

Boom and Bust Coal

2022

TRACKING THE GLOBAL COAL PLANT PIPELINE

Global Energy Monitor, CREA, E3G, Sierra Club, SFOC, Kiko Network,
CAN Europe, LIFE, and Bangladesh Groups



ABOUT THE COVER

The cover photo shows the Longannet power station's chimney stack in Scotland. It was illuminated with a message of hope for the future before its demolition in 2021. Photo © StewartAttwoodPhotography.



Global Energy Monitor

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 Coal Mine Tracker, Global Coal Plant Tracker, Global Gas Infrastructure Tracker, Global Fossil Infrastructure Tracker, Europe Gas Tracker, CoalWire newsletter, Inside Gas newsletter, Global Gas Plant Tracker, Global Registry of Fossil Fuels, Global Steel Plant Tracker, Latin America Energy Portal, and GEM.wiki. For more information, visit www.globalenergymonitor.org.



CENTRE FOR RESEARCH ON ENERGY AND CLEAN AIR

The Centre for Research on Energy and Clean Air (CREA) is an independent research organization focused on revealing the trends, causes, and health impacts, as well as the solutions to air pollution. For more information, visit www.energyandcleanair.org.



E3G

E3G

E3G is an independent climate change think tank with a global outlook. We work on the frontier of the climate landscape, tackling the barriers and advancing the solutions to a safe climate. Our goal is to translate climate politics, economics and policies into action. For more information, visit www.e3g.org.



SIERRA CLUB

SIERRA CLUB

The Sierra Club is America's largest and most influential grassroots environmental organization, with millions of members and supporters. In addition to protecting every person's right to get outdoors and access the healing power of nature, the Sierra Club works to promote clean energy, safeguard the health of our communities, protect wildlife, and preserve our remaining wild places through grassroots activism, public education, lobbying, and legal action. For more information, visit www.sierraclub.org.



SFOC

SOLUTIONS FOR OUR CLIMATE

Solutions for Our Climate (SFOC) is a nonprofit organization established in 2016 to address the social and environmental impacts of climate change. We conduct research on solutions for reducing greenhouse gas emissions and expanding renewables, and coordinate campaigns with both domestic and international organizations to address the climate crisis. For more information, visit www.forourclimate.org.



KIKO NETWORK

Kiko Network is a national Japanese environmental NGO that tackles climate change by working with local communities, conducting research, submitting proposals or negotiating at the national and international levels, and maintaining a database of coal-fired power generation units in Japan. For more information, visit www.kikonet.org/?cat=54.



CAN EUROPE

Climate Action Network (CAN) Europe is Europe's leading NGO coalition fighting dangerous climate change. With over 170 member organisations active in 38 European countries, representing over 1,500 NGOs and more than 47 million citizens, CAN Europe promotes sustainable climate, energy and development policies throughout Europe. For more information, visit caneurope.org.



Legal Initiative for Forest and Environment

LEGAL INITIATIVE FOR FOREST AND ENVIRONMENT

LIFE is a national level public interest environmental law group which applies a unique combination of law, science and advocacy to protect biodiversity hotspots, flora and fauna, clean up air and water and protect vulnerable communities while ensuring that India adopts and implements a low carbon path of development and strengthening climate resilience. For more information, visit thelifeindia.org.in.



Bangladesh Working Group on External Debt

BANGLADESH GROUPS (BWGED, BAPA, & WKB)



BANGLADESH PORIBESH ANDOLON (BAPA)



WATERKEEPERS BANGLADESH

The Bangladesh Working Group on External Debt (BWGED) works to stop unjust and dirty loans which affect the environment, human rights, and livelihoods in Bangladesh. For more information, visit Bwged.blogspot.com. Bangladesh Poribesh Andolon (BAPA) was launched to create a nationwide, united, and strong civic movement to protect Bangladesh's environment. For more information, visit Bapa.org.bd. Waterkeepers Bangladesh (WKB) works to protect the water and water bodies of Bangladesh including its forests resources through enforcement, fieldwork, and community action. For more information, visit waterkeepersbangladesh.org.

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](#).

PRODUCTION

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FURTHER RESOURCES

For additional data on proposed and existing coal plants, see [Summary Data](#) on the GEM website, 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 GCPT data, see [Reports & Briefings](#) on the GEM website. To obtain primary data from the GCPT, see [Download Data](#) on the GEM website.



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EXECUTIVE SUMMARY

The world has more than 2,400 coal-fired power plants operating in 79 countries, for a total of nearly 2,100 gigawatts (GW) of capacity. An additional 176 GW of coal capacity is under construction at more than 189 plants, and 280 GW is planned at 296 plants. The directive for a fighting chance at a livable climate is clear—stop building new coal plants and retire existing ones in the developed world by 2030, and the rest of the world soon after, according to studies by the Intergovernmental Panel on Climate Change (IPCC) and International Energy Agency (IEA), among others.

A long line of coal dominoes fell in 2021. COP26, the biggest climate change summit of the last five years, concluded in Glasgow in November 2021. The summit’s coal outcomes did not involve any timelines nor consensus for a total coal phase-out. Nonetheless, if fully implemented, the commitments made in the run-up to and during the summit mark a breakthrough in the global effort to phase out coal and reduce power sector emissions. The number of coal plants effectively given a close-by date nearly doubled to 750 coal plants (550 GW). Only 170 plants (89 GW), or 5% of the operating fleet today, are not covered by a phase-out date or carbon neutrality target. Still, few of these plants are scheduled to retire on the timelines required by the Paris climate agreement.

Despite progress at COP26, coal’s last gasp is not yet in sight. In 2021, the operating coal fleet grew by 18.2 GW, a post-Covid rebound in a year that saw a slowdown in coal plant retirements. China continued to be the glaring exception to the ongoing global decline in coal plant

development. At a time when developed countries should be helping the rest of the world both end new coal plant construction and begin their coal transitions in earnest, many are instead planning to operate their coal plants at home far beyond the deadlines required by climate science and are clinging on to the false promise of “clean coal” technologies. In addition, the amount of electricity generated from coal rose by 9% in 2021 to a record high, more than rebounding from a 4% fall in 2020 when Covid first struck. Both the global coal capacity increase and the record rise in coal power generation in 2021 crystallize how important the agreement at Glasgow to [phasedown](#) coal was—and how far many key players have to go.

KEY DEVELOPMENTS OF 2021

- Countries announced an unprecedented number of coal phase-out, “no new coal,” “no new coal/fossil financing overseas,” and “net zero” emissions commitments at COP26, with the number of coal plants effectively given a close-by date nearly doubling to 750 coal plants (550 GW).
- Only 180 GW of existing coal capacity in the OECD, or a little more than a third, is scheduled to close by 2030 in line with the Paris climate agreement. The amount would increase to two-thirds of capacity if announcements made by the United States and Germany result in a 2030 coal phaseout.
- Less than 10% of non-OECD coal capacity is scheduled to close by 2050, the year that coal should be phased out to hold warming below 1.5 degrees, according to the IPCC.
- 34 countries have proposed coal plants, down from 41 countries in January 2021.
- Japan, South Korea, and China all pledged to end public support for new international coal plants, followed by a commitment from all G20 countries ahead of COP26. With these pledges, there is essentially no significant international public financier remaining for new coal plants.
- Globally, the operating coal fleet grew by 18.2 GW in 2021. More than half (56%) of the 45 GW of newly commissioned capacity was in China. Outside China, the global coal fleet shrank for the fourth year in a row, although at a slower rate than in 2020.
- After rising in 2020 for the first time since 2015, total coal power capacity under development declined again from 525 GW to

457 GW, a 13% decrease. Pre-construction coal capacity stands at 280 GW globally, equivalent to the current operating fleets of the United States and Japan combined.

- By the end of 2021, 176 GW of coal capacity was under construction in 20 countries, which is slightly less than in 2020 (181 GW). China represented more than half (52%) of that capacity for the first time, and countries in South Asia and Southeast Asia about a third (37%).
- In China, construction started on 33 GW of new coal power plants in 2021, the most since 2016 and almost three times as much as the rest of the world put together.
- In 2021, the amount of U.S. coal capacity retired declined for the second consecutive year, from 16.1 GW in 2019, to 11.6 GW in 2020, to an estimated 6.4 GW to 9 GW in 2021. To meet climate goals, the U.S. needs to retire 25 GW annually on average between now and 2030, which is close to the historic 21.7 GW the country retired in 2015.
- The European Union's 27 member states retired a record 12.9 GW in 2021, with the most retirements in Germany (5.8 GW), Spain (1.7 GW), and Portugal (1.9 GW). Portugal became coal free in November 2021, nine years before its targeted 2030 phase-out date.
- Power overcapacity and/or debt burdens are growing in countries with coal under development, like Bangladesh, Indonesia, and Pakistan, highlighting the need to accelerate financial and other support mechanisms to enable clean energy transitions.
- Recent proposals in countries like the United States, Japan, and Australia involve the use of carbon capture and other “clean coal” technologies to extend the life of outdated plants or rationalize new plants. Given the limited role these technologies have played in lowering coal plant emissions, they are effectively uncertain and expensive distractions from the urgent need to phase out coal.

GLOBAL DATA SUMMARY

China's surge in new coal plants (25.2 GW) almost offset coal plant retirements in the rest of the world (25.6 GW) in 2021 and resulted in an uptick in global capacity (Figure 1). In total, 45 GW of global coal power capacity was commissioned in 2021 while 26.8 GW was retired, causing a net increase in the global coal fleet of 18.2 GW (black line). In 2020, the net increase was 11.5 GW, resulting from slightly more new capacity additions (56.8 GW) and a record 45.3 GW of global retirements.

China's 25.2 GW of new coal plants in 2021 made up 56% of global additions (Figure 1, blue bars). The country retired around 1.2 to 2.1 GW of coal power capacity in 2021, the least retired in more than a decade.¹

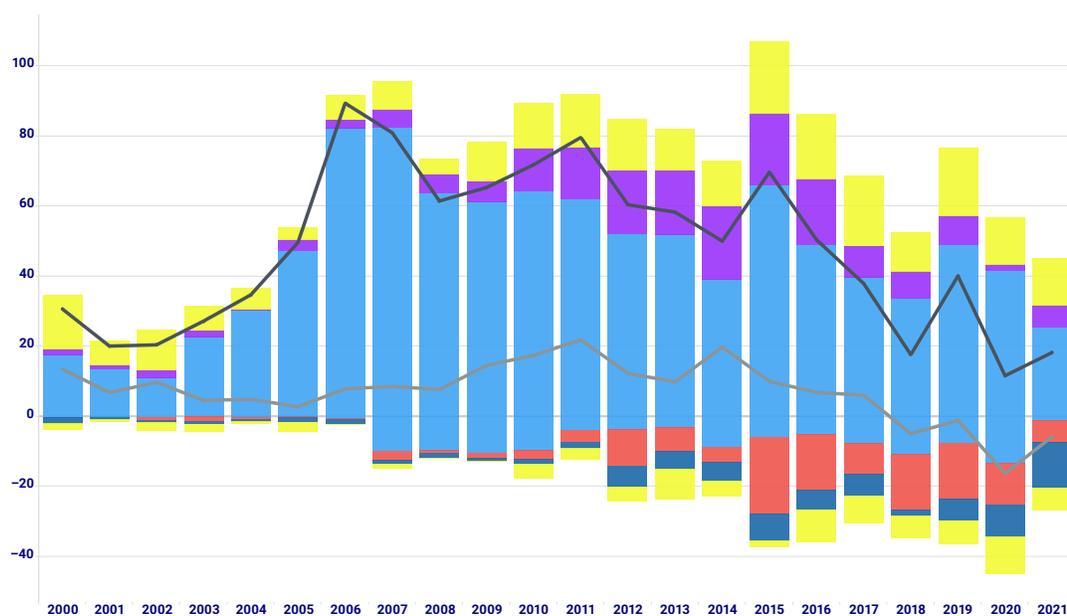
Outside China, most countries have been scaling back their coal plans, leading global coal power capacity outside China to decline since 2018 (gray line). However, this trend slowed in 2021 as the rate

of retirements slowed down. The European Union's 27 member states represented nearly half (48%) of the global capacity retired in 2021, with a record 12.9 GW retiring in 2021. The three countries leading the region's retirements were Germany (5.8 GW), Spain (1.7 GW), and Portugal (1.9 GW). Meanwhile, the amount of U.S. coal capacity retired declined for the second consecutive year an estimated 6.4 GW to 9 GW in 2021.

After rising in 2020 for the first time since 2015, total coal power capacity under development (announced, pre-permit, permitted, and construction stages) declined again from 525.2 GW to 456.5 GW, a 13% decrease. An additional 109 GW of proposed coal was cancelled in 2021, representing about the amount that is currently announced (107.6 GW) or pre-permitted (104 GW), and more than the amount of permitted coal (68.7 GW).

Figure 1: Global commissioning and retirements and the net change, 2000–2021 (gigawatts)

China = light blue, India = purple, Other = yellow, USA = red, EU27 = dark blue,
Net change = black line, Net change without China = gray line



1. This only includes capacity retired at units 30 MW and larger. Based on provincial Development and Reform Commission and NDRC data available as of March 2022, at least 5.2 GW of coal capacity retired at units 6 MW and larger in 2021.

In total, 15 countries commissioned new coal power in 2021. More than half (56%) of the newly commissioned capacity was in China (25.2 GW), with a remaining 14% in India (6.4 GW), 11% in Southeast Asian countries (Indonesia, Vietnam, and Cambodia), and 17% in most regions outside of the Americas.

Over the course of 2021, China’s share of coal under development increased by 7% to 55% (251 GW), meaning China accounts for over half of the capacity under development in the world for the first time (Figure 3). As noted below, the same is true when looking at pre-construction capacity alone.

Figure 2: Coal power capacity built in 2021 by country (gigawatts)²

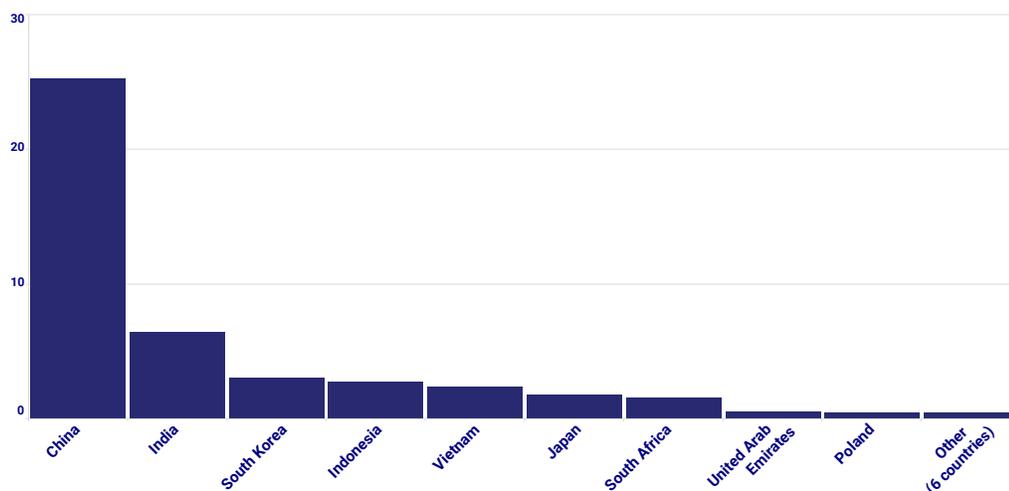
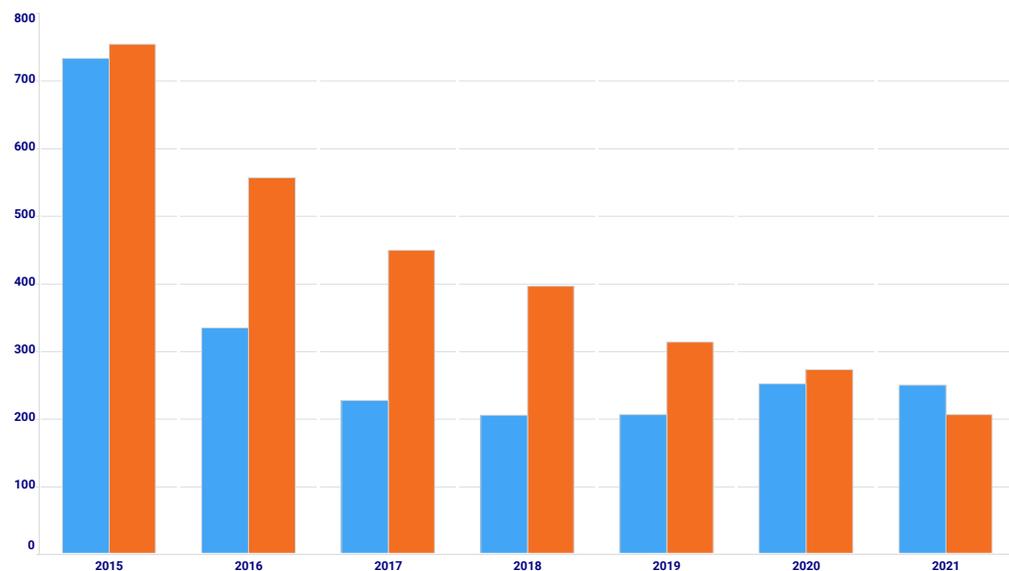


Figure 3: Global coal power in construction and pre-construction, 2015–2021 (gigawatts)

China = blue, Non-China = orange



2. Other (6 countries) = Turkey, Senegal, Kazakhstan, Cambodia, Mongolia, and Pakistan.

CHINA: MOST COAL POWER CONSTRUCTION STARTS SINCE 2016

China's climate targets are not yet leading the country to scale back coal power capacity. Reflecting a resurgence of new coal power permits in 2020, construction starts continued to accelerate in 2021 for the second year in a row. In all, construction started on 33 GW of new coal power plants in 2021, the most since 2016 and almost three times as much as the rest of the world put together (Figure 4).

In addition, 25 GW of new coal power plants were added to the grid in 2021, a drop from 2020 but still more than the rest of the world put together. Plant retirements slowed down as well, and China's coal power capacity continued to increase while capacity in the rest of the world continued to fall.

The key drivers of continued coal power expansion in China include insufficient investment in clean energy; outdated grid planning and operation, with every province planning its capacity as an isolated island;

Resumption of permitting

Permitting of new coal power projects was essentially frozen in 2021, as the leadership emphasized strictly controlling "high emissions" projects.

In the second half of 2021, China experienced a coal and coal power shortage, leading to electricity rationing in more than half of its provinces at the shortage's peak in September. The crisis was successfully leveraged by pro-coal interests to rewrite the country's energy policy.

Although the electricity crisis had [nothing to do](#) with lack of coal power plant capacity, a shift in political winds seems to have resulted in the resumption of coal plant permits in early 2022, with at least 7.3 GW of new capacity permitted just in the first six weeks of the year, more than twice as much as in all of 2021. In addition, the National Development and Reform Commission's (NDRC) recently [called](#) for accelerated approval and construction of new coal-fired power plants to boost demand for (power plant) equipment

and conflict between the central government policy of increasing electricity transmission from west to east versus the preference of governments in the eastern, coastal provinces to generate power locally.

In April 2021, President Xi announced that the country will "strictly limit the increase in coal consumption" in 2021–25 and "phase it down" in 2026–30 as part of the country's pledge to peak CO₂ emissions before 2030 and be carbon-neutral by 2060. The announcement could be read as requiring the country's coal consumption to peak by 2025, or to peak during the 15th Five Year Plan period (2026–30) to achieve a reduction below 2025 level by 2030. While having a backstop in place for coal consumption growth was a step forward, China's planned increase through 2025 or later is still in stark contrast to the immediate annual cuts in coal use that the UN and leading research organizations have called for to meet the goals of the Paris Agreement.

manufacturing industry—rather than out of a need for increased coal power capacity.

The China Electricity Council predicted in January 2022 that coal power capacity would increase by 120 GW from the 2021 level by 2025 and 150 GW by 2030. Assuming that this forecast is in line with government targets, it effectively gives provinces and power firms free hands to permit and initiate more projects. This *carte blanche* could create a "dash for coal" as state power companies and provinces rush to grab market share.

In the same vein, the NDRC [told](#) provinces in July that coal power plants scheduled for retirement should be kept on the grid as "back-up" power sources, leading to a slowdown in plant retirements.

The most new coal power projects in 2021 were started in the power exporting provinces of Guizhou, Inner Mongolia, Shanxi, Shaanxi, and Gansu (Figure 6). Many of these provinces are also major players in

wind and solar development. However, China's plans for west-to-east power transmission continue to rely heavily on expanding coal-fired power, despite the state-owned grid operator State Grid claiming the plans will facilitate clean electricity transmission.

Hunan announced eight thermal power generation projects in its 14th energy Five Year Plan after the electricity shortage in winter 2020–21, when many coal power plants [failed to operate](#) in sub-zero conditions and hydropower output was weak due to low rains. The shortages occurred despite the Central Grid Region, to which Hunan belongs, having far more power capacity than it needs to meet peak demand, showcasing how grid management is still lacking.

Major expansion is also taking place in Zhejiang, Jiangsu, Guangdong, and Shandong, which are among China's most economically developed provinces. They are also expected to increase imports of electricity from the western provinces as a part of the central government's plans, but there is a lot of local

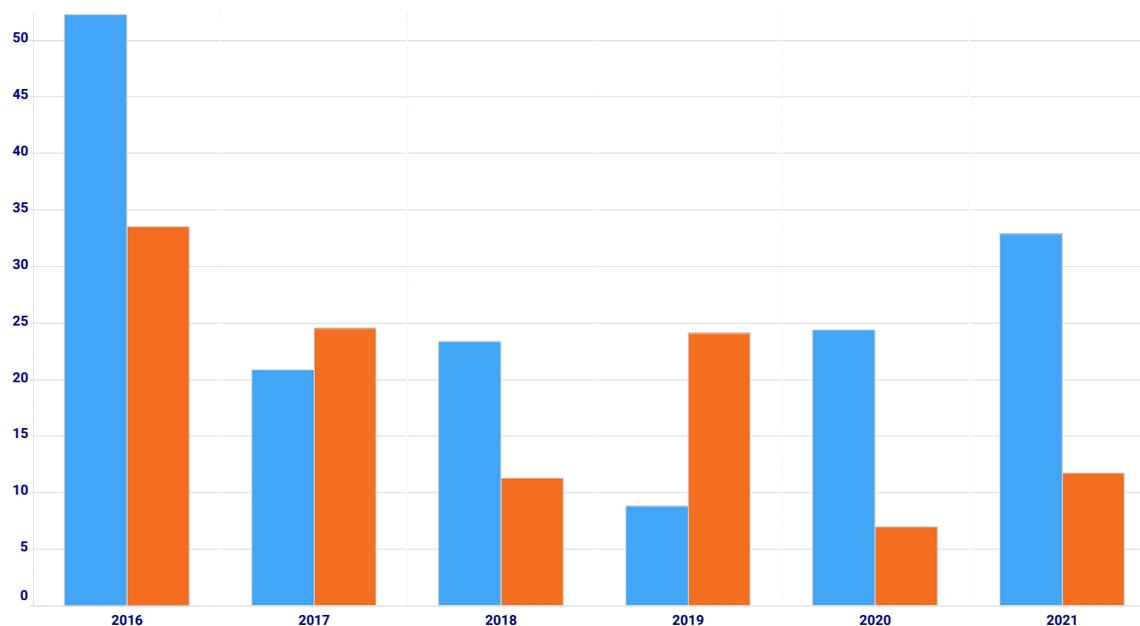
resistance to this as it will lessen demand and revenue for local power plants.

New coal power plants have a typical lifetime of 20–50 years and will lock the power sector further into coal dependency. There is no space for this new capacity to be built and operated under the goals of the Paris Agreement.

A complete shift of new investments into clean capacity is needed to put China on track to peak CO₂ emissions and avoid a glut of unneeded power capacity. Given that China's power sector has been the main source of increases in global fossil emissions in the past two years, directing all new investments into clean power generation would be a crucial contribution to meeting the goals of the Paris Agreement. Such an increase is also eminently achievable given the significant growth that China has already achieved in clean energy, requiring less than a doubling of annual clean power capacity installations.

Figure 4: Yearly coal power construction starts in China and the rest of the world, 2016–2021 (gigawatts)

China = blue, Rest of the world = orange



Coal-fired power generation increased in China in 2021 for the sixth year in a row. Growth in clean energy needs a substantial further acceleration to cover the average rate of growth in electricity demand. In 2021, electricity demand growth was twice as fast as the pre-Covid average, leading to a dramatic one-off surge in coal-fired power generation (Figure 5).

China’s ambitious plans for increasing clean electricity production by 2025 most likely mean that the utilization of coal-fired power plants drops even as capacity increases. The country argues that the continued coal capacity additions don’t directly contradict with its climate commitments, as those commitments allow emissions to rise until late 2020s, and don’t limit coal power capacity as such. However, overcapacity in coal-fired power is likely to make the transition harder and more costly.

Figure 5: Annual changes in power generation in China, 2016–2021 (terawatt-hours)

Source: IEA Monthly Electricity Statistics; Difference between each year’s power generation by source and the preceding year’s. pre-Covid demand growth (2016–2019 average) = dotted line
 Wind = light blue, Nuclear = orange, Solar = red, Biomass = turquoise, Hydro = dark blue, Fossil gas = gray, Coal = black

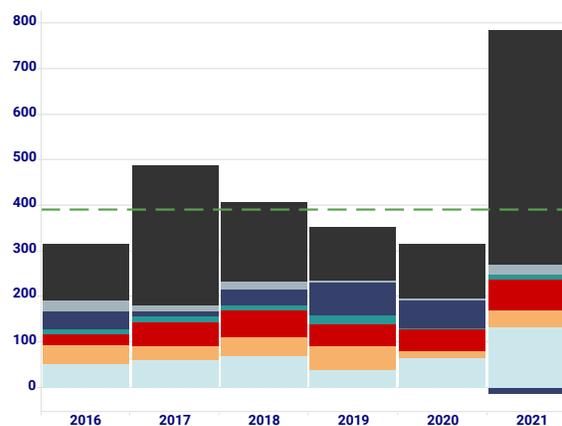
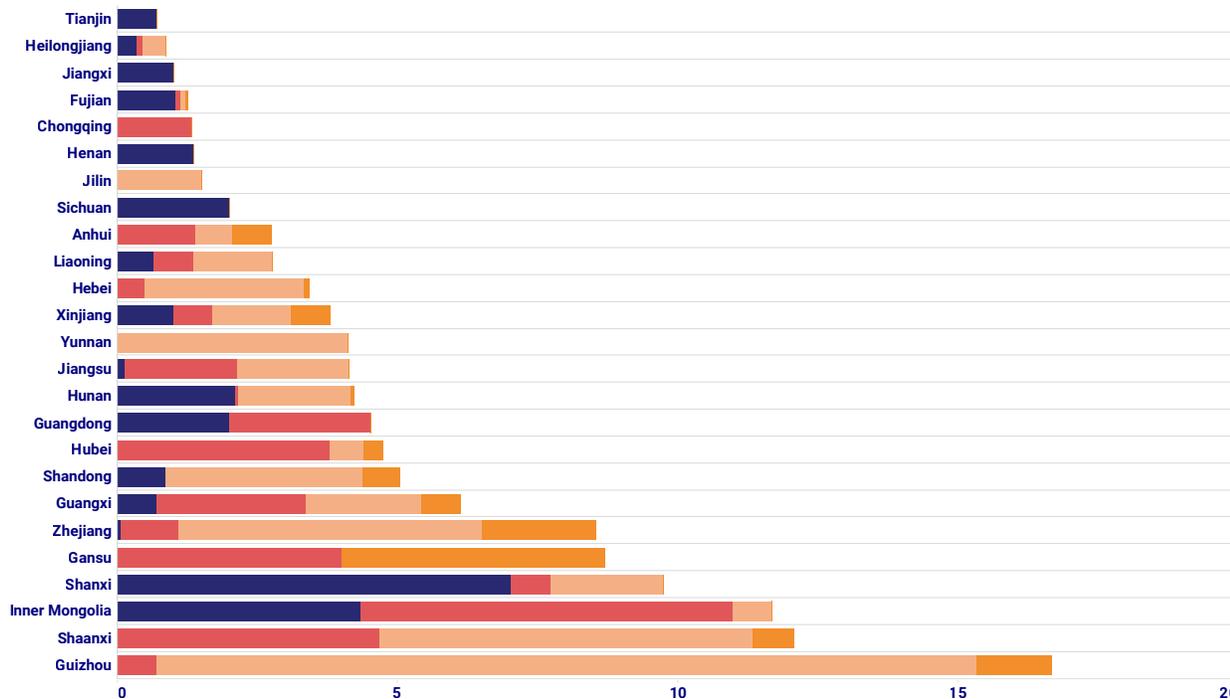


Figure 6: Coal power pipeline in China by change in project status and province, 2021 (gigawatts)

Commissioned = purple, Construction started/Restarted = red, New project started/Re-activated = pink, Permitted = orange



NO NEW COAL: PROGRESS TOWARDS THE LAST COAL PLANT ENTERING CONSTRUCTION

2021 sees the collapse of global coal proposals outside China accelerate

2021 was a significant year in the continued global shift away from new coal power, with multiple countries making significant public commitments to pivot their energy futures away from coal, and swathes of pre-construction coal capacity cancelled. A [coal-focused](#) COP26, building on prior [calls](#) by United Nations Secretary General Antonio Guterres to end the construction of new coal, created a sense of momentum in the global shift away from new coal power, with significant progress [announced](#) at COP26 in Glasgow in November.

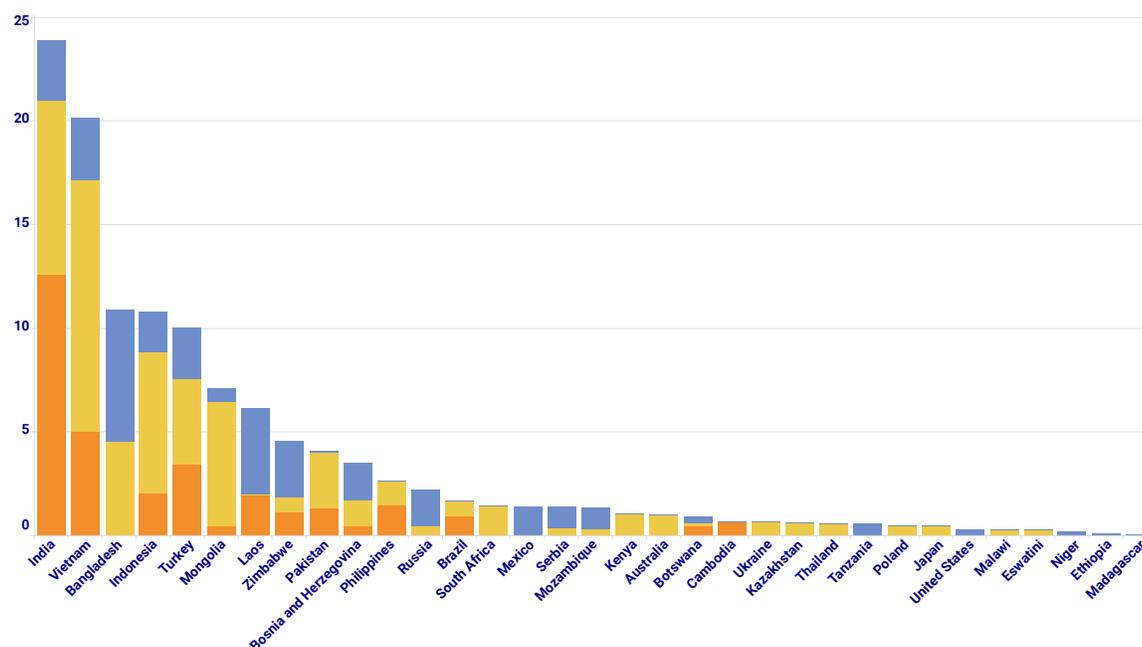
E3G/GEM [analysis](#) in September 2021 found that there had been a 76% collapse in pre-construction capacity of new coal power plants since the Paris Agreement. As of January 2022, pre-construction coal capacity stands at 280 GW globally, equivalent to the current operating fleets of the United States and

Japan combined. Over the course of 2021, China's share of global proposals increased by 7% to 57% (158 GW), meaning China now accounts for over half of all proposed coal plant capacity in the world.

In all, 65 countries have made commitments not to build new plants (see table [here](#)),³ up from 36 in January 2021. This almost doubling of the number of countries vowing off new coal in just a single year demonstrates the pace at which countries are pivoting away from new coal power. Many countries have now scrapped their proposed coal projects. Several more countries have indicated their intent to do the same, some through [political speeches](#), others through signing the 'no new coal' clause of the [Global Coal-to-Clean Power Transition Statement](#) at COP26 or joining the [No New Coal Power Compact](#).

Figure 7: Countries with a pre-construction pipeline in 2021, excluding China (gigawatts)

Announced = blue, Pre-permit = yellow, Permitted = orange



3. 22 of these countries are not in the [Global Coal Plant Tracker](#).

This leaves 34 countries still considering coal at the start of 2022 (Figure 7 & Appendix B),⁴ down from 41 countries in January 2021.⁵ All plans were cancelled

or presumed cancelled in the Czech Republic, Colombia, Djibouti, Ivory Coast, Morocco, Papua New Guinea, Sri Lanka, and Uzbekistan.

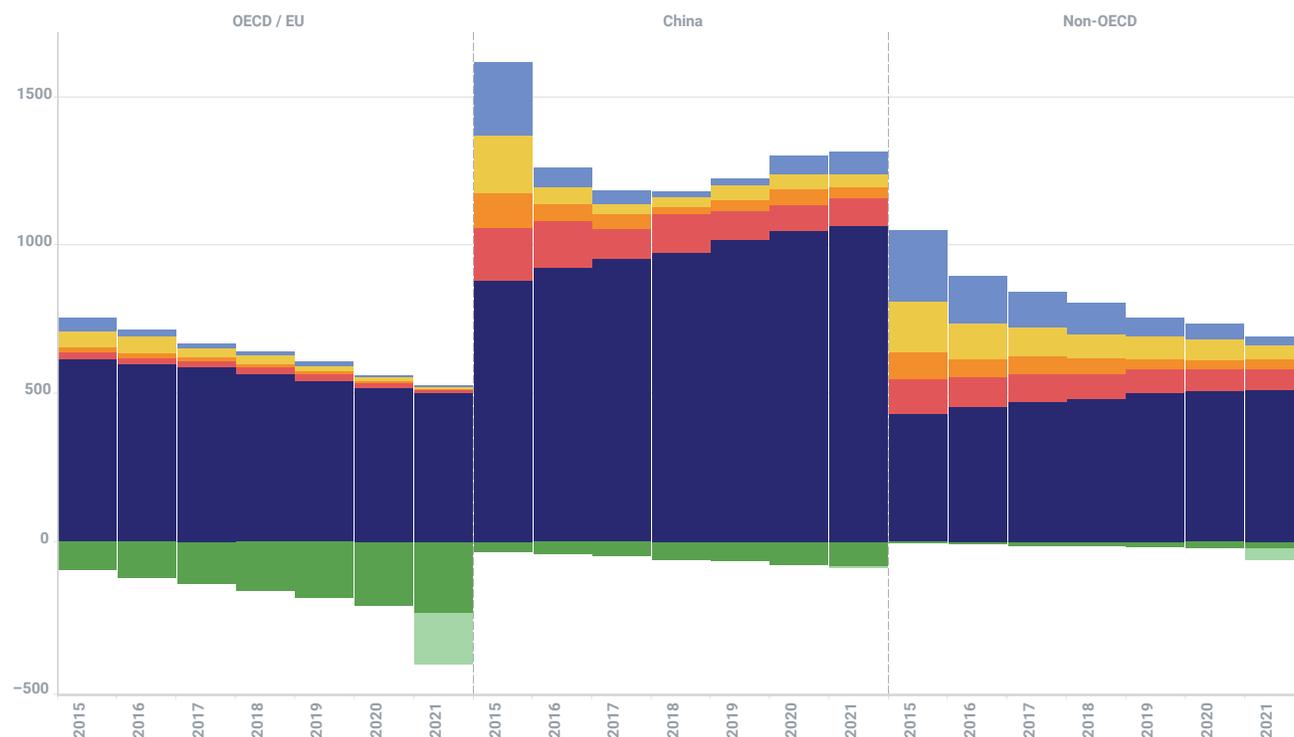
China increasingly dominates coal capacity under development, belying progress elsewhere

Trends in the global coal proposals can be differentiated into three blocs, each with differing dynamics (Figure 8).

Figure 8: Global coal capacity and proposals by status, 2015–2021 (gigawatts)

OECD/EU = left, China = middle, Non-OECD = right

Announced = light blue, Pre-permit = yellow, Permitted = orange, Construction = red, Operating = purple, Retired since 2010 = dark green, Expected retirements by 2030 = light green.



4. Projects are considered shelved in twelve additional countries: Argentina, Colombia, Djibouti, Democratic Republic of Congo, Georgia, Kyrgyzstan, Nigeria, Oman, Papua New Guinea, Sri Lanka, Tajikistan, and Uzbekistan. In addition, it is important to note that projects under construction can also be scrapped. Coal is under construction in three additional countries not listed in Figure 7: South Korea, Iran, and Greece.

5. One [project](#) in Niger was presumed re-announced. Note: Every year, Global Energy Monitor corrects statuses of coal-fired units going back to 2015, resulting in minor changes from numbers reported in previous Boom and Bust or other reports.

OECD proposals contract again, although a few laggards remain

OECD countries continue to turn their backs on new coal. 86% of the group now has no new coal capacity under consideration. Despite clear [recognition](#) amongst the OECD of the collective need to stop building new coal (and rapidly retire existing capacity) to meet the Paris Agreement, six countries are still considering new coal: the US, Australia, Poland, Mexico, Japan, and Turkey. In 2021, Colombia's revised 2020-34 generation and transmission expansion plan did not [anticipate](#) new coal, so its remaining planned units are presumed cancelled and the country dropped off this list. Several of the OECD projects rely on the promise of "clean coal" technologies, which are currently expensive, ineffective, and unproven (see sections below for more information).

In reality, many of the projects remaining in the OECD, including recent proposals in the U.S. and Japan, are unlikely to proceed. Mexican utility CFE has [stated](#) that its proposed 1.4 GW will be [scrapped](#) (Mexico is a member of the [Powering Past Coal Alliance](#)), while the poor economics of the existing coal fleet in

Australia render its [proposed](#) 1 GW project questionable. In the U.S., only a single [project](#) resulted from Trump's push for new coal, and it is unlikely to come to fruition given its [high costs](#) and reliance on public subsidies. Japan's J-POWER plans to add a gasification unit to [Matsushima](#) unit 2, a 500 MW supercritical coal-fired power plant built in 1981. Even with this new addition, [CO₂ emission reduction is limited](#) and contradicts Japan's climate commitments at home and abroad. Unofficial [reports](#) suggest Poland's 500 MW [Leczna plant](#) won't be built given EU climate policy and the declining economics of coal. Turkey accounts for 74% of the OECD proposals, and remains the country with the sixth-biggest coal capacity under development in the world. Yet despite the coal-friendly policies of the government, new projects face fierce public opposition and dwindling financing options, with strong domestic pushback and difficulties accessing finance contributing to the recent cancellation of the [HEMA Amasra plant](#). These OECD countries are discussed in more detail in sections below.

Non-OECD outside China edges towards No New Coal

In the rest of the world (excluding China), the shift away from new coal is growing. 27 countries are still considering new projects with a total capacity of 108 GW (Appendix B). Among these countries, all proposals for Morocco, Ivory Coast, Djibouti, Papua New Guinea, Sri Lanka, and Uzbekistan are considered shelved or cancelled as of 2021.

2022 will see Egypt hosting COP27, with an end to new coal construction on the African continent now within reach. Although 12 countries still have coal proposals—down three since July 2021 (Ivory Coast, Morocco, and Djibouti)—seven of these countries have only a single plant under consideration, and economic headwinds, coupled with the likely loss of keystone Chinese public finance (following President Xi's announcement last year), leave many projects in Africa highly unlikely to proceed. COP27 represents an opportunity for the international community to

support African regional leadership in the shift away from new coal, and towards a clean-energy led future.

South and Southeast Asia now account for 65% of the proposals outside China. State-level commitments and severe economic headwinds in India, along with political signals away from new coal in [Pakistan](#) and [Bangladesh](#), suggest more coal proposals may be cancelled over the course of 2022. Although significant proposals remain in Indonesia, Vietnam and Laos, ongoing [political dialogues](#) and [energy planning processes](#) are increasingly highlighting the [risks](#) associated with new coal.

The fall in coal proposals has also seen prominent Global South advocates for No New Coal emerge, for example [Sri Lanka](#) becoming co-chair of the [No New Coal Power Compact](#). Countries like Morocco and Ivory Coast also both signed the COP26 Coal to Clean

statement, committing to cancel their proposed coal plants. In addition, on the heels of its March 2021 forecast which announced 2.8 GW of new coal capacity, [Malaysia](#) course-corrected by June 2021 and announced an end to new coal in its energy transition plan.

THE PUBLIC COAL FINANCING TAP RUNS DRY IN 2021

The year 2021 shut the door on international public coal financing, as governments in Japan, South Korea, and China all pledged to end public support for new coal plants, followed by a commitment from all G20 countries ahead of the 2021 climate talks.

The announcements are notable as Japan, South Korea, and particularly China had played the role of “lender of last resort” for new coal plants, given the retreat of multilateral development banks from coal financing. With the exit of these three countries and the G20, there is essentially no significant international public financier remaining for new coal plants overseas.

Potentially, the biggest impact from the pledges will be from China, following President Xi Jinping’s announcement at the United Nations General Assembly in September 2021 that China will “not build new coal-fired power projects abroad.” The news was followed by an [announcement](#) from the Bank of China that it would no longer provide financing for new coal plants and coal mining projects outside China starting October 1, 2021.

To date, China is proposing to fund 56 overseas coal plants totalling 52.8 GW of capacity, according to Global Energy Monitor’s [Global Coal Project Finance Tracker](#). If China’s announcement excludes any future public financing, all 56 coal plants are at risk of being cancelled, given the lack of other financing options for new coal plants both internationally and in host countries.⁶

Collectively, the global shift away from new coal increasingly isolates China. This is a trend that is likely to continue through 2022 as further countries scrap their remaining plants, particularly if China follows through on its commitment to no longer build overseas coal.

According to a 2021 [GEM/CREA analysis](#), cancellation of the coal plants dependent on Chinese support would remove two-thirds of coal plants planned for construction in Asia (excluding China and India), leaving only 22 GW remaining in just eight countries. For some countries, such as Bangladesh and Sri Lanka, the impact of China’s announcement could potentially cancel nearly all coal-fired projects in planning.

In Africa, cancellation of the plants would cut the 15.9 GW of proposed coal power by half, as China has been a major financial supporter of new coal plants in the continent.

However, the full meaning and scope of China’s financing pledge remains to be seen. The use of the term “new” in Xi’s statement implies that projects with signed contracts and ones far into planning and development prior to the announcement may be excluded from the announcement. With the exception of a few projects (see sidebar on next page), to date it is unclear if China will pull the plug on the 56 coal plants that its public banks and companies are considering financing.

In the face of dwindling direct public financing for coal, any new coal projects will likely require significant government subsidies and private domestic financing to get built. This will prove to be a challenge as many of the domestic banks where China has proposed to finance new coal projects are not sufficiently capitalized to fund large new coal plants. Given this, the prospects for proposed coal capacity additions advancing to construction or operation are increasingly dim.

6. Notably, Chinese involvement in overseas power projects is not limited to financing. Agreements for Engineering, Procurement and Construction (EPC) as well as the sale of boiler, turbine, and generation equipment are significant, and may be considered under the pledge not to “build” new coal plants.

COAL PLANTS AFFECTED BY CHINA'S NO FINANCING PLEDGE

Shortly after President Xi's September 2021 announcement that China will "not build new coal-fired power projects abroad," a spokesperson for Ncondezi Energy in Mozambique said that he expected "more advanced" projects such as the company's proposed [Ncondezi plant](#) to be honored by Chinese parties. In 2019, Ncondezi Energy signed a joint development agreement with China Machinery Engineering Corp. (CMEC) for the plant; the spokesperson said CMEC remained committed to the project and continued to lead the financing process, although financing had yet to be secured.

In November 2021, the Chinese ambassador to South Africa said that Chinese government-owned institutions would not be providing financing for the proposed [Musina-Makhado plant](#) in South Africa, a large 1.3 to 3.3 GW coal plant proposal designed to provide captive power to a new industrial zone in the area.

In December 2021, China Energy won a [tender](#) to supply equipment for an expansion of the [Sulawesi Labota plant](#). The tender for phase I of the project was signed by China Energy in August 2021.

In January 2022, project company Sunningwell International Limited said that Chinese bank loans will not be available for the planned 700 MW [Ugljevik III plant](#) in Bosnia and Herzegovina, making the future of the project uncertain.

In February 2022, the Pakistan government agreed to include the much-delayed 300 MW [Gwadar plant](#) in its highest priority schemes for payment of invoices after operation. The move was designed to address concerns from Chinese insurance companies, which had previously refused to provide loan guarantees for Gwadar due to payment problems at other Chinese-funded power projects in Pakistan. In return for giving highest priority, the Chinese government agreed that it will provide all necessary support for financial closure of the plant.

Also in February 2022, Energy China [signed](#) an engineering, procurement, and construction (EPC) contract to build a 4x380 MW expansion of the [Halmahera Persada Lygend plant](#) in Indonesia.

TALLYING UP THE PLEDGES: GLASGOW'S IMPACT ON THE GLOBAL COAL POWER FLEET

Coal-fired power generation is the largest source of energy-related CO₂ emissions globally, and reductions in coal use for power are the single most important source of emissions reductions in emissions pathways that meet the goals of the Paris Agreement to limit global temperature rise below 1.5 degrees. To align with that goal, [modeling](#) by the International Energy Agency finds OECD countries should eliminate coal power by 2030 and the rest of the world by 2050.

As noted above, in the run-up to and during the Glasgow climate summit (COP26) in November 2021, countries announced an unprecedented number of coal phase-out, "no new coal," "no new coal/fossil financing overseas," and net zero emissions commitments. The pledges and announcements, if fully implemented, mark a breakthrough in the global effort to phase out coal and reduce power sector emissions:

- 370 more coal plants (290 GW) were effectively given a close-by date. After the pledges presented in the run-up to and at the Glasgow summit, 750 coal-fired power plants on the globe totaling 550 GW of capacity—or 26% of global coal capacity—have a phase-out date, while another 1,600 plants (1,420 GW) are covered by carbon neutrality targets but stop short of a phase-out decision. The 750 figure is nearly double the 380 plants (260 GW) that had a phase-out date before the 2020–21 ambition-raising process that culminated in Glasgow.
- Only 170 plants (89 GW), or 5% of the operating fleet today, are not covered by either type of commitment. These lagging sites are down from 2,100 plants (1,800 GW) before the Glasgow process.
- 90 new coal power projects (88 GW) are likely to be cancelled due to "no new coal" and no new fossil

fuel financing pledges—this is two-thirds of all planned coal plants outside of China.

- Another 130 new projects (165 GW), most importantly in China and Indonesia, are called into question as there is no room for them to operate under the country’s new zero-carbon targets.
- Not all coal phase-out decisions are aligned with the Paris Agreement goals. Only 250 existing coal power plants (180 GW, or 37% of OECD coal capacity) are scheduled to close by 2030 in the OECD and 130 plants (100 GW, or 6% of non-OECD coal capacity) outside the OECD have a closure date by 2050.
- If Germany’s aspirational goal of phasing out coal “ideally” by 2030 can be firmed up, and assuming the United States’ 2035 Clean Power goal will mean

a coal phase out by 2030, the number of coal power plants with a Paris-aligned phase-out date would increase to 590 (460 GW, or 22% of global coal capacity).

- India’s new target for clean power capacity will enable the country to start phasing down coal well before 2030, even assuming power demand growth continues at pre-Covid rates.

There is however a gap in targeted retirements over the next decade, as China is still planning a major expansion and other countries, especially OECD countries such as Japan and Korea, are planning to operate their coal power fleets far beyond the 2030 deadline for phase-out in developed countries. There is also a lot of work to do to translate the announcements into plant-by-plant retirement plans.

Plant level progress

To measure progress on aligning plant-level plans for new capacity and retirements with the pledges and with Paris Agreement goals, CREA and GEM projected global coal-fired capacity over time assuming (1) all coal power projects in active development are realized and (2) the plants that don’t have an announced retirement or coal phase-out date retire at the average age for each region to date.⁷

The various Global Coal Plant Tracker database versions released from January 2018 to January 2022 provide insight into how the outlook for global coal power capacity has changed, and allow tracking progress towards phasing out unabated coal in line with the 1.5 degree pathway. Coal phaseout schedules are based on a 2018 [report](#) by Global Energy Monitor and Greenpeace, which developed regional pathways consistent with the projected coal-fired generation in the IPCC scenarios for holding global warming to 1.5 degrees Celsius. These projections are not realistic economic-financial scenarios, but rather illustrations of how industry plans are changing—or not changing—in response to economic and political developments.

As Figure 9 (on the next page) demonstrates, while China’s 2060 carbon neutrality target implies that most coal-fired capacity will need to be retired by 2050, the country’s power industry is still planning an expansion in coal-fired capacity over this decade that takes the country’s capacity pathway more and more out of sync with the Paris-aligned trajectory through at least the late 2040s.

However, other non-OECD countries have made significant progress in scaling back future coal capacity every year since 2017. No new coal and no overseas fossil fuel financing pledges in the run-up to and at the Glasgow summit marked a further breakthrough. OECD countries have also made progress in phasing out coal power, although they are still far from aligning with the 2030 phaseout that would be in line with the Paris Agreement goals. However, the projected global capacity pathway has not budged, as progress in many OECD and non-OECD countries has been entirely offset by continued announcements and construction starts for new projects in China.

7. More information about assumptions is available in Appendix C (Climate Analysis Methodology) at the end of this document.

At the end of 2017 (orange line), OECD's coal power capacity stood at 670 GW, and was expected to fall to 511 GW by 2030. By the end of 2021 (solid black line), national and operator phase-out decisions in OECD countries saw projected coal capacity in 2030 fall by 119 GW, to 392 GW. Full implementation of Glasgow pledges would see OECD's coal capacity fall by 75% by 2035, to 170 GW. However, the 1.5 degree target requires a complete coal power phase-out in OECD countries no later than that date.

The OECD countries with the largest projected coal power capacity in 2030 are the U.S., Japan, Turkey, Germany, South Korea, Poland, and Australia. Out of these stragglers, Turkey is still planning the most sizable coal power expansion.

The projected 2030 coal power capacity in non-OECD countries excluding China has fallen by 138 GW since 2017, and full implementation of Glasgow pledges

would reduce coal capacity by a further 80 GW. The largest reductions from the situation in 2017, taking into account Glasgow pledges, took place in India (60 GW), Vietnam (19 GW), Bangladesh (17 GW), and Egypt (15 GW).

New coal power projects initiated and restarted in China since 2017 mean that the country's projected coal power capacity increased by no less than 106 GW, offsetting half of the reductions in the rest of the world. China's coal capacity under the carbon neutrality pledge only begins to diverge from the "business-as-usual" pathway in the 2040s. However, even to follow this pathway, no new coal power projects would need to be initiated from now on.

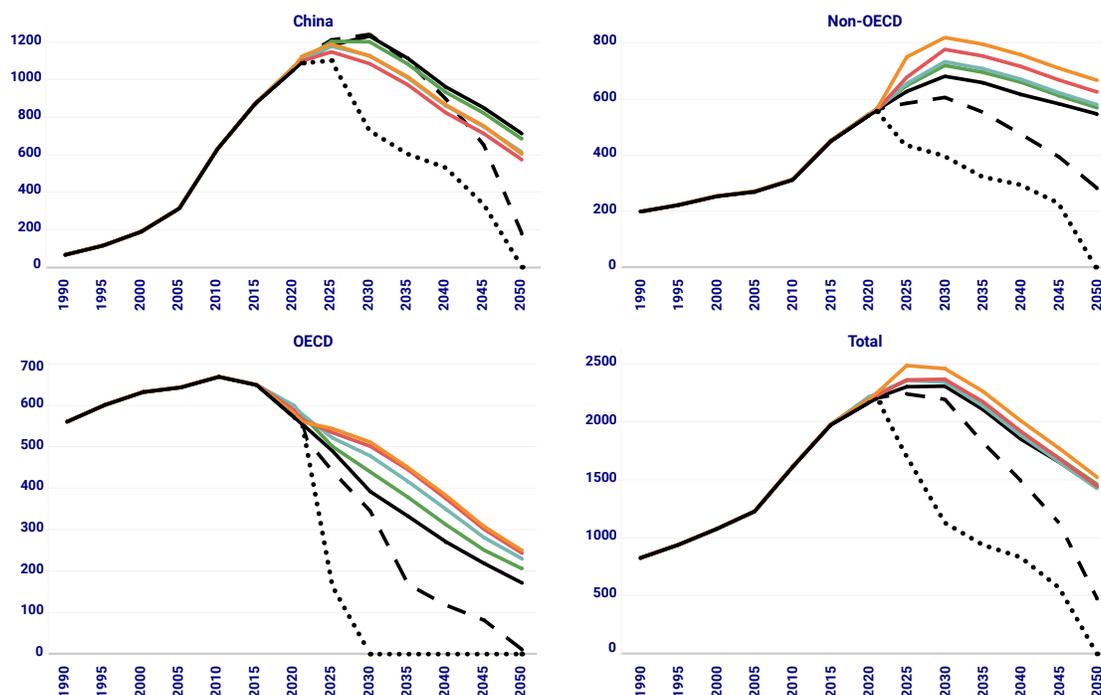
Globally, the projected coal-fired capacity in 2030, if the Glasgow pledges are implemented, is 2,200 GW, while the amount of capacity consistent with the IPCC 1.5 degree pathways is estimated to be about

Figure 9: Historic and projected coal power capacity by region (1990–2050), current pledges, and the gap to 1.5 degrees (gigawatts)

Graphs: China = top left, Non-OECD = top right, OECD = bottom left, Total = bottom right.

Pathways (lines): 1.5 degree pathway = dotted line, current pathway=solid line, pledges pathway = dashed line.

Total capacity expected by year: orange = 2017, red = 2018, blue = 2019, green = 2020, black = 2021.



half, or 1,100 GW. An additional 1,100 GW will need to be cancelled or retired—an estimated 340 GW in the OECD, 500 GW in China, and 200 GW in the rest of

the world—to meet the emission budgets consistent with limiting global warming to 1.5 degrees.

THE ROLE OF “CLEAN COAL” TECHNOLOGIES IN DECARBONIZING THE COAL POWER SECTOR: AN UNCERTAIN AND EXPENSIVE DISTRACTION

A buzz word of 2021 was “abatement,” which in the case of coal power generation is generally understood to [mean](#) the use of Carbon Capture and Storage (CCS) or Carbon Capture, Utilization, and Storage (CCUS) technology or other “advanced” coal plant technologies to lower a plant’s CO₂ emissions. Although carbon capture may be a critical technology to address climate change in certain sectors, to date it has played an extremely limited role in lowering emissions from coal plants due to its high costs. As a result, climate researchers, campaigners, and environmental advocacy groups have long [argued](#) that CCS technologies effectively prolong the world’s fossil fuel dependence and distract from a much-needed pivot to renewable alternatives. However, rather than move away from “advanced” coal plant technologies, in 2021 countries like the US and Japan doubled down on them.

Despite the repeated problems and setbacks with CCS, many coal phase out strategies continue to pin their hopes on the development and scale-up of CCS technologies for reducing coal emissions, such as the [Korea Electric Power Corporation](#) and many others. Others have decided to move on from CCS: as the CEO of Enel [said](#), carbon capture and storage “hasn’t worked” for the electricity industry so far. The better climate solution is to “stop emitting carbon.”

In addition to CCS, the Japanese government has proposed converting existing thermal power generation into “zero-emission” power generation with the use of advanced coal technologies such as ammonia co-firing and coal gasification (IGCC) technologies, in an effort to reconcile the country’s reliance on coal with its net zero ambitions.

A U.S. audit report [criticized](#) wasteful spending on carbon capture projects: of US\$1.1 billion spent by the U.S. Department of Energy on 11 CCS projects, only three were ever built. The coal CCS project that was built—the Petra Nova carbon capture intended to capture 90% of the carbon dioxide emissions at the 240 MW [Parish plant](#) unit—was the country’s only large carbon capture project on a coal plant before it went offline in May 2020 due to low oil

prices, which undercut the demand for compressed carbon dioxide. In Canada, the CCS unit at the [Boundary Dam plant](#), described as “the world’s sole carbon capture project on a large power plant,” was also [offline](#) for over half of 2021 due to tech issues. The frequent outages experienced at Petra Nova and Boundary Dam during just a few years of operations serve as a [red flag](#) for policymakers and investors considering coal carbon capture proposals.

A group of hundreds of major investors recently [urged](#) electric utilities not to use offsets as part of their decarbonization efforts, and to minimize reliance on carbon capture because of its risks and high costs. In many parts of the world, existing coal plants are already uncompetitive. Adding CCS makes coal even less competitive. Lazard [estimates](#) the Levelised Cost of Energy (LCOE) of coal with 90% CCS, excluding the costs of transportation and storage, at US\$152 per megawatt-hour (MW/h)—much more expensive than renewables and other alternatives. An Australian agency [estimated](#) the LCOE from a black coal plant fitted with CCS at A\$162 to A\$211 per MW/h in 2030, compared to the LCOE cost of wind and solar, including integration costs, at A\$46 to A\$67 per MW/h. The high costs of CCS in the power sector were echoed in research [concluding](#) that “the heterogeneous value of CCS across different applications suggests that targeted, rather than blanket, support for CCS represents the best climate policy.” It highlighted the stark differences between the success of renewable energy deployment over the last decade, and the failures of carbon capture during the same period.

As researchers and communities have been [arguing](#) for years, a coal phase-out to enable a just transition to a sustainable energy system is the only clear path to lowering CO₂ emissions from coal plants, and continues to be delayed by the false promise and uncertainty of “clean coal” technologies. Continued reliance and investments in expensive, unnecessary, and outdated coal power infrastructure will ultimately be to the detriment of climate goals, public health, the environment, and coal-affected communities.

IN THE U.S., CONTINUED MOMENTUM AWAY FROM COAL NEEDS TO ACCELERATE

The U.S. remains ranked third in operational coal capacity globally behind China and India. To meet its climate goals, the country must grapple with its “aging fleet of clunkers,” as described by the Sierra Club Beyond Coal Campaign, which has worked with partners to move over half of U.S. coal capacity that was online in 2009 to retirement or announced plans to retire prior to 2031. However, based on planned retirements, the U.S. remains among the OECD countries with the largest projected coal power capacity in 2030, and the rate of retirements needs to speed up.

In 2021 the amount of capacity retired likely declined for the second consecutive year, from 16.1 GW in 2019, to 11.6 GW in 2020, to an estimated 6.4 GW to 9 GW in 2021. To meet climate goals, the U.S. [needs](#) to retire 25 GW annually on average between now and 2030, which is close to the historic 21.7 GW the country retired in 2015.

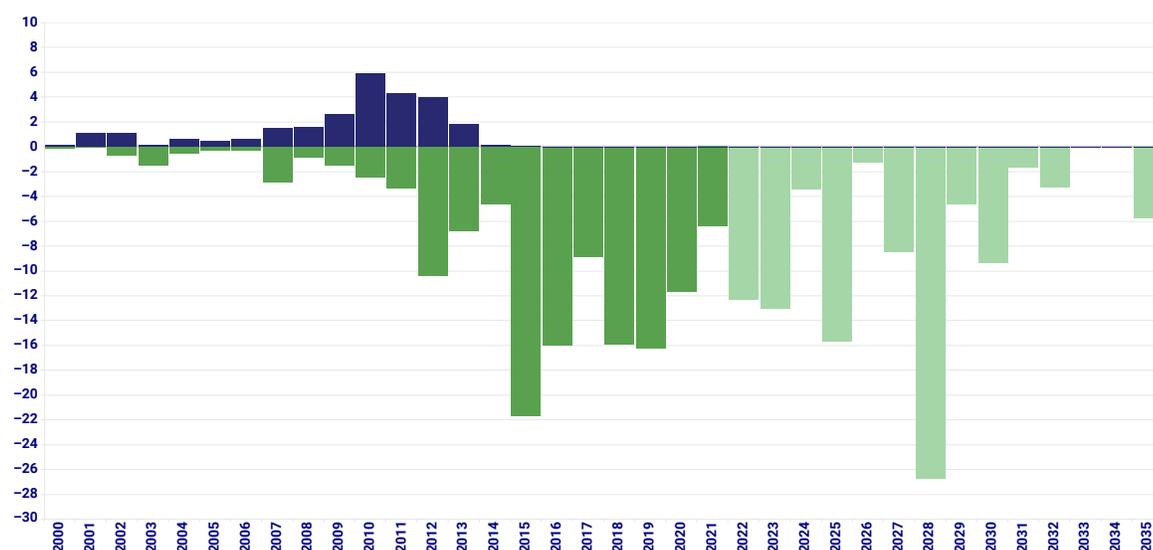
However, the retirement year metric does not provide the full picture on the progress and momentum of the U.S. to move away from coal. According to Sierra Club analysis, in 2021, 16 GW of coal capacity was announced as set to retire before 2031, which was greater than

announcements verified by the Sierra Club in four of the five previous years. There is continued momentum away from coal. At the same time, the U.S. must act now and over the next few years to strengthen and enforce federal pollution safeguards at coal power plants, invest in transitioning communities beyond coal, and accelerate the adoption of renewable energy. Without coordinated federal action, progress on coal in the U.S. will continue but will be slower than is needed to meet the climate crisis and to fulfill the country’s historic climate obligations.

In April 2021, President Biden announced that the United States was committing to reducing its greenhouse gas emissions over the next eight years to 50–52% of what they were in 2005, a commitment formalized under the Paris Agreement. The Biden Administration has also pledged to create a carbon pollution-free power sector by 2035 and a net zero emissions economy by no later than 2050. However, only approximately half (107.8 GW of 227.6 GW) of US operating coal power capacity is currently scheduled for retirement by 2035, up from an estimated 76.6 GW of 233.6 GW in [2020](#). Achieving national and climate goals will necessitate

Figure 10: U.S. coal power capacity commissioned and retired (2000–2021) and planned retirements through 2035 (gigawatts)

Commissioned = purple, Retired = dark green, Planned Retirements = light green



accelerating scheduled plant retirements (Figure 11). In addition, although additional plants are scheduled for retirement between 2036–2049, 105 GW of operating coal units still lack retirement dates entirely.

As of March 2022, Sierra Club estimates that the U.S. must secure an annual average of 17 GW of new coal announced to retire each year through 2030—slightly more than the progress made in 2021.

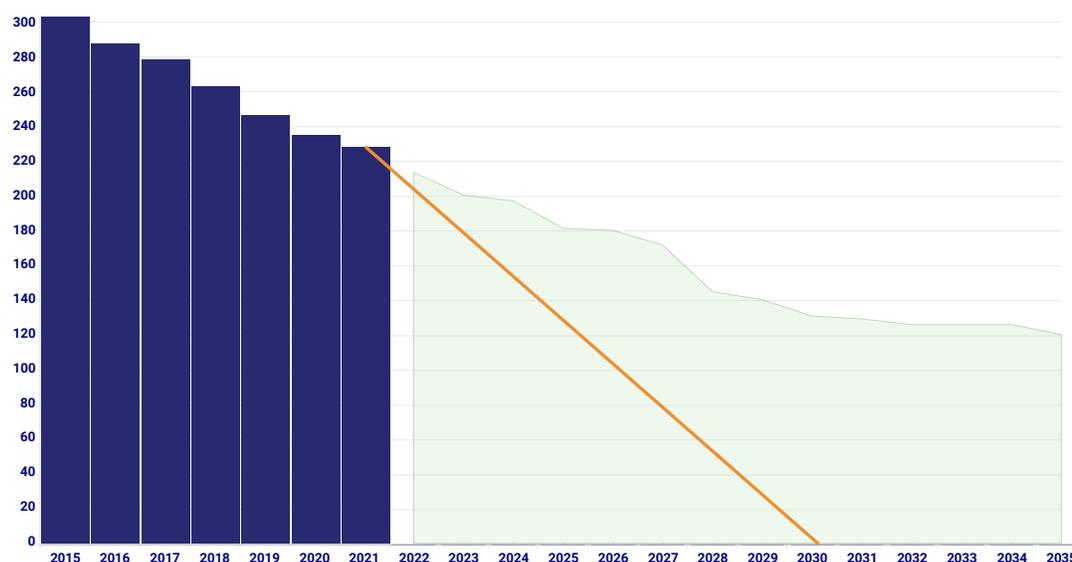
Recently, the Biden administration has taken some initial steps toward restoring or strengthening coal plant regulations, making coal plants more expensive to operate and less competitive compared to alternatives—although the measures are still far from what is needed to meet the Paris Agreement. Early in 2022, the U.S. Environmental Protection Agency [denied](#) extensions on coal ash facility closures and moved to restore the legal basis for a mercury emissions rule that was set aside by the Trump administration, actions that help protect the health of communities and add pressure to plants already struggling to stay financially afloat. In order to meet commitments, the administration needs to pursue an aggressive regulatory agenda and Congress needs to pass its most ambitious climate plans, as outlined in [GEM analysis](#).

As is the case in Europe and other parts of the world, many coal-fired power plants have closed due to their declining economics resulting from the decreasing costs of alternatives and implementation of environmental regulations. Coal plant utilization rates have also significantly decreased due to their growing lack of competitiveness in today's energy markets. However, old and new risks to the country's rapid electric sector transformation cannot be ignored. For example, the promise of carbon capture technologies and the energy intensive cryptocurrency mining gold rush are delaying or could delay the retirement of some uneconomic coal plants.

The [CONSOL Energy Mining Complex plant](#), a proposed 300 MW “carbon-negative” waste-coal plant, is emblematic of the dangerous promise of carbon capture technologies for prolonging coal (see [sidebar](#) on page 18). The project's current research phase was backed by government funding in 2020, and the Pennsylvania-based coal company has a stated goal of beginning construction in 2024 for plant operation by 2028. The [Coal Creek plant](#) in North Dakota was set to retire in 2022, following years of financial losses, but in June 2021, Rainbow Energy Marketing revealed that it had agreed to buy the plant, with plans to retrofit it

Figure 11: U.S. historic and projected coal power capacity (2015–2035) and the gap to 1.5 degrees (gigawatts)

Operating capacity = purple, Operating capacity based on planned retirements = light green,
Operating capacity decrease needed in a 1.5 degree pathway = orange line.



using carbon capture systems. Draft legislative text in President Biden's transformational Build Back Better Act also proposed subsidies for carbon that is captured and sequestered at energy generation facilities, which advocates argued could delay the retirement of outdated plants that would never actually use carbon capture in the near term.

In addition, the enormous electricity consumption needed to sustain mining cryptocurrency is spurring a partial [resurrection](#) of select coal plants. For example,

the [Hardin plant](#), a 115 MW coal plant in Montana, was [slated for closure in 2018](#) due to a lack of customers, but struck a deal to provide power to a bitcoin mining company in 2020.

The U.S., like many other countries, must also ensure its coal fleet is not replaced by new gas to meet its 2035 carbon-free electricity goal. The country already leads the globe in existing gas-fired capacity, with more than a quarter of the world's capacity.

NEW COAL CONTINUES TO DECLINE IN SOUTHEAST AND SOUTH ASIA

The historic collapse in coal projects [projected](#) in 2021 following announcements from Bangladesh, Pakistan, the Philippines, Vietnam, and Indonesia did not fully materialize, as coal projects were cancelled but not on the scale initially suggested by government announcements and plans. In addition, formal cancellations for Chinese backed projects have generally yet to be seen. Nonetheless, the proposed coal projects in South and Southeast Asia continued to decline in 2021.

The trend is notable as the regions have long been regarded as the next center for coal power growth, after China. The regions represent 65% of the globally proposed capacity in pre-construction status outside of China: 38.8 GW (31%) in Southeast Asia and 41 GW (33%) in South Asia. Tightened financing for coal plants, the decreasing costs for solar and wind power, and public opposition may close the door on many of the remaining coal proposals in the regions. The international community can support these regions in moving away from coal through provision of public and private clean energy finance; support to develop flexible grid infrastructure; and technical and capacity assistance to bolster regulatory and policy frameworks that accelerate the transition from coal to clean.

In Southeast Asia, Indonesia (40.1 GW), Vietnam (22.7 GW), Malaysia (13.2 GW), and the Philippines (10.5 GW) represent 90% of the region's 95.6 GW of operating capacity. 5.2 GW of new coal capacity went into operation in 2021 in Indonesia, Vietnam, and at one small unit in Cambodia. Meanwhile, Indonesia

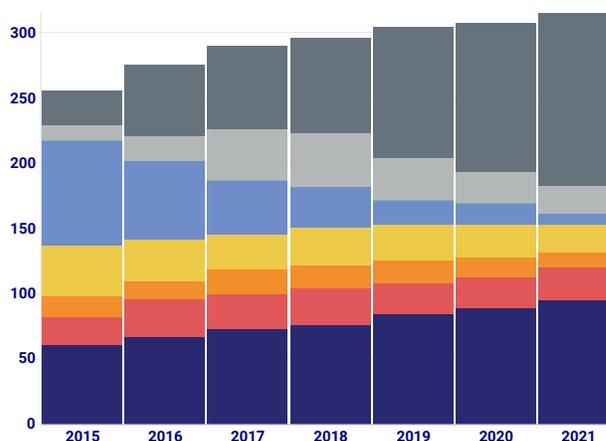
(10.8 GW), Vietnam (20.1 GW), and Laos (6.1 GW) represent 90% of the pre-construction coal capacity in the region. Pre-construction and construction coal capacity dropped from 79.5 GW to 66 GW in 2021, a 17% decrease.

Laos' proposed coal capacity includes an expansion at the existing [Hongsa plant](#), four pre-construction plants, and one shelved proposal, many of which are planned to export most of their power to neighboring countries. In 2021, Cambodia [announced](#) it would not develop any more coal plants beyond those

Figure 12: Southeast Asia coal power capacity by status, 2015–2021 (gigawatts)

Cancelled= dark gray, Shelved = light gray, Announced = blue, Pre-permit = yellow, Permitted = orange, Construction = red, Operating = purple

(Retired capacity by 2021 was <1 GW, not shown)



the government had already [approved](#) as part of its [strategy](#) to be carbon neutral by 2050. The pledge was a welcome development even though it marked no change for the country's coal under development: 1 GW under construction at three plants and the permitted 700 MW [Botum Sakor plant](#). The pre-construction project in Cambodia and many projects in Laos are likely to be [impacted](#) by China's withdrawal from overseas coal.

In Thailand, several controversial projects—the proposed [Krabi](#), [Thepha](#), and [Kao Hin Son](#) plants—were presumed cancelled in 2021 and replaced by gas plans, like the [Surat Thani](#) gas project. However, the one remaining proposal, a 665 MW “replacement” coal unit planned for 2026 at the [Mae Moh plant](#), was effectively permitted.

Brunei, Malaysia, and Myanmar, have no coal plants under development, and Papua New Guinea's first and likely last proposed coal project—the 52 MW [Lae plant](#)—was considered shelved in 2021 and continues to face opposition. Indonesia, Vietnam, and the Philippines are discussed in more detail in other sections below.

In South Asia, India represents 96% (231.9 GW) of the region's 239.6 GW of operating coal capacity. In 2021, 6.4 GW of new coal capacity went into operation in the region, all in India with the exception of new capacity at the small [Hub Cement plant](#) in Pakistan. India represents 61% (23.9 GW) of the pre-construction coal capacity in the region, with the remainder in Bangladesh (10.9 GW) and Pakistan (4 GW). The region's pre-construction and construction coal capacity dropped from 109.9 GW to 80.2 GW in 2021, a 27% decrease.

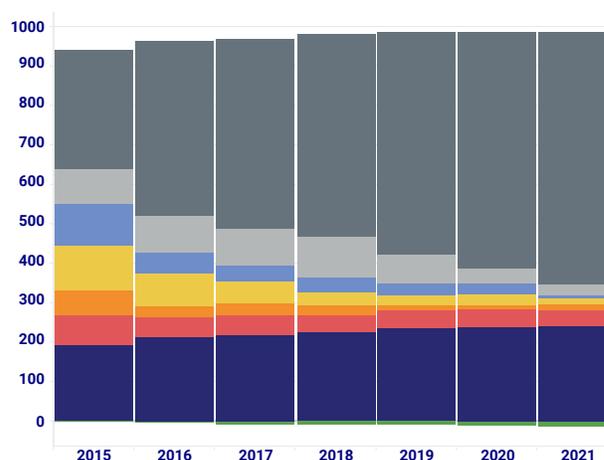
Sri Lanka committed to no new coal in its updated Nationally Determined Contributions under the Paris Agreement in July 2021, so the country's 2.1 GW of pre-construction coal capacity is considered shelved and presumably cancelled. The capacity included the [Foul Point plant](#), the [Lakvijaya plant](#), and capacity in Ceylon Electricity Board's (CEB) 2020 Long Term Generation Expansion Plan (LTGEP). In early 2022, the CEB Engineers Union was still [stressing](#) the need for new coal and LNG, but was met with some criticism.

The island nation is updating its LTGEP in compliance with the government's renewable power generation policies. The process is taking place in the face of [fuel shortages](#) because of Sri Lanka's escalating debt and foreign currency crisis.

In Pakistan, a significant number of coal projects were proposed under the China-Pakistan Economic Corridor (CPEC) framework, with Chinese banks and companies providing financial and technical assistance. CPEC and other coal projects have been plagued by delays, corruption, and opposition, leading to socio-political conflicts as well as a significant rise in Pakistan's debt. In December 2020, Pakistan Prime Minister Imran Khan [announced](#) that the country decided it “will not have any more power based on coal” and that the coal industry's focus would shift to coal-to-gas or coal-to-liquids production. Although the statement implied significant cancellations, projects under construction and at least several proposed projects appear to be moving forward. For example, the [Indicative Generation Capacity Expansion Plan](#) approved in September 2021 retains a significant amount of coal into 2030: the 3.3 GW of coal at plants under construction, the proposed 330 MW [Siddiqsons plant](#), and the proposed 300 MW CPEC [Gwadar plant](#), all identified for

Figure 13: South Asia coal power capacity by status, 2015–2021 (gigawatts)

Cancelled = dark gray, Shelved = light gray, Announced = blue, Pre-permit = yellow, Permitted = orange, Construction = red, Operating = purple, Retired = green



commissioning by 2023. The country has an additional 3.4 GW of pre-construction capacity, which includes the 660 MW [Jamshoro plant](#) Unit 6, whose loans were cancelled following an October 2021 government request, the 1.3 GW [Keti Bandar plant](#), whose feasibility study appeared completed in 2021, and the 1.3 GW CPEC [Thar Block VI plant](#), which is working to develop a coal-to-gas and coal-to-liquid strategy. Although none

INDONESIA

In 2021, Indonesia's operating coal capacity increased 9% from 36.6 GW to 40.1 GW, and is up 54% from 26.1 GW in 2015. Based on available information, new units appeared to begin operating at 7 plants, including captive power stations at the massive [Weda Bay Industrial Park](#), the Konawe Industrial Park ([Delong Nickel Phase II](#)), the [Delong Nickel Phase III](#) site, and the [Nanshan Industrial Park](#).

The country has 15.4 GW of coal power under construction, an amount exceeding all other countries except China and India. In addition, the country has 10.8 GW of coal in pre-construction and 11.2 GW of shelved plans. However, only six pre-construction units, representing a total proposed capacity of 2 GW, have received a permit to begin construction. Indonesia's recent net-zero commitments by both its Ministry of Energy and Mineral Resource (MEMR) and its state-owned utility, PLN, are an indication of change in a country where preferential permitting of coal in the last decade has led to an over-construction of baseload power, a debt-ridden national utility (PLN), and an extremely carbon-intensive economy. In fact, PLN has been [overestimating](#) electricity demand by an average of 34.2% per year since 2015.

In May 2021, PLN announced plans to stop building new coal after [2023](#) and achieve carbon neutrality by [2060](#), in addition to Indonesia's target of 23% renewables by 2025. In August 2021, the Asian Development Bank (ADB) announced the launch of the [Energy Transition Mechanism](#) to provide funding for Indonesia, Vietnam, and the Philippines to upgrade

of the pre-construction projects have been financed and China's pledge to withdraw from overseas coal is likely to [impact](#) many proposals, recent developments [indicate](#) the Gwadar project—which flies in the face of Pakistan's stated [moratorium](#) on new imported coal projects—may still receive Chinese financing to proceed. India and Bangladesh are discussed in more detail in other sections below.

energy infrastructure and accelerate the clean energy transition. In November 2021, Indonesia committed to retiring 9.2 GW of coal capacity by 2030 with international support: 5.5 GW would be decommissioned early without any replacement, and another 3.7 GW would be retired and replaced with renewables. The pledge improved initial plans to decommission [1.1 GW](#) by 2030, but as many have [argued](#), much more focus is needed on canceling new projects.

In addition to the Indonesian government's pledges toward decarbonization, in 2021 two of the country's biggest coal plant financiers—China and Japan—announced an end to financing coal plants overseas. Combined, these developments reflect a turning point for the country's clean energy transition. However, the country still faces significant challenges, as most of its operating coal plants have been built with guaranteed tariffs that have locked PLN into fixed payments for decades, long after just running a coal plant is projected to cost more than building new wind and solar power. Indonesia's new coal-reliant [industrial parks](#) [being](#) developed with Chinese support also run particularly counter to China and Indonesia's ambitious pledges.

In September 2021, a court ruling [mandated](#) the establishment of national air quality standards to protect human health and other measures, which could help address the country's polluting coal fleet if implemented. Meanwhile, advocates [criticized](#) the government's March 2021 decision to declassify coal power plant ash as hazardous waste.

BANGLADESH

Under the 2016 Power System Master Plan “Revisited” (PSMP) released in November 2018, Bangladesh’s coal power was projected to grow from 0.5 GW in 2019 to 25.5 GW by 2040. However, by November 2020, the government finalized [plans](#) to cancel pre-construction coal plants, and in June 2021, [cancelled](#) plans for ten plants amid concerns about fuel costs and widespread opposition.

In total, 10.8 GW of coal capacity was cancelled in 2021, doubling the amount cancelled to date in the country (22.8 GW). However, 2.6 GW of coal power entered construction in 2021, raising the number of plants under construction from four to six, for a total of 6.7 GW. If completed, the plants would nearly quadruple the 1.8 GW coal power capacity currently operating in Bangladesh.

In addition, at the end of 2021, the country still had another 10.8 GW of proposed coal power in pre-construction. Although none of the proposals appear permitted, the project sponsor for the [Orion plant](#) recently signed a “syndication project loan facility agreement” with state-owned commercial banks. One of its two 350 MW units was listed in the PSMP for completion by 2022, and the power station reportedly completed its environmental impact assessment in 2018. The other proposals—the [Patuakhali \(Ashuganj\)](#) Phase I, [Matarbari](#) Phase II, and [Patuakhali \(RPCL/NORINCO\)](#) Phase II projects—were listed for completion by 2024, 2028, and 2031 in the PSMP. Land acquisition in fragile ecosystems and other controversial stakeholder processes are underway. Although Japanese trading house Sumitomo [changed course](#) and pulled out of the [Matarbari](#) Phase II in February

2022, campaigners continue to [advocate](#) for all Japanese support for the plant to stop, in line with Japan’s overseas climate finance commitment. According to reports released in early 2022, the [Patuakhali \(Ashuganj\)](#) coal project was replaced by gas plants.

The statuses of the other announced proposals—the second [Barisal plant](#) unit and the Phulbari power stations ([Gezhouba & Sinohydro](#))—are particularly in question given China’s pledge to end overseas coal financing. However, in September 2021, following China’s announcement, the sponsor for the Phulbari units claimed it remained committed to delivering the projects “in a form that fits in with the Bangladesh Government’s Energy and Power Sector development ambitions” and includes new coal capacity. Finally, an additional 3.4 GW of coal is considered shelved and was likely replaced by proposed gas capacity.

Meanwhile, Bangladesh’s power system [overcapacity](#) problem is growing, made worse by guaranteed power purchase agreements that have forced the country to pay for unused power. A recent [analysis](#) by the Bangladesh Working Group on External Debt found that the Bangladesh Power Development Board’s (BPDB) annual losses total more than US\$1 billion annually, an alarming trend and heavy burden on the Bangladesh economy. More than one-third of the country’s power generation capacity is not being used, creating stranded generation assets that are paid to sit idle. Experts have urged for a [refocus](#) on ever-cheaper renewables and improved transmission and distribution infrastructure to make better use of existing capacity, among other measures.

VIETNAM

The coal fleet in Vietnam has grown faster than in almost any other country, adding two-thirds (14.1 GW) of its current 22.7 GW of operating coal power capacity since 2015, including 2.4 GW at three coal plants in 2021 alone. A further 6.8 GW is under construction. The country has another 20.1 GW of active pre-construction capacity, an amount exceeding all other countries except China and India. However, only a quarter (5 GW) of the capacity is permitted, and no new permits were granted in Vietnam in 2021.

In February 2021, a preliminary draft of Vietnam's Power Development Plan (PDP) for 2021-2030 proposed 37 GW of coal power by 2030, a 51% decline from the 75 GW proposed for 2030 under the 2011 PDP. The 2021 draft PDP also proposed no new coal plants except those already under construction or planned for completion by 2025. However, in September 2021, an updated draft of the PDP added 3 GW of coal power and reduced renewables by 8 GW.

Yet at the November 2021 COP26 climate conference, in another major pivot, Vietnam's Prime Minister Pham Minh Chinh announced a target of reaching

[net zero by 2050](#) and [committed](#) to rapidly scaling up renewables and stopping the building of new unabated coal plants. The country will likely see a fundamental reshaping of its energy and economic development plans to align with the new pledges.

As foreign investors have turned away from coal, difficulty securing financing is also [intensifying](#). In February 2021, Japanese trading house Mitsubishi withdrew from Vietnam's [Vinh Tan 3](#) coal plant project, and in March 2021, the Japan Bank for International Cooperation alleged the 1.2 GW [Vung Ang-2](#) coal plant would be the final overseas thermal coal project to receive public and private funding from Japanese sources. With China, Japan, and South Korea—the forces behind much of Vietnam's coal sector growth to date—announcing an end to international coal finance in 2021, the feasibility of the PDP's projections was cast into doubt even before Vietnam's COP26 announcements. Meanwhile, strong public [opposition](#) to coal proposals and to the country's pro-coal interests remains constant.

PHILIPPINES

In October 2020, the Philippine Department of Energy (DOE) declared a moratorium on new coal plants that were not already in the permitting pipeline. The move was a milestone for the country, which has added half of its 10.3 GW of operating coal plants since 2015. Other than the 1.6 GW which had already been under construction, the Philippines saw no new coal enter construction or added to the grid in 2021. In addition, the amount of coal power considered in active pre-construction was more than halved, declining from 6.3 GW in 2020 to 2.6 GW in 2021. More proposed capacity (10.9 GW) has been cancelled in the country than is currently operating, and advocates have [urged](#) DOE to extend the moratorium to apply to the remaining 2.6 GW in pre-construction and 5.6 GW of shelved proposals.

In October 2021, the DOE released its Energy Plan 2020-2040 (PEP), which retained coal's role in the energy mix until 2040. At the COP26 climate conference, the Philippines partially committed to phasing out coal by 2040, but did not pledge to end investment in new coal power generation domestically and internationally. This development makes it possible for pre-construction plants to get built, and even opens

the possibility for the moratorium on permits to be lifted in the future.

Any new plans are likely to be vehemently opposed, as provinces, towns, and groups continue to ban or oppose projects. For example, in November 2021, the Mayor of Luna declared that her town, the surfing capital of the north, opposed the 670 MW [La Union](#) proposal, a project that had been touted by the previous mayor for its economic benefits. In late 2021, the Philippine Movement for Climate Justice (PMCJ) [called](#) for the Asian Development Bank's new [Energy Transition Mechanism](#) (ETM), launched in partnership with some Southeast Asian countries including the Philippines, to center climate justice and ensure urgency in its new climate finance framework.

As noted in GEM/CREA [analysis](#), the dwindled list of plants in pre-construction is also expected to continue facing difficulty in securing financing due to the retreat of international public funding for coal. Historically, Japanese, Korean, and Chinese financiers already played a small role in funding coal-fired power in the Philippines, and several major national corporations and domestic banks in the country are also moving away from coal.

INDIA

India has the most capacity of operating and proposed coal plants after China. At the height of the country's coal plant building from 2010 to 2017, the country increased its coal fleet by an average of 17.3 GW a year. Although India's 2018 National Electricity Plan (NEP) identified approximately 48 GW of coal for retirement by 2027, new higher-efficiency plants of greater capacity are still being built and retirements have been slow. However, the pace of new coal plants and proposals, as well as coal plant use, has generally slowed despite a post-Covid rebound in commissionings.

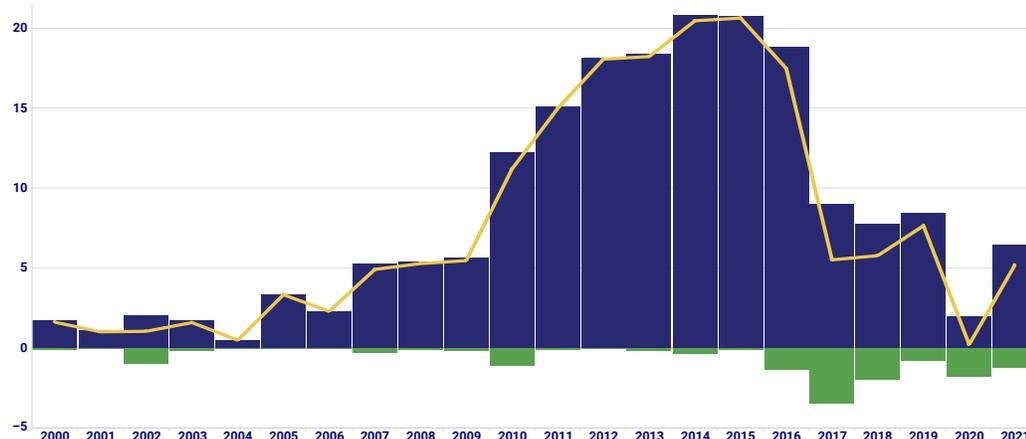
In 2021, continued cost decreases for renewable energy, coupled with worsening health and environmental issues, intensified discussions around stranded assets and closing existing coal plants. Both India's Power and Finance Ministers stated that India's oldest and dirtiest coal-fired power plants need to shut down. In November 2021, Prime Minister Narendra Modi announced India's aim to achieve net-zero emissions by 2070 and also pledged to attain 500 GW of installed electricity capacity from non-fossil fuel sources by 2030. Although the country's draft NEP released April 2021 noted new coal capacity may be needed, by December 2021, an expert committee tasked by the power ministry to update the NEP reportedly [recommended](#) that no new coal-based capacity be considered.

From 2015 to 2021, pre-construction coal power capacity decreased nearly 90%, from approximately 238.6 GW in 2015, to 36.6 GW in 2020—and down an additional 12.7 GW in 2021, to 23.8 GW. During that time, operating capacity increased 20%, from 192 GW in 2015, to 231.9 GW in 2021. In 2021, 6.4 GW went into operation at 11 plants in 7 states, and 1.26 GW was retired, for a net capacity addition of 5.1 GW. This annual addition was an increase from 2020's, which totaled less than 1 GW net, and likely a post-Covid rebound that does not negate the long-term decline in new coal power underway.

Only two new coal plant proposals surfaced in 2021. In December 2021, NTPC restarted the permitting process for the [Katwa Super Thermal Power Project](#), a site the West Bengal Power Development Corporation struggled to develop in the face of landowner opposition after receiving a plant permit in 2008, later transferred to NTPC in 2014. However, by early 2022, NTPC announced the new 1.32 GW project was “being reconsidered” and it was no longer before India's Expert Appraisal Committee. In December 2021, Essar Power M.P., which was in the process of being acquired by Adani, also started the permitting process for a 1.6 GW expansion at [Mahan Super Thermal Power Project](#). The Expert Appraisal Committee

Figure 14: Newly operating and retired coal plants in India by year, 2000–2021 (gigawatts)

Commissioned = purple, Retired = green, Net Capacity = yellow



granted Terms of Reference for the project in early 2022, after not having granted any in 2021.

In addition, the only permit granted in 2021 was the 2.4 GW [Talabira plant](#), a controversial NLC India greenfield project near a critically polluted area in Odisha. In addition, a 600 MW expansion at a plant transferred to NTPC in 2021, the [Jhabua plant](#), received a permit extension in May 2021. As an [analysis](#) by India's Legal Initiative for Forest and Environment noted, the historically low number of new projects approved reflects how difficult it is becoming to setup new coal plants in India: "It is a fact that banks as well as insurance companies are now moving away from coal-fired power plants due to concerns over climate change, high risk due to social opposition, and large number[s] of stranded assets where existing power plants are not able to find takers for the power generated."

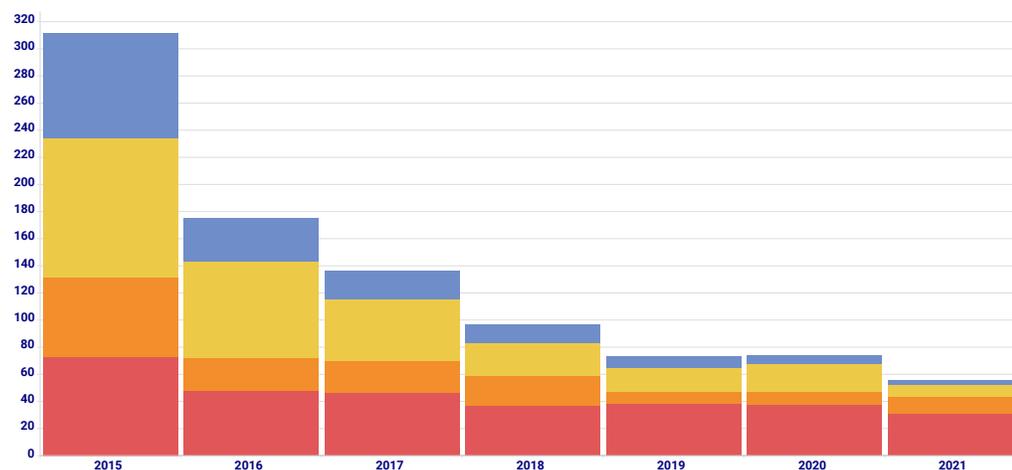
Perhaps the most significant headwind facing coal plants in India continues to be fierce citizen opposition. For example, in 2021, significant National Green Tribunal decisions following public interest litigation, Expert Appraisal Committee investigations, and spontaneous Tribunal action have brought the permits for projects under construction in question, including at the [Ramagundam plant Stage IV](#), [Ennore SEZ Super Critical plant](#), [Ennore plant](#), [North Chennai plant](#), and

[Uppur plant](#). Communities are fighting back against the many coal threats neglected by authorities and power generators. For example, Fly Ash Watch, a collective of individuals and organizations working on the social, environmental, and human health impacts of fly ash waste, released a [report](#) detailing the government's inaction in the face of severe accidents related to coal plants, such as a catastrophe at the [Sasan plant's](#) illegally constructed ash impoundment which claimed six lives. In early 2022, the National Green Tribunal [issued](#) important directives acknowledging the country's fly ash crisis.

Ultimately, despite signs of coal's phase down in India, more than 23.8 GW of planned capacity remains, with more than half (12.6 GW or 52%) permitted; 31.3 GW under construction; and few if any plants with firm retirement dates. The environment ministry introduced more stringent pollution standards for coal plants in 2015, but the deadline to comply with the standards has been repeatedly delayed. If a bold no-new-coal plan is finalized and implemented, this would be a hugely significant move for the country, as it would formalize energy and economic development plans in line with current phase-out trends and net-zero commitments. India's new [target](#) for clean power capacity could enable the country to start phasing down coal well before 2030, even assuming power demand growth continues at pre-pandemic rates.

Figure 15: Coal power under development and in construction in India, 2015–2021 (gigawatts)

Announced = blue, Pre-permit = yellow, Permitted = orange, Construction = red



SOUTH KOREA

In 2021, the Republic of Korea [announced](#) an official coal exit year of 2050, lagging far behind international standards that necessitate a 2030 phase out from [advanced economies](#) to meet the Paris Agreement. The country's Ministry of Trade, Industry and Energy (MOTIE) argued that it is "[impossible](#)" to phase out coal by 2030, despite having [signed](#) on to the Global Coal to Clean Power Transition Statement at COP26. Coal in 2030 is estimated to account for [21.8%](#) of the South Korean power mix, according to its [enhanced NDC](#), which aims for a 40% reduction from the 2018 level by 2030. The government has yet to update the number of coal power units that would have to shut down to meet the 40% reduction by 2030. The 2050 coal exit goals proclaimed by the Presidential Committee on Carbon Neutrality's [scenarios](#) and the state-owned utility [KEPCO group](#) are also both without clear schedules to execute the phase out.

Following President Moon's pledge to close ten aging coal units during his term, which ends in May 2022, the last four of the ten units were [shut down](#) in 2021, eventually to be converted to run on gas. The same year, however, the newly constructed [Shin Seocheon](#) and [Goseong](#) coal plants came online, marring the administration's anti-coal stance. In addition to the currently operating 38 GW of coal power capacity, construction on two more heavily contested new coal plants (4.18 GW) continues and is expected to be

completed in 2023 ([Anin](#)) and 2024 ([Samcheok](#)). By 2030, MOTIE plans to retrofit over half (24 units) of all coal power units (43) with 20% [ammonia co-firing](#). Such a turn towards ammonia as a key to transition away from coal, as opposed to shutting down and replacing coal with solar and wind, runs the risk of prolonging the plants' lifetimes and thus the country's dependence on coal.

The government [announced](#) a moratorium on public financing for overseas coal power projects in 2021. A major loophole is that [exceptions](#) still apply for retrofitting of plants already operating, projects equipped with carbon capture and storage (CCS), and transactions for projects that have already been approved. Domestically, financial institutions are moving away from new coal. The entirety of the 100 billion won corporate bond issued to finance Samcheok's construction was [unsold](#), and the company's credit rating [dropped](#) from AA- stable to A+. [Eight](#) major Korean insurance companies which accounted for far over half of the US\$52 billion coal underwritings by Korean Insurers have [committed](#) to ending all coverage for new coal plants. Nonetheless, most Korean financial institutions with coal exit pledges, including the National Pension Service, limit their actions to investment in new projects and [lack](#) comprehensive divestment policies.

JAPAN

In 2020, Japan pledged to achieve net zero emissions by 2050, and in 2021, announced it aimed to reduce GHG emissions 46% by 2030 compared with fiscal 2013 levels, a significant increase from its previous commitment for a 26% cut. New signs of a shift in Japan's corporate sector also emerged in the face of sustained civil society and local resident opposition. In April 2021, Kansai Electric Power and Marubeni scrapped the 1.3 GW [Akita plant](#) after a study concluded the project was no longer economically feasible. J-POWER and Ube Industries also announced the cancellation of the 1.2 GW [Ube plant](#), citing that electricity demand was expected to remain flat in the region and that renewable energy was expanding.

However, despite these pledges and trends, the country still had 5.4 GW of coal power capacity under construction by the end of 2021, the highest among OECD nations. The figure represents 10% of their currently operating coal capacity. In addition, 1.2 GW of new coal power went into operation at four plants in 2021, including integrated gasification combined-cycle (IGCC) units at the [Nakoso](#) and [Hirono](#) plants—which industry insiders allege are “clean coal” units because they release lower levels of pollutants.

Moreover, just as it appeared the country no longer had any new coal plant plans on the horizon, J-POWER announced plans to add equipment to gasify coal at the second of two old 500 MW units at its [Matsushima plant](#). As Japan Beyond Coal [highlighted](#), using nascent and uncertain coal technologies as an excuse to preserve coal-fired power generation will only lead to further long-term CO₂ emissions. Nonetheless, Japan's Ministry of the Environment has [not stepped up](#) to stop the project in its tracks.

A new [analysis](#) by TransitionZero argued that key climate strategies promoted by the Japanese Government—ammonia co-firing, coal gasification, and carbon capture and storage—come with a high cost and have limited carbon-reduction potential in the electricity sector. Under its [Sixth Strategic Energy Plan](#) approved in October 2021, Japan expects coal to

account for 19% of the country's energy mix for power generation in FY 2030, with total fossil fuels accounting for 41%. However, the government has neither committed to a coal exit date nor arranged a retirement schedule for the country's coal plants.

Civil society groups also have [concerns](#) with recent Japanese electric power system reforms, as one of the new markets created—the capacity market—effectively [subsidizes](#) certain energy sources, including coal, at the expense of renewable energy. The capacity market held its first auction in 2020 for power generation capacity available in FY 2024-25. In 2021, Japan held its second auction targeting capacity available in FY 2025-26 under [revised rules](#). In [December 2021](#), the Organisation for Cross-regional Co-ordination of Transmission Operator (OCCTO) released results showing that of the 165.34 GW bidding into the auction for four years from now, a whopping 40.98 GW was coal, including 9.68 GW at plants with inefficient and outdated combustion technologies. To achieve its targeted power mix by 2030 and net zero emissions by 2050, Japan must ensure coal power does not have any economic or other advantages locking it in for many years to come.

In June 2021, Japanese Prime Minister Yoshihide Suga committed to ending government support by the end of the year for overseas coal power projects led by domestic companies without emission-reduction technologies. The move appeared to finally bring Japan in line with other G7 nations. Pressure is now building for the country to honor the commitment and halt projects in [Bangladesh](#) and [Indonesia](#). Campaigners have been actively [engaged](#) in advocacy to halt all Japanese support for the 1.2 to 2.4 GW [Matarbari plant](#) in Bangladesh. In February 2022, Japanese trading house Sumitomo [changed course](#) and pulled out of the project's Phase II, turning [attention](#) to whether the Japanese government would still push forward. In Indonesia, the proposed [Indramayu](#) expansion could also be funded by JICA. Both projects are not in line with JICA's [April 2010](#) or [January 2022](#) “Guidelines for Environmental and Social Considerations.”

EU27 + UK

Coal is flickering out in the European Union's 27 member states and the United Kingdom, which are home to 5.6% of the world's operating coal capacity. 98.4 GW of the region's operating fleet has closed since 2010, with a record 12.9 GW retiring in 2021. Three countries retired more than 1 GW in 2021: Germany (5.8 GW), Spain (1.7 GW), and Portugal (1.9 GW). In fact, Portugal became coal free in November 2021, nine years before its targeted 2030 phase-out date, joining Belgium, Austria, and Sweden, the three other coal generating European countries to have successfully transitioned off coal power. The region's rapid shift away from coal has primarily been [driven](#) by the falling cost of renewables, the adoption of new pollution control standards, rising carbon dioxide emission costs, and sustained advocacy.

Only one new unit was commissioned in the region in 2021. At a time when most of the EU is focused on managing a quick and just energy transition, a 496 MW lignite-fired unit went into operation at PGE's [Turów plant](#) in Poland in May 2021. It is supplied by the controversial [Turów coal mine](#) and has already experienced multiple shutdowns. In addition, the 100 MW [Puławy plant](#) in Poland and the 660 MW [Ptolemaïda plant](#) Unit 5 in Greece are still under construction and may be the last new coal units the region sees. Greece's new coal unit should be short lived, as the Public Power Corporation (PPC) has [committed](#) to convert it to another fuel by 2025. Finally, Poland has one additional project proposed, the 500 MW [Leczna plant](#), although unofficial [reports](#) suggest it may not be built given EU climate policy and the declining economics of coal.

Attention is also now turning to the region's capacity that is not pledged or scheduled to retire by 2030: The 63.6 GW represents roughly half of the region's operating and mothballed capacity, and is based in Germany (24.8 GW), Poland (22.9 GW), the Czech Republic (6.3 GW), Bulgaria (4.9 GW), Romania (3.7 GW), Slovenia (.6 GW), and Croatia (.3 GW). However, in November 2021, Germany's new government agreed to strive to bring forward the country's 2038 coal exit target to 2030 and substantially accelerate its renewable energy rollout. Meeting this goal would bring the amount of capacity incompatible with meeting Paris Agreement goals down to 38.8 GW, or about one-third (31%) of the region's existing coal fleet. Other lagging countries are making progress in the right direction. For example, in January 2021, the Czech Republic's new government announced it was considering implementing a 2033 phase out date. Poland, which insists that its coal industry will continue until 2049 despite already facing substantial financial losses, stands in stark contrast to its European neighbors.

In February 2022, the Russian invasion of Ukraine highlighted the EU region's vulnerabilities due to its [reliance](#) on coal, oil, and gas imports from Russia. Coal's short and long-term landscape is likely to see important shifts depending on how the EU responds to recent geopolitical developments. As the head of the Ukrainian delegation to the Intergovernmental Panel on Climate Change (IPCC) Svitlana Krakovska [emphasized](#), climate change and conflict have the same roots—fossil fuels—and our dependence on them.

TURKEY

Planned coal plants in Turkey continued to decline in 2021, with 10.6 GW of planned coal power cancelled in 2021, and 87 GW cancelled since 2010. Coal proposals have faced an uphill battle due to large-scale public protests, lawsuits challenging their permitting, and dwindling financing options. Plants that have moved forward in construction and commissioning in Turkey have been reliant on international public coal financing, meaning future proposals will struggle for funding given pledges by China and the G20 to stop building new coal plants (see [sidebar](#) on page 15).

Most support for Turkey's proposals have come from Chinese companies and banks. In January 2021, Energy China announced that it had signed an Engineering, Procurement, and Construction (EPC) contract for the [Kirazlıdere plant](#), while the Chinese-financed [EMBA Hunutlu plant](#) was expected to begin operations by the end of 2021, although to date commissioning has not been announced.

Yet the prospects of international financing for new coal plants in Turkey looks increasingly unlikely. In September 2021, Chinese President Xi said that China will “not build new coal-fired power projects abroad.” Additionally, at the Glasgow climate summit, all G20 countries pledged to stop funding new coal plants, following separate, earlier announcements by the governments of Japan and South Korea. Combined, the announcements mean all previously significant sources of international public coal financing are no longer available.

In addition to shrinking international financing, coal proposals in Turkey also face strong domestic resistance. In 2021, the licenses and permits for several

coal proposals in Turkey were cancelled due to public opposition and lawsuits, as well as the withdrawal of the companies from the projects, including the proposed [Çayırhan B](#), [Ayas](#), [Ağan](#), and [HEMA Amasra](#) coal plants. The cancellation of Çayırhan B in particular is notable given that it is the first example of the Ministry of Energy's streamlined “boneless investment,” which was planned to arrange all the necessary permits for building a coal plant and tender it to private companies as investment-ready.

While proposed coal plants face an uncertain future, many completed coal plants are also struggling. The Czech-funded [Yunus Emre plant](#) was partially commissioned in 2016, operated for a brief 700 hours, and has been closed since due to a mismatch between the boiler design and the quality of the coal in the area—although plant developers also face [claims](#) of corruption over the plant's development. In 2018 the Turkish Savings Deposit and Insurance Fund (TMSF) took over the plant and [tried](#) to sell it in 2019, but no buyer for the plant has been found. Several other coal plants in Turkey were mothballed for several months in 2020–2021 due to outdated pollution controls and coal shortages, but were [recently](#) put back online without sufficient retrofits to the filtrations systems.

Just before the COP26 climate talks in Glasgow, the head negotiator for Turkey in the climate summits, Mehmet Emin Birpınar, [said](#) he believed there will be no new coal investments in Turkey due to economic reasons, as renewables are getting cheaper while coal is getting more expensive. According to Birpınar, there have not been any new applications for coal plant projects in the last two years, and projects are not feasible without international financing.

AUSTRALIA

At the COP26 climate summit, the Australian government [refused](#) to join more than 40 countries committing to phase out coal power, with the energy minister declaring Australia was focused on developing technology not “wiping out industries.” By the end of 2021, Australia had 25.1 GW of coal power capacity, of which only 7.1 GW, or 28%, was scheduled for retirement by 2030, leaving it far short of the complete coal phase out by 2030 in advanced nations required under the IEA’s 1.5C degree scenario.

Australia has not commissioned a new coal plant since 2009, and in 2021, the capacity of shelved coal plant proposals increased from 2.7 GW to 4.7 GW. The country’s only active proposal is Shine Energy’s 1 GW [Collinsville plant](#), which received an A\$3.6 million grant for a feasibility study despite the fact that Shine has never developed a power plant. The company recently [pitched](#) it as a “flexible” firming project to support the uptake of renewables. The pivot neatly aligns with federal government [moves](#) to subsidize such fossil fuel plans in the name of stabilizing the

grid. In addition, Shine made unfounded claims that coal can be burned with “zero emissions” via advances in currently ineffective and unproven technologies.

Meanwhile, the owners of coal plants face growing hurdles in keeping them operating. In February 2022, Origin Energy [announced](#) the closure in 2025 of the 2.8 GW [Eraring plant](#), Australia’s largest, seven years earlier than planned. According to the company, “[t]he economics of coal-fired power stations are being put under increasing, unsustainable pressure by cleaner and lower cost generation, including solar, wind and batteries.” The move brings the coal capacity with 1.5C compliant retirement date in Australia up from 28% to 40%.

The nation’s largest and oldest energy utility, [AGL Energy](#), was also trying to fend off a [takeover bid](#) by a consortium proposing to accelerate the 2033 and 2045 closures of its [Bayswater](#) and [Loy Yang A](#) plants, which total 4.8 GW, to 2030.

AFRICA AND MIDDLE EAST

Coal capacity in development in Africa and the Middle East fell from 21.1 GW in 2020 to 16.1 GW in 2021, a one-year decline of 23%, and a decline of 73% since 2015, when it was 60.2 GW. Meanwhile, only 2.4 GW of new coal was commissioned or recommissioned in 2021 at plants in Senegal, the United Arab Emirates, and South Africa, bringing the region's operating coal capacity from 49.8 GW in 2015 to 56.7 GW by 2021.

In Senegal, the controversial 125 MW [Sendou plant](#) was recommissioned after facing years of issues and opposition, but the government announced gas conversion plans for the plant in October 2021.

Similarly, in the United Arab Emirates, the second dual-fuel unit at the [Hassyan plant](#) was completed in May 2021, but by February 2022, the complex was converted to run solely on gas in line with Dubai's 2050 net-zero goals. In terms of other UAE proposals, in 2021, Utico confirmed it was exiting the [RAK plant](#) "clean coal carbon capture" project it had signed with Shanghai Electric in 2014, with sights on [hydrogen production](#) instead. And with no recent developments on the proposed [Ras al-Khaimah](#) and [Ajman](#) plants, the United Arab Emirates may have seen the first and last of its coal power generation years in 2020-21.

In South Africa, 1.5 GW of additional coal capacity was commissioned at the long delayed and over budget [Kusile](#) and [Medupi](#) plants, bringing South Africa's operating coal capacity to 43.4 GW in 2021, a whopping 76% of the operating coal capacity in Africa and the Middle East. Additionally, 2 GW of coal power projects were presumed cancelled in 2021 in the country, including the controversial 300 to 600 MW [Khanyisa plant](#). A court ruled in May 2021 that the plant's environmental authorization had lapsed in 2018, while water licenses for the plant were scrapped in 2020 due to inadequate public participation.

The cancellations leave only a few gigawatts of coal capacity under development in South Africa, which includes another 2.4 GW in construction at [Kusile](#). Much of the remaining capacity is made up of the

proposed 1.32 GW (or greater) [project](#) at the proposed Musina-Makhado Special Economic Zone (MMSEZ). The plant is set to be [replaced](#) with cleaner energy plans after China confirmed it would no longer be funding it in November 2021. Also in November 2021, the African Climate Alliance, Vukani Environmental Justice Movement in Action, and groundWork filed a landmark constitutional [lawsuit](#) challenging the 1.5 GW of new coal generation [proposed](#) in the Minister of Energy's determination for new coal capacity and the country's underlying 2019 [Integrated Resource Plan for Electricity \(IRP\)](#): 750 MW in 2023 and another 750 MW in 2027.

Overall, the challenge of decarbonizing the country's coal-reliant energy system is made even more difficult by the reliability issues plaguing the grid, the dire financial situation of the state-owned utility Eskom, and the pressure from government and industry to move towards gas power infrastructure. South Africa's Just Energy Transition Partnership launched in November 2021 at COP26 represents an [unprecedented opportunity](#) to make progress and a potential model for other nations: An initial US\$8.5 billion of international climate finance could support just transition interventions, power sector decarbonization, and economic diversification into future energy sectors, including electric vehicles and green hydrogen.

As noted above, the implementation of China's decision to ditch financial support for coal projects will play an essential role in whether many of the region's coal projects advance or not. Zimbabwe has the most coal capacity under development in Africa with 5.9 GW, and most of it is dependent on uncertain Chinese financing. For example, in June 2021—before China's announcement—the Industrial and Commercial Bank of China (ICBC) said that it wouldn't be moving forward with financing for the proposed [Sengwa plant](#). However, in September 2021, project sponsor RioZim claimed that the company had not received any communication regarding ICBC pulling out of the project, and that the deal was still on track.

Serious uncertainty is playing out in other countries, such as in Mozambique, where Ncondezi Energy signed an engineering, procurement and construction (EPC) contract for the 300 MW [Ncondezi](#) project and coal mine in Tete, Mozambique, with China Machinery Engineering Corporation in September 2021. By January 2022, its shares fell 15% after the company announced it was awaiting further clarity on China's position before progressing with the project.

Although most countries are clearly moving away from coal, many commitments to long held proposals remain. For example, in May 2021, Niger's Prime Minister Ouhoumoudou Mahamadou announced a government commitment to increase the rate of household access to electricity to 30% by 2026, reiterating its intention to build the 200 MW [Salkadamna plant](#). In June 2021, Tanzania's President Samia Suluhu Hassan also called for implementation of the 600 MW [Mchuchuma plant](#), adding the government would not hesitate to act if the Chinese investor didn't take it on. However, Africa and the Middle East ultimately did not see a single new previously unconsidered plant proposed in 2021. The fact highlights that, despite the region's increasing energy demand, it appears to be moving away from coal as a power source.

The region's most surprising coal project revival was in the Middle East, in Iran, where the proposed 650 MW [Tabas plant](#) has been on-and-off again for decades. In late 2021, the head of Iran's Thermal Power Plants Holding Company (TPPH) said

construction was "on the agenda," with the units expected by 2024. An open coal mine was [launched](#) in July 2021 to feed what would be the country's first coal plant if completed. The senior energy official also announced that Iran has to build [5 GW](#) of coal-fired power capacity in the coming years due to address gas' seasonal limitations and diversify the fuel mix.

Meanwhile, many companies with proposals in Africa continued to move away from coal, jeopardizing the fate of many new coal plants. For example, in 2021, Australia's Intra Energy Corporation—the company behind Tanzania's shelved [Ngaka](#) proposal—transferred ownership of its Tanzanian coal interests to a Tanzanian company. In addition, Ireland based Kibo Energy, which held interests in plants proposed in [Mozambique](#), [Tanzania](#), and [Botswana](#), announced it intended to dispose of its coal assets following a shift in international climate policies.

As highlighted by the operating plant conversions in Senegal and the UAE, countries are also pivoting from coal to gas, as has been the case in many other parts of the world. In November 2021, the Ivory Coast government renounced the country's only coal project—the Chinese-funded 700 MW [San Pedro Port plant](#)—noting it would pursue gas plans instead, despite calls for renewables. The international community can support the region in moving away from fossil fuels through provision of public and private clean energy finance and other forms of support.

LATIN AMERICA

Latin America had 3.0 GW of coal power in development in 2021, a 30% decrease from 2020 and a long-term decline of 70% from the 10.1 GW that was under development in 2015. While coal power development declines, the conservative governments of Brazil and Mexico have pushed for the increased use of coal. Conversely, Chile is planning a coal exit, Colombia scrapped its coal plant proposals, and Panama is closing old, polluting plants.

In Brazil, the government under President Jair Bolsonaro [proposed](#) US\$3.9 billion in funding in August 2021 to support the country's coal mines and to “modernize” its coal plants. Shortly after, in January 2022, Bolsonaro signed a law extending subsidies for the [Jorge Lacerda plant](#) from their original expiration date of 2027 to 2040, allowing the plant to continue selling power at above-market prices. Despite this, [recent power auctions](#) in Brazil were all awarded to renewable energy projects, even with 1.3 GW of coal power among the bidders. In 2021, France-based energy company Engie said it planned to sell its proposed [Pampa Sul plant](#) in accordance with its announced transition towards carbon neutrality.

In Mexico, the election of President Andrés Manuel López Obrador in 2018 provoked a decided shift in federal policy toward fossil fuels despite Mexico's stated commitment to decarbonization. However, in November 2021, a top official of Mexico's state-owned electric utility indicated that Mexico has no plans to build new coal-fired power plants, implying that the 1.4 GW [Coahuila plant](#) has been cancelled.

In 2019, the Chilean government announced a decarbonization plan designed to shut down the nation's entire coal fleet by 2040, with 18 of the country's 28 coal-fired units now expected to retire as soon as 2025. In September 2021, Chile was part of the coalition of national governments that launched the No New Coal Power Compact, which requires supporters to cease permitting and construction of new coal power plants by the end of 2021.

In Colombia, the proposed 1,125 MW [La Luna plant](#) and 300 MW [Termobijao plant](#) are no longer listed in future government energy plans and appear to be shelved. Still, Colombia remains one of the world's leading producers and exporters of coal, significantly outpacing all other South American countries in both categories.

In June 2021, Panama's president [announced](#) that the country's dirtiest power plants (including the [Bahía las Minas](#) and [Cobre Panamá](#) coal plants) would need to be retired or converted to cleaner fuel by 2023. In September 2021, Bahía las Minas' majority shareholder, Celsia, [said](#) the plant would be decommissioned before 2023.

Overall, the amount of coal power capacity under construction in Latin America remained at zero in 2021, with no new coal plants commissioned, suggesting that the region may already have seen its last new coal plant despite the best efforts of pro-coal governments.

APPENDIX A

Coal Power Capacity in Development and Operating by Country (megawatts)

Country	Pre-construction	Construction	All Active Development	Shelved	Operating	Cancelled (2010–2021)
Albania	0	0	0	0	0	800
Argentina	0	0	0	120	375	0
Australia	1,000	0	1,000	4,720	24,677	8,716
Austria	0	0	0	0	0	800
Bangladesh	10,890	6,734	17,624	3,440	1,845	22,845
Belarus	0	0	0	0	0	1,400
Belgium	0	0	0	0	0	1,100
Bosnia and Herzegovina	3,530	0	3,530	550	2,073	1,020
Botswana	900	0	900	2,400	732	4,650
Brazil	1,666	0	1,666	600	3,177	4,390
Brunei	0	0	0	0	220	0
Bulgaria	0	0	0	0	4,829	2,660
Cambodia	700	1,015	1,715	0	705	4,880
Canada	0	0	0	0	5,680	1,500
Chile	0	0	0	0	4,941	9,527
China	158,446	92,319	250,765	36,266	1,064,401	622,262
Colombia	0	0	0	1,585	1,634	1,250
Croatia	0	0	0	0	210	1,300
Czech Republic	0	0	0	0	7,406	1,380
Democratic Republic of Congo	0	0	0	500	0	0
Denmark	0	0	0	0	1,180	0
Djibouti	0	0	0	150	0	0
Dominican Republic	0	0	0	0	1,064	2,040
Egypt	0	0	0	0	0	15,240
El Salvador	0	0	0	0	0	370
Eswatini	300	0	300	500	0	1,600
Ethiopia	90	0	90	0	0	0
Finland	0	0	0	0	1,468	385
France	0	0	0	0	3,107	180
Georgia	0	0	0	300	0	0
Germany	0	0	0	0	38,356	20,413
Ghana	0	0	0	0	0	2,100
Greece	0	660	660	0	1,925	1,250
Guadeloupe	0	0	0	0	102	0
Guatemala	0	0	0	0	1,010	300
Guinea	0	0	0	0	0	330

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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 (2010–2021)
Honduras	0	0	0	0	105	0
Hong Kong	0	0	0	0	6,110	0
Hungary	0	0	0	0	944	3,520
India	23,893	31,340	55,233	20,450	231,947	587,231
Indonesia	10,840	15,419	26,259	11,220	40,162	32,770
Iran	0	650	650	0	0	0
Ireland	0	0	0	0	915	0
Israel	0	0	0	0	4,900	1,260
Italy	0	0	0	0	6,956	6,795
Ivory Coast	0	0	0	0	0	700
Jamaica	0	0	0	0	0	1,140
Japan	500	5,470	5,970	0	50,114	12,177
Kazakhstan	636	0	636	130	11,999	2,260
Kenya	1,050	0	1,050	960	0	730
Kosovo	0	0	0	0	1,290	830
Kyrgyzstan	0	0	0	600	910	0
Laos	6,126	0	6,126	600	1,878	700
Latvia	0	0	0	0	0	435
Madagascar	60	0	60	0	120	0
Malawi	300	0	300	220	0	3,100
Malaysia	0	0	0	0	13,280	4,900
Mauritius	0	0	0	0	195	110
Mexico	1,400	0	1,400	0	5,378	1,850
Moldova	0	0	0	0	1,610	0
Mongolia	7,080	50	7,130	950	960	2,010
Montenegro	0	0	0	0	225	1,664
Morocco	0	0	0	0	4,257	1,670
Mozambique	1,350	0	1,350	900	0	3,770
Myanmar	0	0	0	0	160	21,225
Namibia	0	0	0	0	120	550
Netherlands	0	0	0	0	4,152	1,311
New Zealand	0	0	0	0	500	0
Niger	200	0	200	100	0	400
Nigeria	0	0	0	2,400	285	2,145
North Korea	0	0	0	0	3,700	300
North Macedonia	0	0	0	0	800	730
Oman	0	0	0	1,200	0	0
Pakistan	4,082	3,300	7,382	163	4,968	24,040

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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 (2010–2021)
Panama	0	0	0	0	426	0
Papua New Guinea	0	0	0	52	0	0
Peru	0	0	0	0	135	135
Philippines	2,670	1,621	4,291	5,600	10,557	10,980
Poland	500	100	600	0	30,180	22,383
Portugal	0	0	0	0	0	0
Romania	0	0	0	0	4,675	5,705
Russia	2,193	335	2,528	326	41,770	12,530
Senegal	0	0	0	0	155	850
Serbia	1,350	350	1,700	0	4,405	1,445
Slovakia	0	0	0	0	769	885
Slovenia	0	0	0	0	1,069	0
South Africa	1,470	2,400	3,870	600	43,409	14,330
South Korea	0	4,180	4,180	0	38,114	7,500
Spain	0	0	0	0	3,127	800
Sri Lanka	0	0	0	2,400	900	3,500
Sudan	0	0	0	0	0	600
Sweden	0	0	0	0	0	0
Syria	0	0	0	0	60	0
Taiwan	0	0	0	0	19,244	14,000
Tajikistan	0	0	0	300	400	350
Tanzania	600	0	600	690	0	1,075
Thailand	600	0	600	56	5,988	11,670
Turkey	10,020	1,465	11,485	995	18,773	86,993
Ukraine	660	0	660	0	19,525	2,060
United Arab Emirates	0	1,200	1,200	1,200	1,200	3,070
United Kingdom	0	0	0	0	6,328	9,968
United States	300	0	300	0	226,978	28,168
Uzbekistan	0	0	0	150	2,493	300
Venezuela	0	0	0	0	0	2,800
Vietnam	20,130	6,840	26,970	3,540	22,717	44,915
Zambia	0	0	0	0	330	2,240
Zimbabwe	4,570	990	5,560	350	950	7,240
Total	280,102	176,438	456,540	107,283	2,074,732	1,751,502

APPENDIX B

The countries below are sorted by total pre-construction coal capacity, from lowest to highest. The capacities exclude proposals that are presumed shelved or cancelled (see Global Coal Plant Tracker [definitions](#)).

The six countries with the highest pre-construction capacities represent 84% of the global pre-construction capacity.

34 Countries with Pre-construction Coal Capacity as of January 2022 (megawatts)

Country	PPCA Member?	Permitted	Pre-permit	Announced	Figure 8 Category
Madagascar	No	0	60	0	Non-OECD
Ethiopia	Yes	0	0	90	Non-OECD
Niger	No	0	0	200	Non-OECD
United States	No	0	0	300	OECD / EU
Eswatini	No	0	300	0	Non-OECD
Malawi	No	0	300	0	Non-OECD
Poland	No	0	500	0	OECD / EU
Japan	No	0	500	0	OECD / EU
Tanzania	No	0	0	600	Non-OECD
Thailand	No	0	600	0	Non-OECD
Kazakhstan	No	0	636	0	Non-OECD
Ukraine	Yes	0	660	0	Non-OECD
Cambodia	No	700	0	0	Non-OECD
Botswana	No	450	150	300	Non-OECD
Australia	No	0	1,000	0	OECD / EU
Kenya	No	0	1,050	0	Non-OECD
Mozambique	No	0	300	1,050	Non-OECD
Serbia	No	0	350	1,000	Non-OECD
Mexico	Yes	0	0	1,400	OECD / EU
South Africa	No	0	1,470	0	Non-OECD
Brazil	No	940	726	0	Non-OECD
Russia	No	0	450	1,743	Non-OECD
Philippines	No	1,470	1,200	0	Non-OECD
Bosnia and Herzegovina	No	450	1,250	1,830	Non-OECD
Pakistan	No	1,290	2,752	40	Non-OECD
Zimbabwe	No	1,120	750	2,700	Non-OECD
Laos	No	2,000	0	4,126	Non-OECD
Mongolia	No	450	5,980	650	Non-OECD
Top 6 Countries by Total Pre-Construction Capacity (84% Of Global Total)					
Turkey	No	3,420	4,100	2,500	OECD / EU
Indonesia	No	2,020	6,840	1,980	Non-OECD
Bangladesh	No	0	4,540	6,350	Non-OECD
Vietnam	No	5,060	12,070	3,000	Non-OECD
India	No	12,630	8,343	2,920	Non-OECD
China	No	36,795	46,737	74,914	China

APPENDIX C: CLIMATE ANALYSIS METHODOLOGY

“Business-as-usual” retirement ages were based on the average age of coal power plants at retirement, or the 90th percentile of the age of operating plants, whichever was greater. For new projects without an announced commissioning date, we spread commissioning over the next 10 years, differentiating by the current status of the project.

Countries in which capacity has already peaked were assumed to make progress towards the phase out year immediately. In countries that are still building new capacity, capacity was assumed to start falling towards the target five years after the last planned project is completed.

Carbon neutrality targets were conservatively assumed to imply a phase-out of (unabated) coal by the target year.

For China, the 2060 carbon neutrality target was assumed to imply 180 GW of coal-fired capacity in 2050, based on the [Tsinghua ICCSD roadmap](#). Coal power capacity was assumed to peak in 2030, at 1,260 GW, based on a [forecast](#) by the China Electricity Council.

The U.S. 2035 Clean Power goal was assumed to mean the phase-out of (unabated) coal power by that year.

The 1.5 degree pathway is an updated version of the Global Energy Monitor & Greenpeace [pathway](#) published in 2018, following the same emission budget and methodology, but with plant lifetimes updated to reflect changes in coal plant status. The pathway assumes rapid reductions in plant utilization factors, meaning that emissions fall significantly faster than capacity.