

China And Its Coal Fleet

July 28, 2020

A friend asked recently how many coal-fired power plants China is building. We weren't sure, so we decided to do a little research. There are multiple sources for some of the information that follows, but one is a particularly good source of data on coal-fired generation around the world.

By way of background, China signed onto the Paris Agreement which calls for each country to make a commitment (“Nationally Determined Contribution,” or NDC) of some sort to address greenhouse gas (GHG) emissions. China’s NDC includes a pledge to stop increasing CO₂ emissions (reach its peak in emissions) by 2030, or earlier if possible, as well to take other steps such as increasing reliance on renewables.ⁱ By comparison, the Obama administration committed the U.S. to reduce GHG emissions by 26-28% below 2005 levels by 2025.

Global anthropogenic GHG emissions are estimated to be 51.8 billion metric tons (tonnes) in 2018.ⁱⁱ The U.S. was responsible for about 6.7 billion tonnes of GHGs in 2018 and, therefore, represents about 13% of global emissions.ⁱⁱⁱ The U.S. coal fleet emitted 973 million tonnes of CO₂ in 2019, or 1.9% of global emissions.^{iv} The coal fleet is the number three source (19%) of energy-related CO₂ emissions in the U.S. economy. Petroleum (mostly transportation) is first (46%) and natural gas is second (33%).^v

China is the largest consumer of primary energy in the world, and it relies on coal for about 58% of its primary energy needs. This helps make it the world’s largest emitter of GHGs at almost 14 billion tonnes last year, which represents about 27% of global GHG emissions.^{vi} The U.S. is the number two emitter, followed by India, Russia and Japan.

To meet its Paris commitment, China will have to reduce its reliance on coal. (Climate Action Tracker rated China’s NDC as “highly insufficient” to meet its responsibilities under the Paris Agreement.^{vii}) However, headlines and the numbers behind the headlines indicate that China’s coal fleet is growing, and China is providing financial support to coal projects in other countries.

A Few Headlines

- *“Surging coal use in China threatens global CO₂ goals,” E&E News, June 9, 2020.*^{viii}

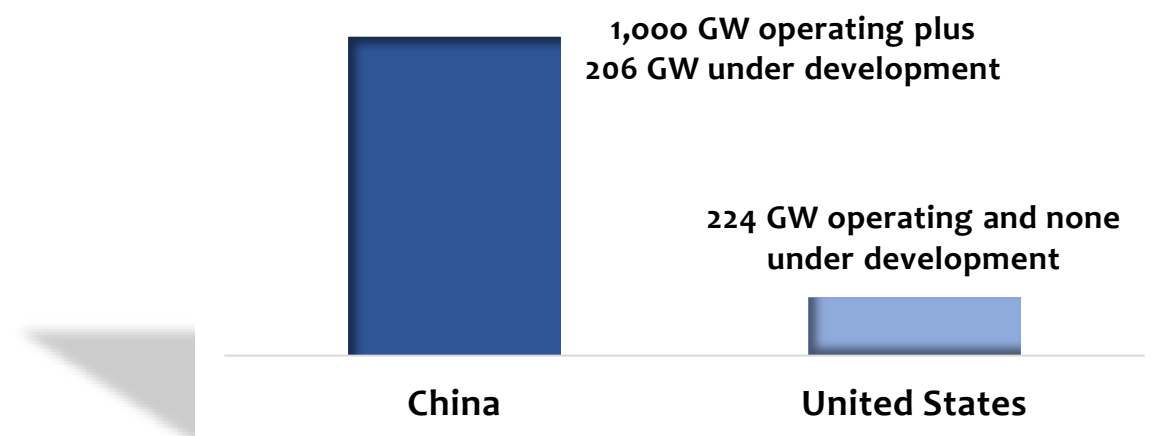
- **“China Is Still Building an Insane Number of New Coal Plants — While the rest of the world turns away from the fossil fuel, China is investing big in coal-powered electricity,”** *Wired*, November 27, 2019.^{ix}
- **“China must cancel new coal plants to achieve climate goals: study,”** *Reuters*, January 6, 2020.^x
- **“China’s appetite for coal power returns despite climate pledge — Capacity rose by 42.9 GW in 18 months, far outpacing global efforts to cut use of fossil fuel,”** *The Guardian*, November 20, 2019.^{xi}
- **“Years after freezing new projects, China is back to building coal power plants,”** *Washington Post*, November 20, 2019.^{xii}

Some Numbers

The best source we found about China’s coal fleet is a report titled **“Boom and Bust 2020 — Tracking the Global Coal Plant Pipeline”** published by Global Energy Monitor and others.^{xiii} The report provides data on coal-fired generating capacity in China and 107 other countries.

Below are some excerpts from the report. To put some of the numbers in perspective, total U.S. electric generating capacity (gas, coal, oil, nukes and renewables) is 1,100 GW (or 1.1 million megawatts).^{xiv} The U.S. coal fleet makes up about 224 GW of the total.^{xv}

- **“At over 1,000 GW, China is home to about half of all global coal power capacity, and 41% of global capacity under construction and in pre-construction development (205.9 GW).”** [Therefore, China’s coal fleet is about equal to the entire electric generating capacity of the U.S., and it’s still growing. The U.S. coal fleet is only slightly larger than the amount of coal-fired capacity China has under construction and in development.]



- *“The [global] coal fleet grew in 2019 by a greater amount than in 2018. The uptick was primarily due to an increase in plants going into operation in China ... China’s continued pursuit of new coal power is effectively driving the ongoing expansion of the global coal fleet.”*
- *“Although coal’s share of primary energy in China fell by 1.5 percentage points to 57.7% in 2019 from a year earlier, the amount of coal used still rose 1% ...”^{xvi}*
- *“In China, the amount of [coal-fired] capacity in pre-construction development increased [in 2019] ... The increase comes as the power industry in China continues to advocate for a capacity target in the upcoming five-year plan that would make room for up to 200 new coal-fired generating units by 2025.” [This means that China would be building, on average, more than three new coal units per month.]*
- *“Nearly two-thirds [43.8 GW] of the 68.3 GW of newly commissioned [global coal] capacity was in China.” [China’s new coal-fired generating capacity last year is roughly equivalent to the entire electric generating capacity of Illinois.^{xvii}]*
- *“Over a third of the [global coal] capacity in pre-construction development is in China (106.2 GW), a 46% increase from 2018 when capacity in pre-construction development in China was 72.7 GW—and a potential sign the country plans to add new coal power into its 14th Five Year Plan (2021-2025) and perhaps beyond.”*
- *The report “... estimates China’s coal fleet saw a net increase of 36.8 GW in 2019, significantly higher than the official government estimate ... of 28.9 GW.” [The larger number is equivalent to the electric generating capacity of Georgia.]*
- *The next largest additions of coal-fired capacity after China are India (66 GW), Turkey (33 GW), Indonesia (31 GW) and Vietnam (31 GW). Those five countries plan to add almost 370 GW of new coal-fired generating capacity. [This amount of generating capacity would equate to roughly 780 new coal-fired generating units.^{xviii}]*
- *Worldwide, almost 500 GW of new coal-fired capacity (more than twice the size of the U.S. coal fleet) in 53 countries are either under construction or in pre-construction planning. [This amount of generating capacity would equate to roughly 1,000 new coal-fired generating units.]*

Last, it’s worth noting that China is financing and building both fossil-fuel and renewables infrastructure in other countries. Of the coal plants under development outside of China, some 102 GW have received funding

commitments or proposed funding from Chinese financial institutions and companies.^{xix}

Postscript

Our friend's question seemed to imply that China might be building a lot of new coal-fired generation. She was right.

ⁱ China's NDC pledges (1) "peaking of carbon dioxide emissions around 2030 and making best efforts to peak early;" (2) "lowering carbon dioxide intensity (carbon dioxide emissions per unit of GDP) by 60 to 65 percent from the 2005 level;" (3) "increasing the share of non-fossil fuels in primary energy consumption to around 20 percent;" and (4) "increasing the forest stock volume by around 4.5 billion cubic meters from the 2005 level."

ⁱⁱ "Trends in Global CO₂ and Total Greenhouse Gas Emissions: 2019 Report," PBL Netherlands Environmental Assessment Agency, The Hague, 2019; EIA, Short Term Energy Outlook, June 2020.

ⁱⁱⁱ U.S. EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018," April 13, 2020 <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2018>

^{iv} EIA, "How much of U.S. carbon dioxide emissions are associated with electricity generation?" May 26, 2020.

^v EIA, "Frequently Asked Questions —What are U.S. energy-related carbon dioxide emissions by source and sector?" These percentages are for 2019. Total energy-related CO₂ emissions were 5.131 billion tonnes. Petroleum was responsible for 2.354 billion tonnes, natural gas 1.689 billion tonnes and the electric power sector 1.076 billion tonnes. Of electric power sector emissions (21% of energy-related emissions), coal contributed 973 million tonnes. <https://www.eia.gov/tools/faqs/faq.php?id=75&t=11>

^{vi} The Rhodium Group, "Taking Stock 2018," <https://rhg.com/research/taking-stock-2018/>

^{vii} Climate Action Tracker, accessed July 25, 2020 <https://climateactiontracker.org/countries/china/>

^{viii} <https://www.eenews.net/stories/1063354565>

^{ix} <https://www.wired.com/story/china-is-still-building-an-insane-number-of-new-coal-plants/>

^x <https://www.reuters.com/article/us-climate-change-china-coal/china-must-cancel-new-coal-plants-to-achieve-climate-goals-study-idUSKBN1Z603Z>

^{xi} <https://www.theguardian.com/world/2019/nov/20/china-appetite-for-coal-power-stations-returns-despite-climate-pledge-capacity>

^{xii} https://www.washingtonpost.com/world/asia-pacific/years-after-freezing-new-projects-china-is-back-to-building-coal-power-plants/2019/11/20/b9075baa-ob38-11ea-8054-289aef6e38a3_story.html

^{xiii} Global Energy Monitor, Sierra Club, Greenpeace and CREA, "Boom and Bust 2020: Tracking the Global Coal Plant Pipeline," March 2020, Christine Shearer et al.

<https://energyandcleanair.org/publications/boom-and-bust-2020-tracking-the-global-coal-plant-pipeline/>

^{xiv} See EIA AEO 2020 reference case for electric generating capacity.

^{xv} EIA AEO 2020 projects the coal fleet will be 224 GW this year.

^{xvi} The Rhodium Group "Taking Stock 2019," July 8, 2019 <https://rhg.com/research/taking-stock-2019/>

^{xvii} Energy Information Administration, "State Electricity Profiles, Data for 2018," December 31, 2019 <https://www.eia.gov/electricity/state/>

^{xviii} According to "Boom and Bust 2020" Appendix B, there are 700 coal-fired generating units in various stages of development totaling 332 GW. Therefore, the average size of a to-be-built unit is 474 MW.

^{xix} Climate Action Tracker, accessed July 25, 2020 <https://climateactiontracker.org/countries/china/>