Boom and Bust 2020:

TRACKING THE GLOBAL COAL PLANT PIPELINE

Christine Shearer, Lauri Myllyvirta, Aiqun Yu, Greig Aitken, Neha Mathew-Shah, Gyorgy Dallos, and Ted Nace

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The cover shows the Navajo generating station in Arizona, one of the many large US coal plants retired in 2019. Photo copyright © Darcy Padilla.

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Global Energy Monitor (GEM) develops and shares information on fossil fuel projects in support of the worldwide movement for clean energy. Current projects include the Global Coal Plant Tracker, the Global Fossil Infrastructure Tracker, the Europe Gas Tracker, the CoalWire newsletter, and the GEM wiki. For more information, visit https://globalenergymonitor.org/

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ABOUT THE GLOBAL COAL PLANT TRACKER

The Global Coal Plant Tracker is an online database that identifies and maps every known coal-fired generating unit and every new unit proposed since January 1, 2010 (30 MW and larger). Developed by Global Energy Monitor, the tracker uses footnoted wiki pages to document each plant and is updated biannually. For further details, see Tracker Methodology at EndCoal.org.

AUTHORS

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FURTHER RESOURCES

For additional data on proposed and existing coal plants, see Summary Statistics at EndCoal.org, which provides over 20 tables providing results from the Global Coal Plant Tracker (GCPT), broken down by province, nation, and region. For links to reports based on GPCT data, see Reports at EndCoal.org. To obtain primary data from the GCPT, contact Ted Nace (ted@tednace.com).

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EXECUTIVE SUMMARY

For the fourth year in a row, most leading indicators of coal power capacity growth declined in 2019, including construction starts, amount of capacity permitted for construction, and amount of capacity in pre-permit development, according to the Global Coal Plant Tracker.[1]

With climate concerns dominating headlines, builders of new coal plants face an increasingly adverse business environment, including widening restrictions by over 126 globally significant banks and insurers, as well as commitments to phase out coal and accelerate a transition to clean power by 33 national and 27 subnational governments.

Despite the decline in coal plant development, the 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, the result of a permitting binge from 2014 to 2016. Outside of China, the global coal fleet overall shrank for the second year in a row as retirements exceeded commissioning. Globally, the amount of power generated from coal in 2019 declined by 3% compared to 2018, with global coal plants now operating at an average 51% of their available operating hours, a record low.

In China, the amount of capacity in pre-construction development increased for the first time since the central government began placing restrictions on new coal plant proposals and permits in 2016. 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. Meanwhile, coal power capacity additions in China continue to exceed demand, with 40% of the coal power capacity commissioned in 2019 already relegated to emergency back-up status that limits its usage, according to an analysis by Global Energy Monitor.

1. Includes coal-fired units 30 megawatts and above.

Key developments of 2019 included:

- Globally, the coal fleet grew by 34.1 gigawatts (GW) in 2019, the first increase in net capacity additions since 2015. Nearly two-thirds of the 68.3 GW of newly commissioned capacity was in China. Outside China, the global coal fleet overall shrank for the second year in a row. Within members of the Organization for Economic Cooperation and Development (OECD), coal power capacity has been declining since 2011.

- As the US and EU move away from coal, Japan is now the biggest driver of new coal power in the OECD. Japan has 11.9 GW of coal power under development domestically that would increase lifetime carbon dioxide emissions from its existing coal fleet by 50% (from 3.9 to 5.8 billion tonnes). Outside its borders, Japanese public finance is behind 24.7 GW of coal power, larger than the coal fleet of Australia (24.4 GW).

- Nearly half of the retired coal power capacity in 2019 was in the US, the second highest on record. In the European Union, retirements were the fourth highest. Under Trump, US coal plant retirements have increased 67% compared to Obama. Retirements averaged 8.2 GW a year during Obama's tenure (2009–2016), and 13.7 GW a year during Trump's tenure (2017–2019).

- The pre-construction pipeline continued to shrink. In India it fell by half from 2018 to 2019, in Southeast Asia by 22%, in Africa by 40%, and Latin America by 60%. Turkey now has more coal power in pre-construction development than India, a prospect that was unthinkable just a few years ago when China and India together dominated development.

- Construction starts were down in 2019, with big drops in Southeast Asia and China, and no construction starts in Africa or Latin America. As a result, the amount of capacity under construction decreased 16% from 2018 to 2019, as commissioned capacity was not replaced by an equivalent amount of construction starts.

- No Australian, European, or US commercial bank provided direct project financing for the coal power construction starts of 2019, although many still provide financial support to companies and state entities that are building coal plants.

- Coal power generation fell 3% globally compared to 2018, with strong falls in the EU (–24%), the US (–16%), and even India (–3%). As a result, global average utilization of coal power plants fell to a record low of 51%.

- The worst effects of China's permitting binge in 2014–2016 are now being seen in the form of an increase in plants going into operation in China. The additions ran far ahead of generation growth, meaning the overcapacity situation continued to worsen. China's central government has already relegated 40% of the coal power commissioned in 2019 to emergency back-up status, limiting the operating hours of these plants.

- Even with the fall in coal plant development and use in 2019, the world is not on track for the steep reductions in coal power necessary to meet the Paris climate agreement. Coal power use needs to fall 80% by 2030 to keep global warming below 1.5°C, according to the Intergovernmental Panel on Climate Change, and the United Nations has called for 2020 to be the global end date for new coal plant proposals.

- Despite low and falling utilization of existing coal-fired capacity, the Chinese power industry is advocating for a capacity target in the upcoming five-year plan that would make room for the addition of up to 200 new coal-fired power units by 2025—a net increase of 150 GW over current levels. Given the need for coal power use to decrease 80% by 2030, China's new coal power cap could be the most consequential global climate policy decision being made in the early 2020s.

THE FACTORS SHAPING COAL POWER IN 2019

For the fourth consecutive year, despite an uptick in the number of new coal plants going into operation, the overall global pipeline for new coal power capacity continued to contract. Proposed and existing coal power projects faced increasing resistance due to protests by citizens and NGOs, reports about the accelerating impacts of climate change, and ever stronger competition from renewable sources of electricity.

Coal power projects also faced an increasingly chilly business climate due to widening restrictions by financial institutions and by governmental policies promoting a coal phase-out. To date, over 126 globally significant banks, asset managers, and insurers have enacted some form of restriction on coal finance. The Powering Past Coal Alliance, having grown to 33 national and 27 subnational governments, has widened the number of governments working to accelerate a transition away from coal power.

Meanwhile, falling costs of renewables and low prices of fossil gas continued to erode the finances of existing coal plant operators and discourage new projects. Coal power capacity that is being built is exceeding demand, with global coal power use falling 3% in 2019, despite the growth of the coal fleet. As a result, global coal plants operated at an average 51% of their available operating hours in 2019, a record low.

Even with the decline in both coal plant development and use, coal power must fall a staggering 80% by 2030 to keep global warming below 1.5°C, according to the Intergovernmental Panel on Climate Change. Toward meeting this goal, the United Nations has called for a moratorium on new coal plant proposals by 2020. While coal plants face increasingly intense public opposition and unfavorable economics, efforts need to be radically ratcheted up to reduce coal power use by 80% within the decade.

GLOBAL DATA SUMMARY

After declining every year since 2015, net capacity additions to the global coal fleet went back up in 2019, as commissioning surpassed 2018 levels and retirements flattened. Globally, 68.3 gigawatts (GW) of new coal power were commissioned and 34.2 GW retired in 2019, leading to a net increase in the global coal fleet of 34.1 GW (black line, Figure 1).[2]

Nearly two-thirds (64%) of the newly commissioned capacity was in China (43.8 GW) and 12% in India (8.1 GW), with the remaining 24% located mainly in Malaysia (2.6 GW), Indonesia (2.4 GW), and Pakistan (2 GW). In total, 17 countries commissioned new coal power in 2019. Globally, commissioned capacity in 2019 marks a 34% decline over 2015, when commissioning was 105.8 GW, but a 35% increase over 2018, when commissioning was 51 GW (Table 1).

For retirements, nearly half (48%) of the retired coal power capacity in 2019 was in the US (16.5 GW) and over a fifth (22%) in the EU28 (7.5 GW). Despite 2019 being the second highest year for US retirements and fourth highest for the EU, the amount of retired capacity globally in 2019 fell slightly below 2018, due to a drop in retired capacity in China as well as in India.

While the global coal fleet grew in 2019, global capacity outside of China declined for the second year in a row (dotted black line, Figure 1), as these other countries together retired more coal power capacity (27.2 GW) than was commissioned (24.5 GW). China's continued pursuit of new coal power is effectively driving the ongoing expansion of the global coal fleet.

2. The average coal-fired unit has a gross electrical capacity of 350 megawatts (MW), while the most common size unit is 660 MW. Newer units can be up to 1,100 MW, or 1.1 GW. Most power stations have two or more units.

Figure 1: Global commissioning and retirements and the net change, 2000–2019 (gigawatts)

China = light blue, India = gray, Other = yellow, US = red, EU28 = dark blue,
Net change = black line, Net change without China = dotted black line

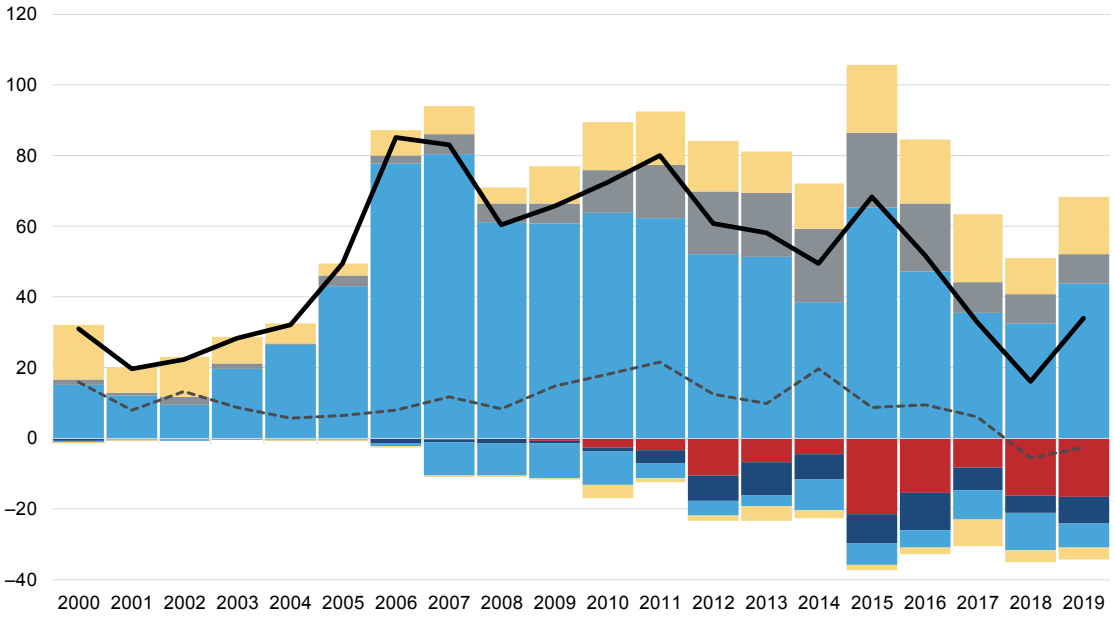


Table 1: Changes in the coal plant pipeline, 2015–2019 (megawatts)[3]

	2015	2016	2017	2018	2019	Change from 2018 to 2019	Change from 2015 to 2019
Announced	534,735	248,407	177,489	132,022	95,494	–28%	–82%
Pre-permit	429,774	228,013	166,301	138,322	124,505	–10%	–71%
Permitted	188,014	111,808	110,426	85,576	79,610	–7%	–58%
Announced + Pre-permit + Permitted	1,152,523	588,228	454,216	355,920	299,609	–16%	–74%
In Construction	315,427	276,940	215,746	237,539	199,572	–16%	–37%
All development	1,467,950	865,168	669,962	594,459	499,181	–16%	–66%
Started Construction (past 12 months)	72,418	78,354	40,169	25,567	24,334	–5%	–66%
Completed (past 12 months)	105,847	84,551	63,384	50,996	68,340	34%	–35%
Retired (past 12 months)	37,458	32,732	30,328	34,856	34,233	–2%	–9%
Net change in capacity	68,389	51,819	33,056	16,140	34,107	111%	–50%
On Hold	214,734	577,759	608,715	481,365	292,397	–39%	36%
Cancelled (since 2010)	611,776	880,555	1,066,426	1,269,314	1,522,519	20%	149%

3. Global Energy Monitor recently completed a survey on the correct status of each coal-fired unit going back to 2015, resulting in some minor changes from numbers reported in previous Boom and Bust reports.

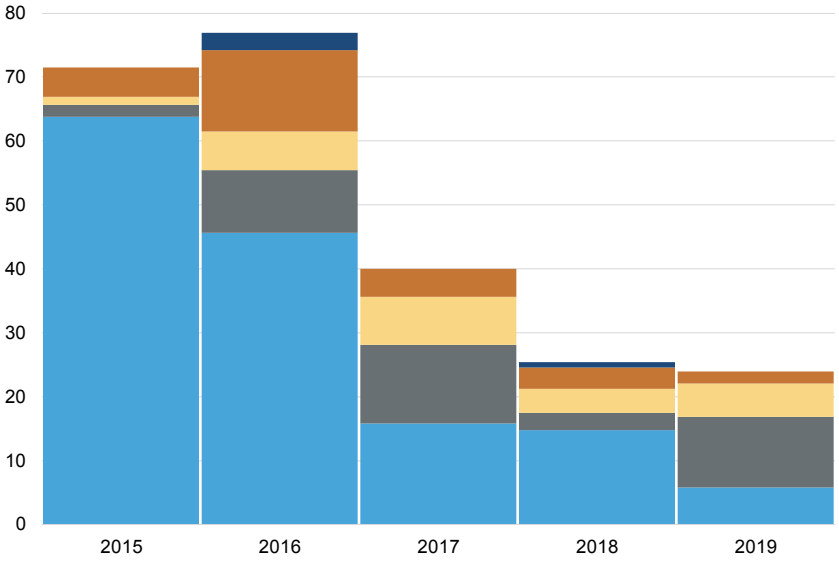
Although commissioning increased in 2019, the pipeline for new commissioning is showing signs of a slowdown. Construction starts in 2019 have fallen by two-thirds since 2015, from 72.4 GW in 2015 to 24.3 GW in 2019 (Figure 2). The most radical decrease occurred in China (blue), where construction starts decreased 75% from 63.8 GW in 2015 to 15.7 GW in 2017, as the central government began placing restrictions in 2016 on coal development to rein in construction from a province-level permitting boom that began in late 2014.

Regionally, the biggest growth in construction starts in 2019 took place in South Asia (gray), as India started construction on 8.8 GW of new coal power capacity—despite the country already having 19.3 GW of coal plants frozen in construction due mainly to financing problems. An increase in 2019 also occurred within members of the Organization for Economic Cooperation and Development (OECD, yellow), due to construction starts in South Korea (2.1 GW), Japan (1.8 GW), and Turkey (1.3 GW).

Although Southeast Asia is often hailed as the next center for coal plant development, construction starts there have fallen over 85%, from 12.8 GW in 2016 to 1.8 GW in 2019 (orange). Latin America, Africa, and the Middle East regions have also seen a slowdown: since 2015, there have been 3.1 GW of construction starts in Africa and the Middle East, and 0.4 GW in Latin America, none of which took place in 2019 (dark blue).

Figure 2: Global construction starts by region, 2015–2019 (gigawatts)

China = light blue, South Asia = gray, OECD = yellow, Southeast Asia = orange, Latin America and Africa & Middle East = dark blue



For the fourth year in a row, global coal power capacity under construction and in pre-construction development declined, falling two-thirds from 1,468 GW in 2015 to 499.2 GW in 2019 (Figure 3). (See Appendixes A and B for all country and regional totals.)

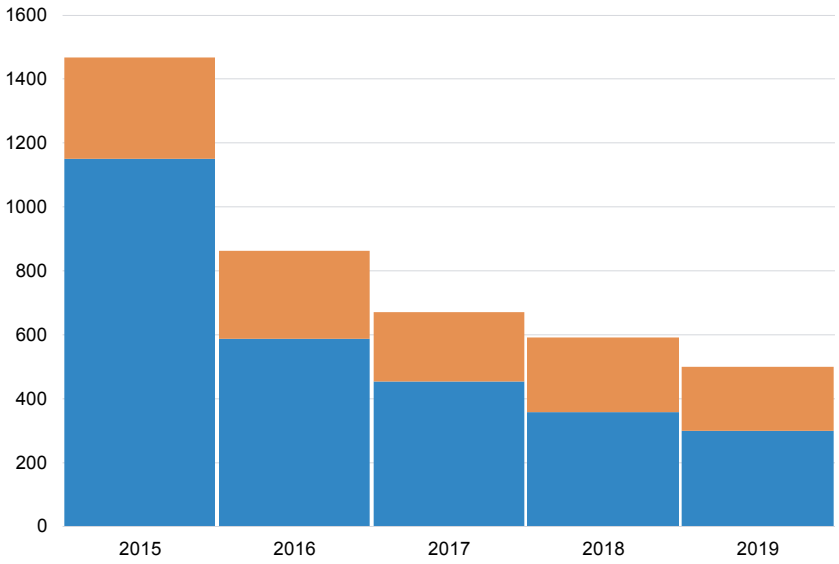
Capacity under construction fell 16% from 237.5 GW in 2018 to 199.6 GW in 2019, and by 37% since 2015, when construction was 315.4 GW (orange). About half of capacity currently under construction is in China (99.7 GW), followed by 18% in India (37 GW), 6% in Indonesia (11.8 GW), and 5% in Japan (9.3 GW).

Capacity in pre-construction development has seen the biggest drops, from 1,152.5 GW in 2015 to 299.6 GW in 2019, an 82% decline (blue). Over a third of the 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.

In India, capacity in pre-construction development halved in just the past year: from 60.2 GW in 2018 to 29.3 GW in 2019, with only 2.8 GW newly proposed in 2019. At 31.7 GW, Turkey now has more capacity in pre-construction development than India's 29.3 GW, followed by Vietnam (22.3 GW), Indonesia (19.4 GW), and Bangladesh (18.8 GW).

Figure 3: Global coal-fired capacity under development, 2015–2019 (gigawatts)

Pre-construction = blue, Construction = orange



COAL POWER CAPACITY DOWN IN THE OECD SINCE 2011

From 2000 to 2019, OECD countries commissioned 121.7 GW of new coal power capacity and retired 189.9 GW, resulting in a net decline in the OECD of 68.2 GW (Figure 4). Coal power capacity has been falling in the OECD since 2011, where the coal fleet is on average twice as old as the rest of the world (35 years compared to 18 years). Commissioning in 2019 totaled 4.4 GW, led by Poland (1.8 GW), Japan (1.3 GW), and Turkey (0.7 GW).

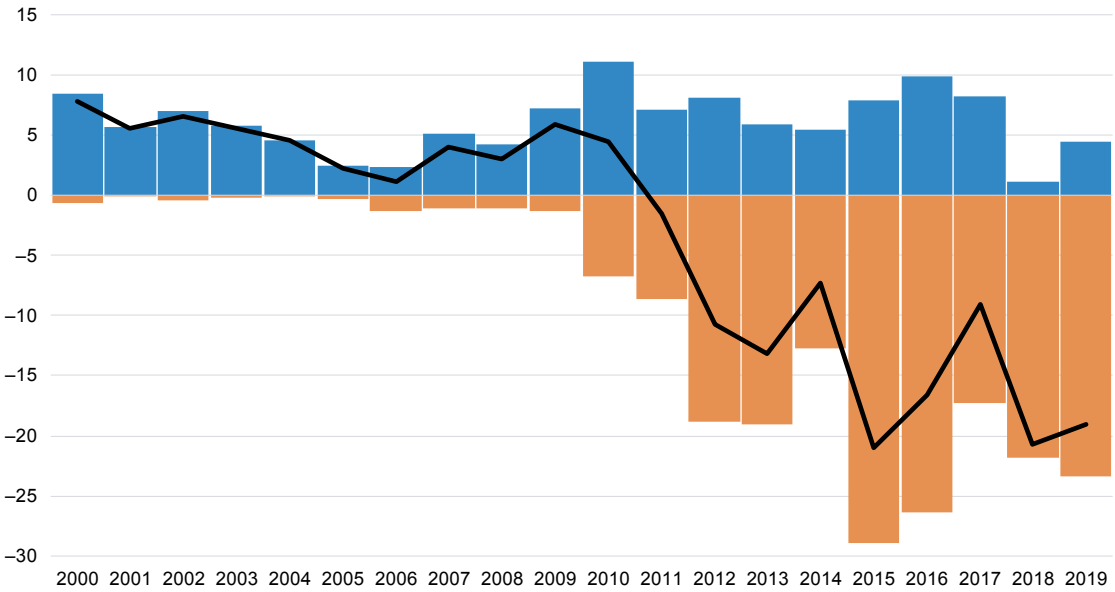
The EU had its fourth highest year for retired capacity in 2019, with the most retirements in the UK (2.7 GW) and Germany (1.2 GW). Retirements are poised to increase, as 14 EU countries have committed to phase out coal power by 2030, and Germany by 2038. Given their phase out commitments, new coal plants in Germany and the Netherlands will have to retire early, including Germany's 1.1 GW Datteln 4 plant, currently under commissioning. In 2019, Greece committed to phasing out its coal power by 2028, putting the fate of its last coal plant under construction (Ptolemaida V) into question.

Poland has not committed to phase out coal power, with 1.4 GW of coal power in advanced construction planned to come online in 2020. However, the country has pledged that an additional 1 GW coal block at Ostroleka power station will be the country's last coal plant, although the plant's inability to secure financing means it may not be built at all, or may be gas-fired.

As the EU phases down its coal power capacity, there was a marked 24% drop in EU coal power generation over 2018, with declines in every member country. The decline brought coal's share in EU power generation down from 19% in 2018 to just 14% in 2019.

Figure 4: Commissioning and retirements in the OECD, 2000–2019 (gigawatts)

Commissioning = blue, retirements = orange, net change = black line



At 16.5 GW, 2019 was the second highest year for US retirements on record, following 2015's 21.6 GW (Figure 5). During Obama's tenure (light blue), retirements averaged 4.2 GW in his first term (2009–2012) and 8.2 GW in his second (2013–2016). Under Trump (dark blue, 2017–2019), retirements have averaged 13.7 GW a year (dashed black lines), a 67% increase over Obama's two terms. Coal power generation in the US also declined in 2019, falling 16% compared to 2018. No coal plant over 50 megawatts (MW) has been built in the country since 2015, and the last remaining coal plant proposal over 50 MW—the 0.9 GW Holcomb plant in Kansas—was called off by its sponsors this year.

While much of the OECD is moving away from coal, some OECD members continue to develop new coal plants. Construction starts since 2015 have been led by Japan (10.7 GW), South Korea (7.4 GW), and Turkey (3.5 GW), followed by the EU (2 GW) (Figure 6).

However, the amount of capacity under construction and in pre-construction development in the OECD has been going down, from 142.4 GW in 2015 to 62.3 GW in 2019, a 56% decline (Figure 7). Over that time, 78 GW of planned coal power capacity has been shelved or cancelled in the OECD.

Japan started construction on 1.8 GW of coal power in 2019, and commissioned 1.3 GW of new coal power. Japan is the only Group of Seven (G7) country adding to its domestic coal power capacity, and is facing pressure to move away from coal. Since 2017, the amount of coal capacity under pre-construction development has fallen by 75%, as project sponsors formally cancelled plans for 8.3 GW of new projects. In March 2019, the Environment Ministry said it would oppose new coal plants, although it can be overruled by the more powerful Ministry of Economy, Trade, and Industry.

Figure 5: US retired capacity, 2009–2019 (gigawatts)

Coal power capacity retired under Obama = light blue, Coal power capacity retired under Trump = dark blue, Average of each term = dotted black line

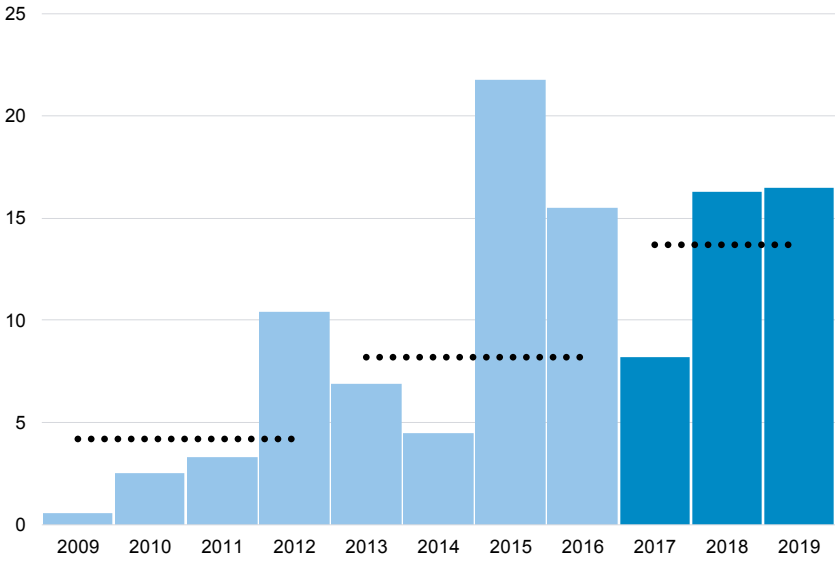


Figure 6: Construction starts in the OECD, 2015–2019 (gigawatts)

Japan = gray, South Korea = light blue, EU28 = dark blue, Turkey = orange

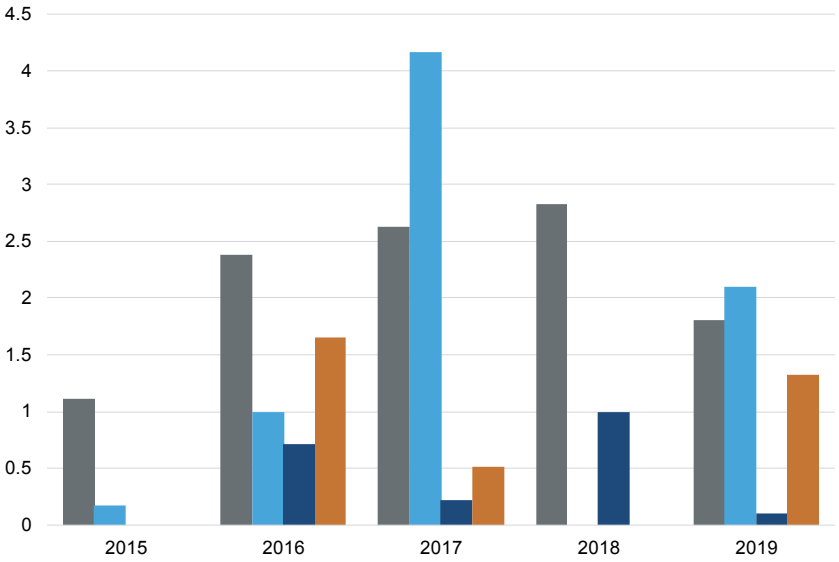
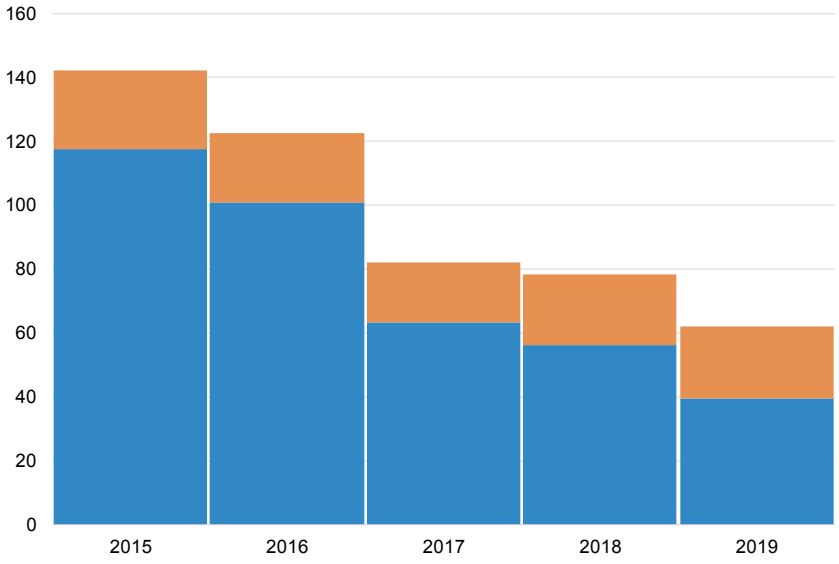


Figure 7: OECD Capacity under development, 2015–2019 (gigawatts)

Pre-construction = blue, Construction = orange



Still, Japan has 21 coal-fired units under development totaling 11.9 GW that, if used at current rates, would increase lifetime carbon dioxide emissions from Japan's existing coal fleet by 50% (from 3.9 to 5.8 billion tonnes). Outside its borders, Japanese public finance is behind 24.7 GW of new coal plants that would emit about 4.2 billion tonnes of carbon dioxide over their lifetime, equivalent to the current lifetime emissions of Indonesia's entire coal fleet. Given the quickly falling price of wind and solar power globally, the coal units supported by Japan both domestically and abroad represent about US$64.5 billion worth of potentially under-utlilized assets, as coal power increasingly loses market share to lower-cost alternatives.[4]

South Korea started construction on 2.1 GW of new coal power in 2019, but it is the last coal plant planned in South Korea, as President Moon Jae-in has ceased permitting for new coal plants. The country is also exploring plans to retire 9 GW of coal power capacity by 2030. Despite signs of a domestic policy shift away from coal, South Korea—and Japan—are significant public funders of plants under development around the world.

At 31.7 GW, Turkey has the second highest capacity in pre-construction development, second only to China. The proposals are part of a long-standing national plan to increase domestic coal power and fuel the plants with new lignite coal mines in Turkey. However, the country has only 1.5 GW of coal power capacity under construction, as financing to build coal plants faces many obstacles including widespread public opposition, a weakening national currency, and poor market conditions for privately-owned plants. As the country's plans for new coal power have fallen short, there are proposals to refurbish and extend the life of older coal plants by up to 30 years. As of January 1, 2020, five of these retirement-age coal plants had their operations suspended on the basis of non-compliance with environmental regulations, following major public campaigns on the right to clean air.

Australia proposed 3 GW of new coal power in 2019, making the country second only to China in the amount of newly proposed coal power. Australia's most recent commercial coal plant was commissioned a decade ago, but the pro-coal policies of the recently re-elected Liberal National Party have led to new proposals aimed at supporting the country's established coal mining sector. However, the projects are already struggling to attract financing, with solar and wind projects being built across Australia at A$40–50 per megawatt hour (MWh), compared to an estimated A$100/MWh to A$150/MWh for coal-fired power plants.

4. Based on IEA World Economic Model 2019, Documentation Table 6, on estimated coal plant costs per megawatt.

CHINA INCREASES COMMISSIONING AND PROPOSALS

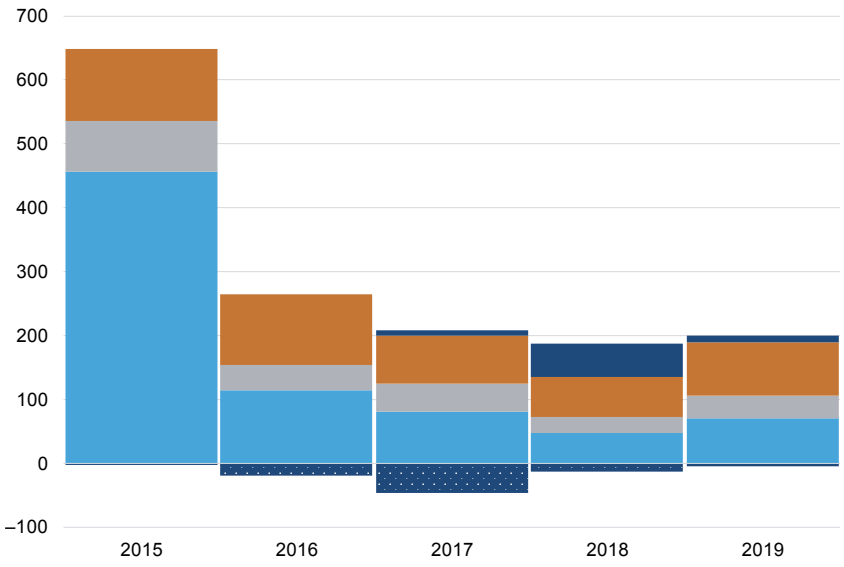
At over 1,000 GW, China is home to about half of all global coal power capacity, and 41% of global capacity under construction and in pre-construction development (205.9 GW). Despite the large amount of capacity under development, the amount marks a significant decrease from previous years, although the trend may be reversing.

China had nearly 650 GW of coal power capacity under development in 2015, the height of a permitting boom during which authority was moved from the central government in late 2014 to the provinces (Figure 8). The amount fell to 245 GW just a year later, as the central government began placing restrictions on coal plants in 2016; provinces issued a "red light" were discouraged from proposing or permitting new plants. Additionally, 83.6 GW of capacity under construction was suspended in China from 2016 to 2019 (dark blue, dotted).

However, 85% of the capacity (70.7 GW) that had been in suspended construction has since been revived, mostly in 2018 (dark blue). The amount of revived construction decreased in 2019, but the amount in pre-construction development grew: from 72.7 GW in 2018 to 106.2 GW in 2019, a 46% increase (33.5 GW). Over 17 GW of coal power capacity that had been permitted for construction and then suspended were revived in 2019, leading to an increase in permitted capacity (gray).

Figure 8: China capacity under development, 2015–2019 (gigawatts)

Announced and pre-permit development = light blue, Permitted = gray, Construction = orange, Suspended construction = spotted dark blue, Revived construction = dark blue



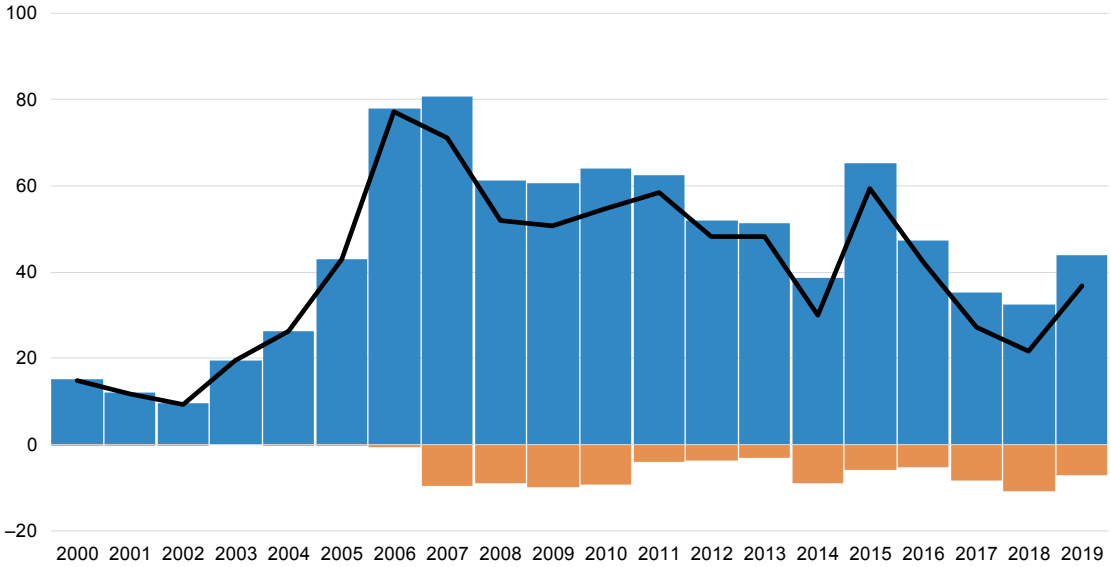
Due to the resurgence in 2018 of large amounts of capacity in advanced stages of construction, commissioning in China jumped up to 43.8 GW of new capacity in 2019, while retirements decreased to 7 GW (Figure 9). In all, GEM estimates China's coal fleet saw a net increase of 36.8 GW in 2019, significantly higher than the official government estimate by the China Electricity Council of 28.9 GW.

While China's coal fleet increased in 2019, there will not necessarily be a corresponding increase in coal power use and greenhouse gas emissions. That is because the central government has already relegated 40% (17.9 GW) of the 43.8 GW of newly commissioned coal power in 2019 to emergency back-up status that restricts its usage. Given that provinces are strongly incentivized to meet economic growth targets, the mandatory reduction in hours for brand new coal plants suggests many were built more as local stimulus for financial growth—when the provinces had control of coal plant permitting—than out of need.

Since 2015, the average running hours for China's coal plants have hovered around 50%, as the rapidly growing fleet chases after a contracting market and competition from lower-carbon alternatives. Facing reduced hours and thus income, as well as high prices for coal, nearly half of China's thermal power companies experienced net financial losses in 2018. Still, the country looks poised to continue coal plant development into its 14th Five Year Plan (2021–2025), with the Chinese power industry advocating for a 150 GW increase over current levels.

Figure 9: Commissioning and retirements in China, 2000–2019 (gigawatts)

Commissioning = blue, retirements = orange, net change = black line



PUBLIC FUNDING TO THE FORE AMIDST TIGHTENING FINANCE CONDITIONS FOR NEW PLANTS

In 2019, there were 24.3 GW of construction starts across 11 countries. When a coal plant enters the construction stage, this tends to signify that a project sponsor has recently been able to secure the necessary debt financing from one or more external lenders, public or private, sometimes in combination with a direct state subsidy and/or use of the company's own internal capital.

For those coal plants which began construction in 2019, GEM was unable to determine the sources of financing for eight new plant starts in China due to a lack of publicly available information, although it can be assumed that Chinese state-backed agencies provided majority support.[5]

WESTERN COMMERCIAL BANKS EXITING COAL, JAPAN URGED TO FOLLOW

For 2019 construction starts where financing data was available, no evidence of direct financial support from Australian, European, or US commercial banks was found—meaning no western bank provided funding for the coal plants themselves, also known as project finance. This is in keeping with the bans on coal power project finance which have been introduced by many of these institutions in recent years.

The limited restrictions on coal plant financing adopted by Japanese commercial banks, however, meant that financial closure for the 1.3 GW Yokosuka coal plant in Japan was reached in February 2019. The US$2.4 billion debt financing for the Tokyo Electric Power Company (TEPCO) and Chubu Electric joint venture is split in equal tranches between Japanese public and private institutions, led by the Development Bank of Japan and commercial banks Mizuho Bank, MUFG Bank, and Sumitomo Mitsui Banking Corporation (SMBC). Both the Japanese government and the big three banks are coming under increasing domestic and international pressure to introduce much stricter policies which would cut off finance for coal power altogether. Currently, the big three are lined up to finance five new plants in Bangladesh, Mongolia, and Vietnam which would introduce 4.7 GW of new capacity.

Outside of Japan, direct financial support for coal plant construction starts in 2019 was also provided by smaller, local banks, namely for Duc Giang-Lao Cai in Vietnam and Sulut-3 and Lombok FTP2 in Indonesia. Overall, however, funding support from commercial banks to specific coal plant projects is declining, confirming the sentiments expressed by Indonesian coal company executives in 2019 that "coal power plant financing is very challenging".

CHINESE PUBLIC COAL FINANCE ON THE MARCH OVERSEAS

As direct private financing for coal plants dries up, Chinese public finance continues to play an important role. Fifteen percent (2.8 GW) of the 18.5 GW of construction starts outside China are being supported by the Export-Import Bank of China. The state policy institution has backed the Banshkhali plant in Bangladesh with a US$1.74 billion loan, the Bangko Tengah (SS-8) plant in Indonesia with a US$1.2 billion loan, and it is a majority backer of the Kostolac B3 lignite power plant in Serbia.

(continued on next page)

5. The research used the IJGlobal subscription database and other sources.

PUBLIC FUNDING TO THE FORE AMIDST TIGHTENING FINANCE CONDITIONS FOR NEW PLANTS *(continued)*

STATE-BACKED SUPPORT IN INDIA POSES QUESTIONS FOR WESTERN BANKS

The entry into construction in 2019 of 8.8 GW of new coal power capacity in India—the biggest country jump in plant starts over 2018—occurred at four coal plants (see Table). In an indication of how Indian private financial institutions are now steering clear of the thermal coal sector amidst increasingly acute signs of banking sector stress due to stranded coal power assets, all four of these coal plants are financially reliant on the Power Finance Corporation (PFC) and Rural Electrification Corporation (REC). These two infrastructure finance companies, which are set to merge this year after PFC's takeover of REC in 2019, fall under the control of India's Ministry of Power.

Between January 2017 and September 2019, PFC received financial support of US$34.9 billion from 49 banks, comprising US$4.9 billion in loans and US$30 billion in new capital raised through bond issues.[6] The bulk of this support came from commercial Indian commercial banks, though approximately 20% was provided by major international banks such as Barclays, Citi, HSBC, JPMorgan Chase, and Standard Chartered, as well as Japanese banks Mizuho and MUFG.

PFC is heavily concentrated in fossil fuels: other than the four coal plant deals noted above, PFC's most recent annual report for 2018–2019 shows its disbursements for renewable energy accounting for ~5% of total disbursements, compared to ~25% of total disbursements going to thermal power. Thus the provision of capital for a state-aligned investment vehicle heavily involved in coal power financing is problematic. While many of the major international banks have ended their support for coal plant project finance, the case of PFC points to the ongoing problem that most banks' restrictions on coal financing still fail to adequately cover balance sheet lending and underwriting.

Companies such as PFC which are actively helping to develop new coal plants—with severe implications for climate change, air, and water pollution, and national economies—should be a red flag for international banks. A minimum approach for such companies should involve ring-fenced loans or the provision of underwriting services only for renewable energy generation/transmission projects, or no funding support at all.

2019 Construction starts in India and the financing

Adani Godda (1.6 GW):	It was confirmed in September 2019 that Power Finance Corporation (PFC) and Rural Electrification Corporation (REC) are providing US$1.4 billion in loans to the US$2 billion project.
Patratu (1.6 GW):	While it was reported in mid-2017 that there were expectations for 50% of the project funding to come via commercial bank debt, in October 2018 it was confirmed that REC is covering 75% of the project costs with a US$1.96 billion loan.
Udangudi (1.6 GW):	In January 2018, REC loaned US$1.46 billion, covering approximately 80% of the overall project costs.
Yadadri (4 GW):	In May 2017 the first four units of the thermal power plant project received financing of US$2.65 billion from REC. In September 2017, PFC committed a loan of US$600 million to TSGENCO for setting up the fifth unit of the coal plant.

6. Research by BankTrack and urgewald into the financing of coal plant developer companies, December 2019.

CONSTRUCTION STARTS FALL IN SOUTHEAST ASIA

Since 2000, 67.9 GW of coal power have been commissioned in Southeast Asia, three-fourths of which have been added since 2011 (50.6 GW). Given the region's young coal fleet there have been no retirements (Figure 10).

Despite the significant commissioning over the past decade, the pipeline for new commissioning is slowing: construction starts have fallen over 85%, from 12.8 GW in 2016 to 1.8 GW in 2019, with the biggest drops in Indonesia and Vietnam, as well as the Philippines (Figure 11). Overall, the amount of capacity

Figure 10: Commissioning and retirements in Southeast Asia, 2000–2019 (gigawatts)

Commissioning = blue, retirements = orange, net change = black line

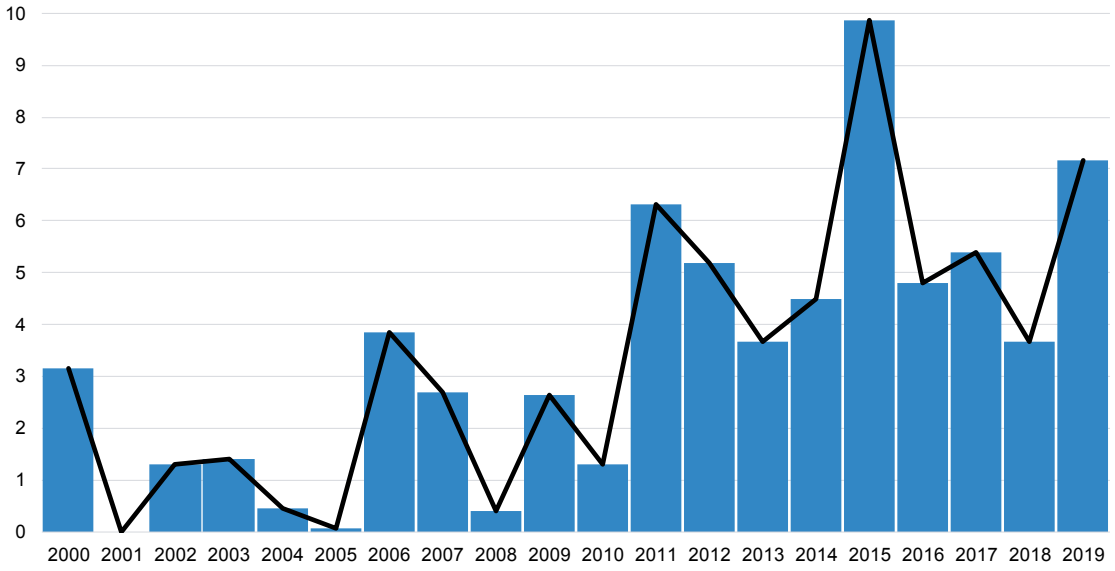
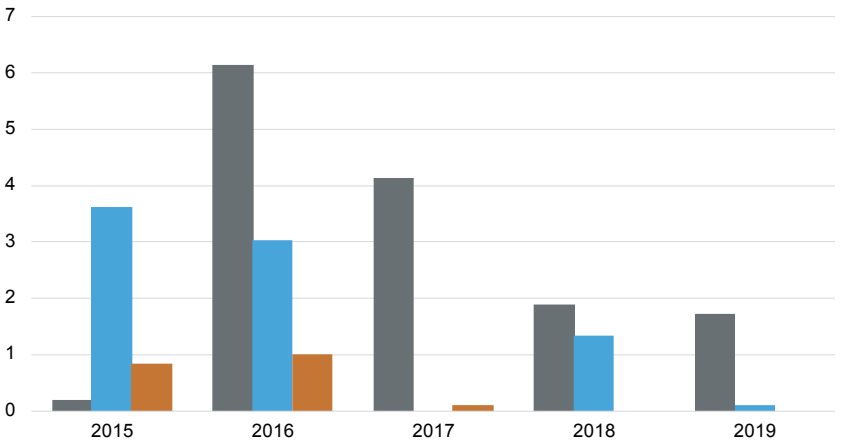


Figure 11: Construction starts in Southeast Asia, 2015–2019 (gigawatts)

Indonesia = gray, Vietnam = blue, Philippines = orange



under construction and in pre-construction development in Southeast Asia has halved, from 153.2 GW in 2015 to 78 GW in 2019 (Figure 12). Over that time 94.5 GW of coal power capacity was shelved or cancelled, as leaders in Southeast Asia face pressure to transition away from coal.

Indonesia has commissioned 21 GW of coal power capacity since 2010 and currently has 11.8 GW under construction—amounts that exceed all other countries except China and India. Despite this rapid growth, Indonesia's Ministry of Energy has consistently scaled back its coal expansion plans. Its 2015 ten-year energy plan envisaged 42 GW of new coal capacity, while there is 20.6 GW in the proposed 2019 plan—far below the country's 31.2 GW development pipeline, meaning cancellations may be necessary. Recently, Indonesia's Minister for Energy and Mineral Resources said publicly owned utility PLN may retire coal units when they reach 20 years old and replace them with renewable capacity.

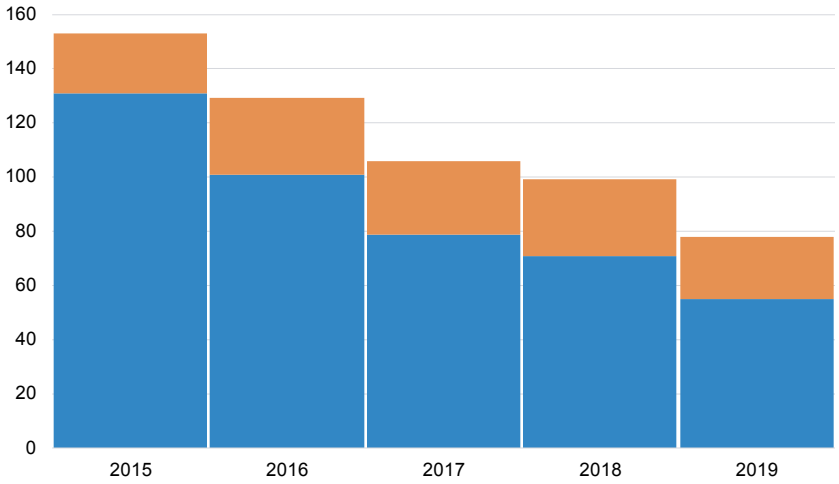
The coal fleet in Vietnam has grown faster than in almost any other country, adding 76% (14 GW) of its 18.4 GW of coal-fired capacity in the past six years. An additional 8.7 GW are under construction and 22.3 GW are in pre-construction status. Public opposition has grown alongside the expanding coal fleet due to negative impacts such as worsening air pollution. Over 32 GW of planned coal power has been shelved or cancelled since 2015 due to both public opposition and government plans exceeding power demand, although some of the coal projects were replaced with new coal or gas plant proposals. The government recently reduced its 2030 target for coal from 75 GW to 55 GW, while community groups are pushing for further reductions in the country's 2020 energy plan. In 2020, Vietnam's National Steering Committee for Power Generation put forward a plan to lower the country's coal power capacity target to 35.8 GW by 2025.

The Philippines has 9.7 GW of operating coal-fired capacity, over half of which has been commissioned since 2013, including 1.2 GW in 2019. An additional 9 GW is proposed and 1.6 GW is under construction. These coal projects face a well-organized opposition that includes the Catholic church, which opposes coal over its climate and environmental impacts. In March 2019, Negros Occidental became the eighth and largest of the country's 81 provinces to ban all coal-fired plants, effectively canceling a 0.3 GW plant that had been proposed in 2018.

While planned coal-fired capacity has declined across much of the rest of Southeast Asia, Laos recently proposed 2.4 GW of new coal power to export to Cambodia: the Xekong and Sekong coal plants.

Figure 12: Capacity under development in Southeast Asia, 2015–2019 (gigawatts)

Pre-construction = blue, Construction = orange



SOUTH ASIA SEES RAPID DECLINES IN INDIA AND PAKISTAN, NEW CONSTRUCTION IN BANGLADESH

South Asia has long been hailed as the next center of coal power growth after East Asia. But as can be seen in Figure 13, a steady rise in coal power growth from 2011 to 2016 turned into a sudden and steep drop in 2017, due mainly to India. Commissioning fell from an annual average of 18.9 GW from 2011–2016 to 10.2 GW in 2017–2019, a 46% decline. Coal plants throughout South Asia have faced unfavorable economics, with the Indian government listing over 40 GW of the country's coal plants as financially stressed.

Despite the poor market conditions for coal, construction starts in India increased in 2019 (gray, Figure 14), and were all heavily supported by state funding (see Funding discussion on page 16). Bangladesh (orange) has had construction starts totaling 4.5 GW since 2016, financed through large loans from foreign public finance institutions. Construction starts in Pakistan (blue) peaked in 2016 and have since steadily declined, as financial problems surround the country's operating coal plants. Capacity under development in South Asia has fallen nearly three-fourths since 2015, from 354 GW in 2015 to 96.2 GW in 2019 (Figure 15), during which time 257.7 GW of capacity was shelved or cancelled.

Figure 13: Commissioning and retirements in South Asia, 2000–2019 (gigawatts)

Commissioning = blue, retirements = orange, net change = black line

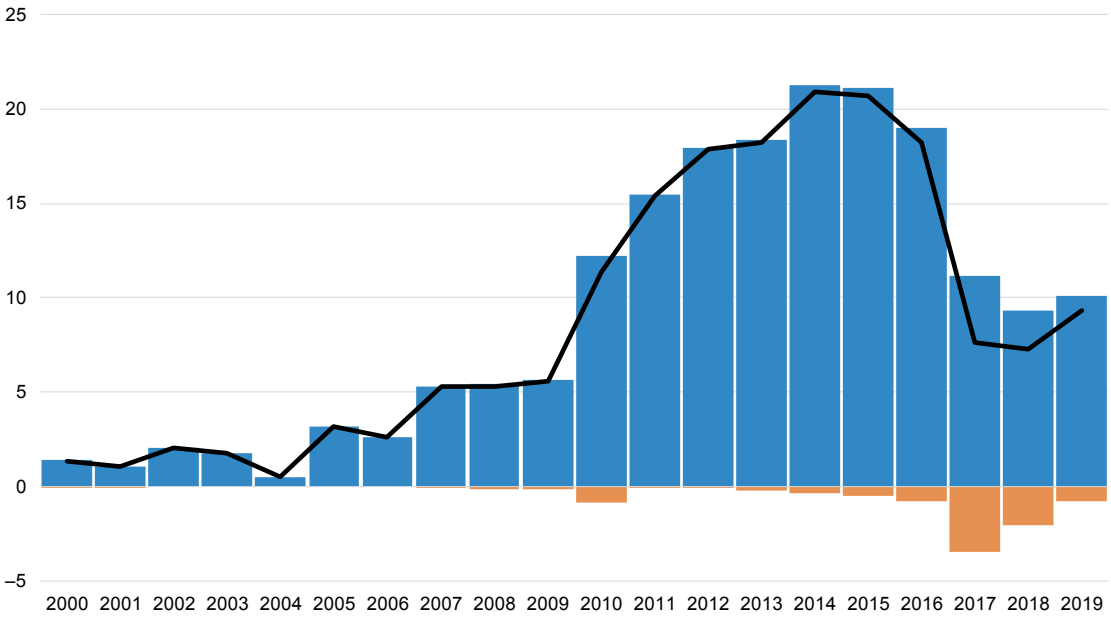


Figure 14: Construction starts in South Asia, 2015–2019 (gigawatts)

India = gray, Pakistan = blue, Bangladesh = orange

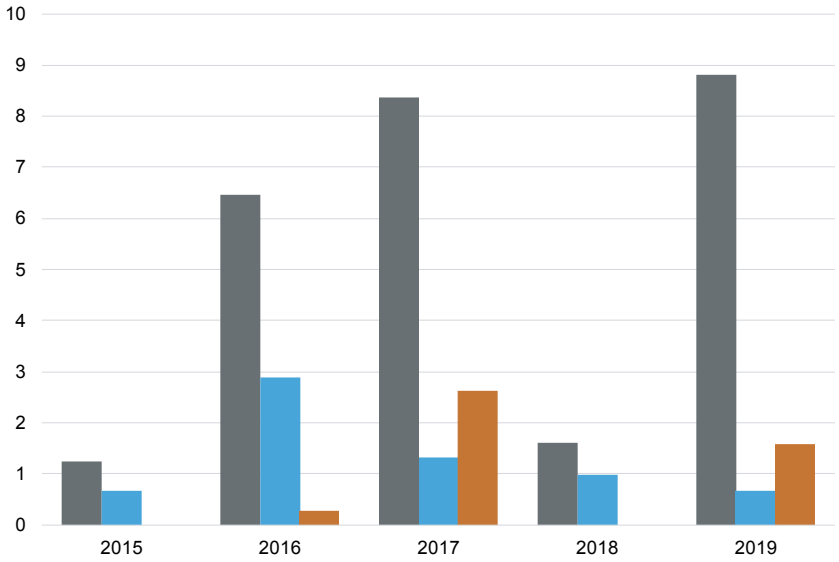
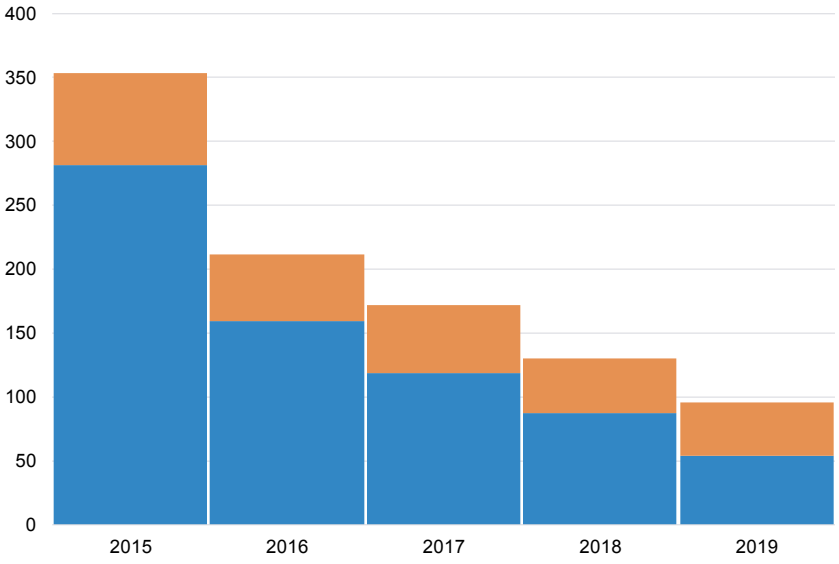


Figure 15: Capacity under development in South Asia, 2015–2019 (gigawatts)

Pre-construction = blue, Construction = orange



Most of the reduction in the South Asia pipeline occured in India, where capacity under construction and in pre-construction development declined 80% from 311.1 GW in 2015 to 66 GW in 2019, with only 2.8 GW newly proposed in 2019. Consultants Wood Mackenzie recently concluded solar is 14% cheaper than coal-fired power in India, making it difficult for new coal plants to secure power purchase agreements in competitive tenders. Coal power generation fell 3% in 2019, due to a drop in power demand and an increase in renewable power generation, including hydropower from a strong monsoon season. Since 2017, the country has commissioned more solar and wind capacity than coal. In June 2019 the Ministry of Renewable Energy said it was aiming for 523 GW of renewables by 2030—over double the country's currently operating coal power capacity of 229 GW.

Pakistan has commissioned nearly all of its 5.1 GW of coal power since 2015, including 2 GW in 2019. An additional 1.7 GW are under construction and 4.6 GW are in pre-construction status. Many of Pakistan's coal proposals are backed by Chinese finance as part of the China-Pakistan Economic Corridor (CPEC). Since taking office in August 2018, Pakistani prime minister Imran Khan has tried to scale back the CPEC, saying the country cannot afford all the projects as the Pakistan rupee has depreciated significantly against the US dollar, making imports of commodities such as coal increasingly expensive. Debt is threatening two of the country's three commercially operating coal plants: the Chinese-funded Port Qasim site is in financial difficulties just a year after opening, while the Sahiwal plant is reportedly on the brink of closure as the government is struggling to pay back developer China Huaneng. In January 2019, Pakistan asked China to shelve the joint US$2 billion Rahim Yar Khan coal plant for financial reasons. Overall, 13 GW of coal power has been shelved or cancelled in Pakistan since 2015.

Bangladesh's 2016 Master Plan "Revisited", released in November 2018, is heavily reliant on coal, which is planned to grow from the current 0.5 GW to 25.5 GW by 2040, whereas renewable capacity would rise from 0.3 GW to just 7.9 GW over the same period. Many of the planned coal projects consist of multiple proposals in one location, such as 9.3 GW of coal power capacity in the sub-district of Moheshkhali. The country has nearly 4.2 GW of coal power capacity under construction, and 18.8 GW in pre-construction status. Since 2015, 13.4 GW of capacity has been shelved or cancelled due to lack of activity or public opposition, but these projects are often replaced by new, larger proposals—e.g. the Phulbari coal plant, a planned 1 GW coal plant that was suspended after three people were killed during protests in 2006, and was recently revived as a 6 GW coal plant.

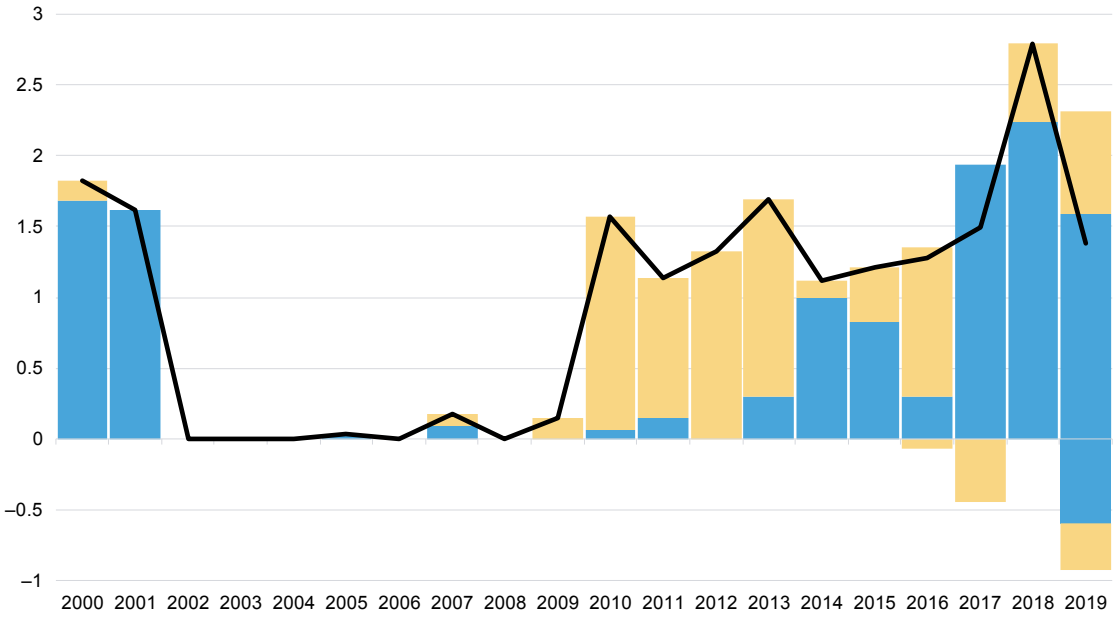
RAPID DROP IN CAPACITY UNDER DEVELOPMENT IN LATIN AMERICA AND AFRICA AND THE MIDDLE EAST

Latin America, Africa, and the Middle East regions have had smaller amounts of coal plant development than most regions of the world, and are now showing signs of rapid decline, with few construction starts since 2015 and big drops in capacity under development.

Coal plant commissioning in these regions has been concentrated in just a few countries. Since 2000, Latin America has commissioned 8.4 GW of coal power, with half in OECD members Chile (3.5 GW) and Mexico (0.7 GW), and over a quarter in Brazil (2.3 GW). Chile and Brazil have also retired 0.8 GW of coal power capacity since 2016. Africa and the Middle East have commissioned 11.8 GW of coal power since 2000, with over half (6.2 GW) in South Africa and a quarter (3.1 GW) in Morocco. South Africa utility Eskom also retired 0.6 GW of coal power in 2019, as many of its older coal plants exceed air pollution limits (Figure 16).

Figure 16: Commissioning and retirements in Latin America and Africa and the Middle East, 2000–2019 (gigawatts)

Latin America = yellow, Africa and Middle East = blue, Net change = black line

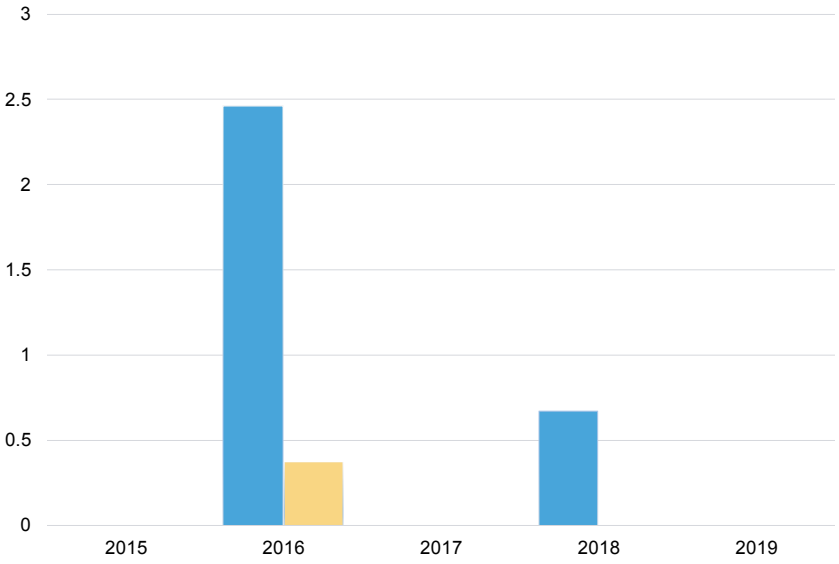


Construction starts in Africa and the Middle East have been sporadic and sparse, suggesting the regions will soon see a decline in commissioning (Figure 17). Over the past five years Latin America oversaw construction starts in just 2016: a new 0.4 GW unit at the Mejillones coal plant in Chile, which was commissioned in 2019. Two older units totaling 0.3 GW at the plant will be retired in 2024.

Africa and the Middle East have had 3.1 GW of construction starts since 2015: the United Arab Emirates (UAE) began construction on the 2.4 GW Hassyan coal plant in 2016 and Zimbabwe on a 0.7 GW expansion of the Hwange coal plant in 2018. Both projects have since faced problems: this year the UAE called off phase two of the Hassyan plant, reportedly in response to rising coal prices, while Chinese banks have indefinitely suspended US$1.1 billion in financial support for the Hwange expansion, putting its future into question.

Figure 17: Construction starts in Latin America and Africa and the Middle East, 2015–2019 (gigawatts)

Latin America = yellow, Africa and Middle East = blue



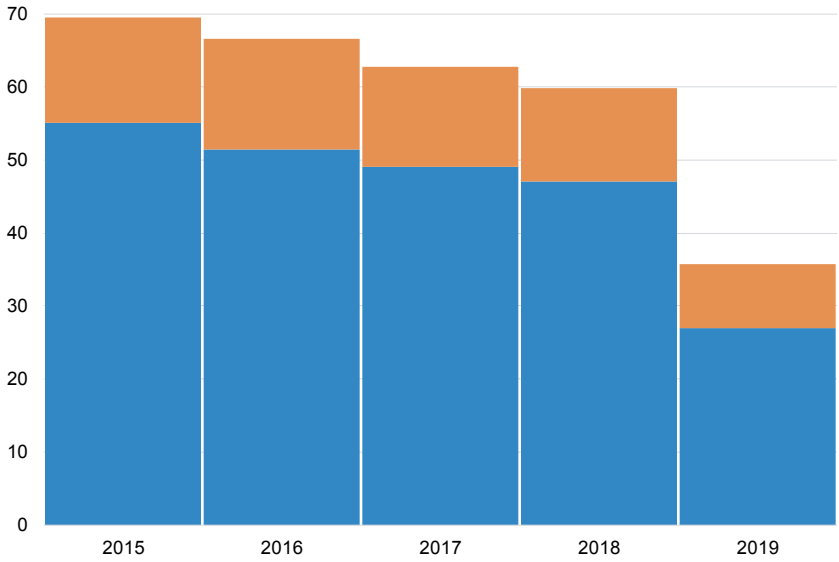
Latin America, Africa, and the Middle East were amongst the regions with the largest drops in capacity under development in 2019. In Latin America, capacity under construction and in pre-construction development fell 57% from 5.8 GW in 2018 to 2.5 GW in 2019, as 2.6 GW of coal projects were shelved or cancelled and 0.7 GW commissioned. The only two remaining countries in Latin America with coal power in active development are the Dominican Republic, where the 0.8 GW Punta Catalina coal plant is under construction, and Colombia, where the 1.1 GW La Luna coal plant is permitted for construction (Figure 18).

In Africa and the Middle East, capacity under construction and in pre-construction development fell 40%, from 54 GW in 2018 to 33.2 GW in 2019, as 18 GW of coal projects were shelved or cancelled. Half of the capacity under development is in two countries: South Africa, which has a long-established coal mining and coal power sector, and Egypt, where the government has been planning new coal plants since overturning a ban on thermal coal imports in 2015.

South Africa is home to over a third of the capacity under development in Africa and the Middle East (11.1 GW). The country is pushing forward with the 4.8 GW Kusile and 4.8 GW Medupi coal plants despite ongoing financial and technical difficulties at both plants, with 1.6 GW commissioned at Medupi in 2019. The country is also exploring plans with the Bank of China for a 4.6 GW coal plant in the Waterberg coalfield. Another 20% of the Africa and the Middle East pipeline is in Egypt, which is seeking permits to build the 6.6 GW Hamarawein coal plant and associated coal import capacity. Its Ministry of Electricity has shelved plans for the 2.6 GW Ayoun Moussa and 4 GW Marsa Matruh coal plants, saying they are not needed.

Figure 18: Capacity under development in Latin America and Africa and the Middle East, 2015–2019 (gigawatts)

Pre-construction = blue, Construction = orange



APPENDIX A

Coal power capacity in development and operating by country (megawatts).

Country	Pre-construction	Construction	All Active Development	Shelved	Operating	Cancelled (2010–2019)
China	106,176	99,710	205,886	128,942	1,004,948	568,500
India	29,327	36,698	66,025	65,687	228,964	537,757
Turkey	31,715	1,465	33,180	6,570	19,514	65,017
Indonesia	19,360	11,840	31,200	11,990	32,373	22,970
Vietnam	22,262	8,680	30,942	4,300	18,432	43,175
Bangladesh	18,770	4,214	22,984	11,875	525	2,810
Japan	2,612	9,269	11,881	135	46,682	9,318
South Africa	6,280	4,770	11,050	5,010	41,435	8,390
Philippines	8,978	1,558	10,536	4,124	9,670	5,374
South Korea	0	7,260	7,260	500	37,600	7,000
Mongolia	6,080	885	6,965	1,900	781	1,460
Egypt	6,600	0	6,600	6,000	0	2,640
Pakistan	4,558	1,650	6,208	2,300	5,090	22,350
Russia	4,945	120	5,065	226	46,862	12,318
Bosnia and Herzegovina	3,530	0	3,530	550	2,073	1,020
Australia	2,980	0	2,980	900	24,382	8,056
Poland	500	2,470	2,970	3,000	30,870	18,383
Nigeria	2,400	0	2,400	530	0	1,615
United Arab Emirates	0	2,400	2,400	3,000	0	1,270
Zimbabwe	1,490	670	2,160	3,290	950	3,600
Serbia	1,750	350	2,100	0	4,405	1,070
Germany	920	1,100	2,020	0	44,470	19,493
Kenya	2,010	0	2,010	64	0	666
Thailand	1,311	655	1,966	4,070	5,571	7,500
Cambodia	1,600	150	1,750	2,400	505	1,940
Laos	1,500	0	1,500	1,326	1,878	0
Oman	1,200	0	1,200	0	0	0
Botswana	1,050	132	1,182	2,100	600	4,504
Colombia	1,125	0	1,125	450	1,649	800
Sri Lanka	900	0	900	0	900	3,500
Mozambique	870	0	870	3,310	0	1,800
Czech Republic	180	660	840	0	8,517	1,200
Taiwan	0	800	800	1,600	18,125	12,400
Dominican Republic	0	770	770	0	305	2,040
Ivory Coast	700	0	700	0	0	0

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Coal power capacity in development and operating by country (megawatts) – *continued*

Country	Pre-construction	Construction	All Active Development	Shelved	Operating	Cancelled (2010–2019)
Tanzania	690	0	690	1,200	0	475
Ukraine	660	0	660	0	22,265	2,060
Greece	0	660	660	0	3,175	1,250
Kazakhstan	0	636	636	0	12,704	1,320
Romania	600	0	600	0	4,675	5,105
Brazil	600	0	600	1,328	3,149	4,690
Zambia	600	0	600	640	330	1,000
Malawi	520	0	520	2,400	0	700
Kosovo	500	0	500	0	1,290	330
Hungary	500	0	500	0	944	3,020
Swaziland	500	0	500	0	0	1,600
Tajikistan	300	0	300	0	400	350
Uzbekistan	150	0	150	0	2,522	300
Niger	100	0	100	600	0	0
Ethiopia	90	0	90	0	0	0
Madagascar	60	0	60	0	120	0
Papua New Guinea	60	0	60	0	0	0
United States	0	0	0	0	246,187	28,168
Malaysia	0	0	0	0	13,530	2,100
Spain	0	0	0	0	9,991	800
United Kingdom	0	0	0	0	9,718	9,968
Italy	0	0	0	0	8,627	6,795
Canada	0	0	0	0	8,429	1,500
Hong Kong	0	0	0	0	6,112	0
Mexico	0	0	0	0	5,378	1,850
Chile	0	0	0	725	5,152	8,802
Israel	0	0	0	0	4,900	1,260
Bulgaria	0	0	0	0	4,829	2,660
Morocco	0	0	0	0	4,317	1,320
Netherlands	0	0	0	0	4,152	1,311
France	0	0	0	0	3,915	0
North Korea	0	0	0	0	3,700	300
Denmark	0	0	0	0	2,500	0
Portugal	0	0	0	0	1,978	0
Moldova	0	0	0	0	1,610	0
Finland	0	0	0	0	1,558	385
Slovenia	0	0	0	0	1,069	0

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Coal power capacity in development and operating by country (megawatts) – *continued*

Country	Pre-construction	Construction	All Active Development	Shelved	Operating	Cancelled (2010–2019)
Ireland	0	0	0	0	915	0
Kyrgyzstan	0	0	0	1,200	910	0
Guatemala	0	0	0	0	888	300
Slovakia	0	0	0	0	801	885
North Macedonia	0	0	0	430	800	300
New Zealand	0	0	0	0	500	0
Panama	0	0	0	0	408	0
Argentina	0	0	0	120	350	0
Austria	0	0	0	0	246	800
Montenegro	0	0	0	0	225	1,664
Sweden	0	0	0	0	221	0
Brunei	0	0	0	0	220	0
Croatia	0	0	0	0	210	1,300
Mauritius	0	0	0	0	195	110
Myanmar	0	0	0	3,850	160	17,375
Peru	0	0	0	0	135	135
Namibia	0	0	0	0	120	550
Honduras	0	0	0	0	105	0
Syria	0	0	0	0	60	0
Senegal	0	0	0	125	30	850
Jordan	0	0	0	0	30	0
Ghana	0	0	0	2,100	0	0
Georgia	0	0	0	300	0	0
Reunion	0	0	0	0	0	0
Guadeloupe	0	0	0	0	0	0
Iran	0	0	0	650	0	0
Venezuela	0	0	0	0	0	2,800
Jamaica	0	0	0	0	0	1,140
Albania	0	0	0	0	0	800
Belarus	0	0	0	0	0	1,400
Belgium	0	0	0	0	0	1,100
Democratic Republic of Congo	0	0	0	500	0	0
El Salvador	0	0	0	0	0	370
Guinea	0	0	0	80	0	250
Latvia	0	0	0	0	0	435
Sudan	0	0	0	0	0	600
Total	**299,609**	**199,572**	**499,181**	**292,397**	**2,044,831**	**1,522,519**

APPENDIX B

The following additional tables can be found at
https://endcoal.org/global-coal-plant-tracker/summary-statistics/

- Coal Plants by Country (Power Stations) – January 2020
- Coal Plants by Country (Units) – January 2020
- Changes from January 2019 to January 2020 (MW)
- Coal Plants by Country: Annual CO_2 – January 2020
- Coal Plants by Country: Lifetime CO_2 – January 2020
- Coal Plants by Region (MW) – January 2020
- Coal Plants by Region (Power Stations) – January 2020
- Coal Plants by Region (Units) – January 2020
- Coal Plants by Region: Annual CO_2 – January 2020
- Coal Plants by Region: Lifetime CO_2 – January 2020
- Retired Coal Plants by Year (MW) – 2006–2019
- Newly Operating Coal Plants in India by Year (MW) – 2006–2019
- Coal Plants in India (MW) – January 2020
- Coal Plants in India (Power Stations) – January 2020
- Coal Plants in India (Units) – January 2020
- Newly Operating Coal Plants in the United States by Year (MW) – 2006–2019
- Coal Plants in the United States (MW) – January 2020
- Coal Plants in the United States (Power Stations) – January 2020
- Coal Plants in the United States (Units) – January 2020
- Newly Operating Coal Plants in China by Year (MW) – 2006–2019
- Coal Plants in China (MW) – January 2020
- Coal Plants in China (Power Stations) – January 2020
- Coal Plants in China (Units) – January 2020
- Coal Plants by Combustion Technology – January 2020
- Global Ownership of Coal Plants (MW) – January 2020