “campaign-style” emission reduction measures was widely seen as a rebuke to these curbs. Additionally, a sharp increase in crude steel production in the first half of the year means production in the second half [would need to fall](#) by approximately 11% to meet the target. The expectation now is that a new, less restrictive target to limit output will be put in place. A less strict target would still mean putting an end to the around 10% growth rate of steel output seen during the past 12 months.

Major power firms [said in a survey](#) that 91% of their new generation investments went into non-fossil capacity early in the year. The solar industry [expects](#) investments and installations to recover, leading to around 60GW of capacity installed this year. Solar panel manufacturing has been surging recently, lending credence to the forecast. This indicates that a transition is taking place within the power sector, while the steel sector has yet to make significant shifts.

If the expectations can be met, the second half of the year would see the mix of added power capacity align better with the country's climate goals.

A [new Politburo directive](#) on reducing carbon emissions and warning against “campaign-style” measures has prompted warnings from state media and experts [against](#) “unrealistic pledges” and statements [emphasizing](#) that reaching carbon neutrality is a “long-term task”, playing down the amount of progress that can be expected by 2025. These statements have been [interpreted](#) as the country’s leadership “softening its tone on climate ambition”. The tug-of-war between fossil fuel and clean energy interests continues on multiple fronts.

Methodology

The changes in coal power project status analysed for this briefing are based on the latest July 2021 update of the Global Energy Monitor's Global Coal Plant Tracker (GCPT). GCPT is the most detailed dataset available on the global coal power fleet, and 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 the 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.

Information on new iron and steel projects was compiled from the websites of provincial Industrial and Information Technology Bureaus and Ecology and Environment Bureaus, which are responsible for implementing steel overcapacity and capacity replacement policies, and environmental permitting of new steel plants, respectively. New project announcements were mapped systematically, and total blast furnace, converter and electric arc capacity, as well as capacity being replaced, was captured for each project.

CO₂ emissions trends were calculated based on apparent consumption of each fossil fuel and reported production of cement. Apparent consumption means consumption estimated as a residual of domestic production, imports and exports and inventory changes. Production data was obtained from National Bureau of Statistics monthly releases, trade data from China Customs, and inventory changes from industry surveys and estimates obtained from [Wind Financial Terminal](#). National Bureau of Statistics default conversion factors were used to convert fuel consumption from physical units to energy units, and IPCC default emissions factors per fuel were used to calculate CO₂ emissions. Cement CO₂ emissions factor was based on Andrew ([2019](#)).

About Global Energy Monitor

Global Energy Monitor (GEM) develops and shares information on energy projects in support of the worldwide movement for clean energy. Current projects include the Global Steel Plant Tracker, Global Coal Mine Tracker, Global Coal Plant Tracker, Global Fossil Infrastructure Tracker, Europe Gas Tracker, CoalWire newsletter, Global Gas Plant Tracker, Global Registry of Fossil Fuels, Latin America Energy Portal, and GEM.wiki.

www.globalenergymonitor.org

About Centre for Research on Energy and Clean Air (CREA)

CREA is an independent research organisation focused on revealing the trends, causes, and health impacts, as well as the solutions to air pollution. We use 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.

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