

Boom and Bust Coal

2023

TRACKING THE GLOBAL COAL PLANT PIPELINE

Global Energy Monitor, CREA, E3G, Reclaim Finance, Sierra Club, SFOC,
Kiko Network, CAN Europe, Bangladesh Groups, ACJCE, Chile Sustentable



ABOUT THE COVER

The cover photo shows activists staring down a bucket wheel excavator at the [Garzweiler](#) open-pit coal mine in Lützerath, Germany, where the mine's planned expansion would raze nearby villages and evict local residents. Photo © Bernd Lauter / [Greenpeace](#), January 2023.



Global Energy Monitor

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Global Energy Monitor (GEM) develops and shares information on energy projects in support of the worldwide movement for clean energy. By studying the evolving international energy landscape, and creating databases, reports, and interactive tools that enhance understanding, GEM seeks to build an open guide to the world's energy system. 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 is an independent climate change think tank with a global outlook. They work on the frontier of the climate landscape, tackling the barriers and advancing the solutions to a safe climate. Their goal is to translate climate politics, economics and policies into action. For more information, visit www.e3g.org.



RECLAIM FINANCE

Reclaim Finance is an NGO affiliated with Friends of the Earth France. Reclaim Finance exposes the climate impacts of financial players, denounces the most harmful practices and puts its expertise at the service of public authorities and financial stakeholders who desire to bend existing practices to ecological imperatives. For more information, visit reclaimfinance.org.



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.



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. SFOC conducts research on solutions for reducing greenhouse gas emissions and expanding renewables, and coordinates 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 level, 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. Note: CAN Europe only contributed to information on Türkiye.



BANGLADESH GROUPS (BAPA & WKB)

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.



Alliance for Climate Justice & Clean Energy

ALLIANCE FOR CLIMATE JUSTICE AND CLEAN ENERGY (ACJCE)

The Alliance for Climate Justice and Clean Energy (ACJCE) is a civil society network endeavoring for a transition in Pakistan's energy sector. ACJCE includes six organisations, namely Policy Research Institute For Equitable Development (PRIED), Pakistan Fisherfolk Forum (PFF), Alternative Law Collective (ALC), Indus Consortium (IC), The Knowledge Forum (TKF), and Alternate Development Services (ADS). For more information, visit acjce.com.



CHILE SUSTENTABLE

Created in 1997, Fundación Chile Sustentable is an initiative of environmental organizations, academics, and citizens dedicated to the analysis and design of new public policies on water, energy, and biodiversity in support of Chile's transition to a green, democratic, and socially equitable society capable of restoring ecosystems and facing the climate crisis. Through citizen proposals and campaigns, it has influenced the achievement of new laws for environmental protection, water security, and energy transition in Chile. For more information, visit www.chilesustentable.net.

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 upheaval in the global energy sector in 2022 created renewed speculation of a “coal comeback,” but the end of coal nevertheless remains in sight. Today, nearly one-third of operating global coal capacity (580 gigawatts (GW)) has a phase out date, and much of the remaining capacity (1,400 GW) is under the purview of carbon neutrality targets. Just 5% of the global coal fleet stands beyond the scope of a national commitment—a reality nearly unthinkable a decade ago.

But the pace of the global coal phase out is not yet compatible with the goals of the Paris climate agreement. Last month, the UN Secretary-General António Guterres [outlined](#) an “Acceleration Agenda,” renewing calls for an immediate [end to new coal](#), and for a phase out of existing coal by 2030 in developed countries and 2040 in the rest of the world. Under such a scenario, only 70% of OECD operating coal capacity is currently on pace (330 GW), and outside the OECD, only 6% of coal capacity has a known closure date before 2040 (93 GW). In terms of new coal, while coal under development—or coal in pre-construction and construction—has collapsed by two thirds since the Paris agreement, nearly 350 GW of new capacity is still proposed across 33 countries, and an additional 192 GW of capacity is under construction. China’s pre-construction and construction capacity surpassed the rest of the world’s in 2021, and the gap widened in 2022. New coal capacity under development in China increased by 38% (266 GW to 366 GW), while the capacity in the rest of the world decreased by 20% (214 GW to 172 GW). China now accounts for two thirds (68%) of global capacity under development, up from 55% a year ago.

Urgent action is necessary to ensure an end to coal and a fighting chance at a livable climate. The IPCC has stated the necessity for “rapid and deep, and

in most cases immediate greenhouse gas emission reductions.” To accomplish this, countries need to translate announcements into plant-by-plant retirement plans as well as ramp up phase out commitments. Details on how current and future policies and funds will be implemented to impact coal retirement dates and ensure a swift and equitable end to new coal will be essential. The internationally-agreed coal power [phase down](#) is a work in progress. But whatever the case, 2022 provided an object lesson in the endemic weaknesses of the coal sector. Despite some seemingly favorable conditions—oil and gas shortages, outages at nuclear plants, and severe weather events that curbed hydropower—the “coal comeback” failed to materialize in much of the world even if coal is not yet dead.

Key Developments of 2022

- Globally, the operating coal fleet grew by 19.5 GW in 2022. More than half (59%) of the 45.5 GW of newly commissioned capacity was in China. Outside China, the global coal fleet continued to shrink, although at a slower rate than in previous years.
- After the European Union retired a record high of 14.6 GW of coal capacity in 2021, the gas crisis and Russia’s invasion of Ukraine prompted a slowdown in coal retirements, with only 2.2 GW retired in the last year. Temporary restarts and extensions are generally expected to wind down in the next few years, and what appeared to be a spike in coal capacity added only 1% to total EU coal generation in 2022.
- The U.S. led coal retirements with 13.5 GW retired in 2022. To meet national energy and climate goals, continued momentum away from coal needs to accelerate.
- The Group of Seven major industrial countries (G7) accounts for 15% (323 GW) of the world’s operating coal capacity and none of the pre-construction coal capacity aside from [one proposal](#) in Japan. In 2022, the group [pledged](#) to phase out [unabated](#) coal and “predominantly” decarbonize their electricity sectors by 2035; each country should now implement a 2030 coal phase out to ensure the G7 delivers. The Group of Twenty (G20) is home to 93% of the world’s operating coal capacity (1,926 GW) and 88% (305 GW) of the pre-construction coal capacity.
- In the past two years, the international community has [committed](#) US\$45.2 billion for the coal-to-clean transition, with the biggest financial packages going to [South Africa](#), [Indonesia](#), and [Vietnam](#).
- Although international public coal financing is essentially dry as a funding tap, support for coal can [arrive](#) through a variety of financial pipes. For the era of coal to come to an end, all these pipes must be shut off.

- In 2022, 99 private financial institutions adopted new or updated coal policies. However, the majority of policies are insufficient to align banks, insurers, and investors with climate science. Only 12 of these new or updated policies are strong enough to halt support for the developers of new coal mines and power plants, or set deadlines to end all coal power-related finance in the timeframe required.
- All world regions outside Central Asia and China saw a decline or plateau in the scale of new coal under consideration in 2022. There are no new coal projects under consideration in the European Union and North America. The scale of proposed new coal power capacity outside China is down by 84% since 2015, with reductions of 90% in OECD/EU and 83% in non-OECD countries.
- India sent mixed signals regarding its future coal use. The country has 28.5 GW of coal power capacity planned, up 2.6 GW in 2022, and 32 GW of coal power capacity under construction.
- Total coal power capacity under development (including announced, pre-permit, permitted, and construction stages) has been around 500 GW since 2019, a significant collapse from the 1,576 GW under development globally in 2014. The figure hit a record low of 479.4 GW in 2021, and inched back up to 537.1 GW in 2022, a 12% one-year increase led by China.
- For the first time since data collection began, total pre-construction coal capacity has fallen below 100 GW in the world outside China (96.7 GW). Only 20 new coal plant proposals were initiated or restored in the entire world outside China in 2022. A handful of other projects previously under construction that had been presumed shelved or abandoned also appeared back on the table in India.
- The development of overseas coal plants backed by China has slowed. 19% (21 GW) of the approximately 108 GW of China-backed overseas coal capacity in pre-construction and construction as of China's September 2021 [pledge](#) has been cancelled or is presumed cancelled, but nearly 40% moved forward.
- Phasing out operating coal power by 2040 would require an average of 117 GW of retirements per year, or four and a half times the capacity retired in 2022. An average of 60 GW must come offline in OECD countries each year to meet their 2030 coal phaseout deadline, and for non-OECD countries, 91 GW each year for their 2040 deadline. Accounting for coal plants under construction and in consideration (537.1 GW) would require even steeper cuts.

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GLOBAL DATA SUMMARY

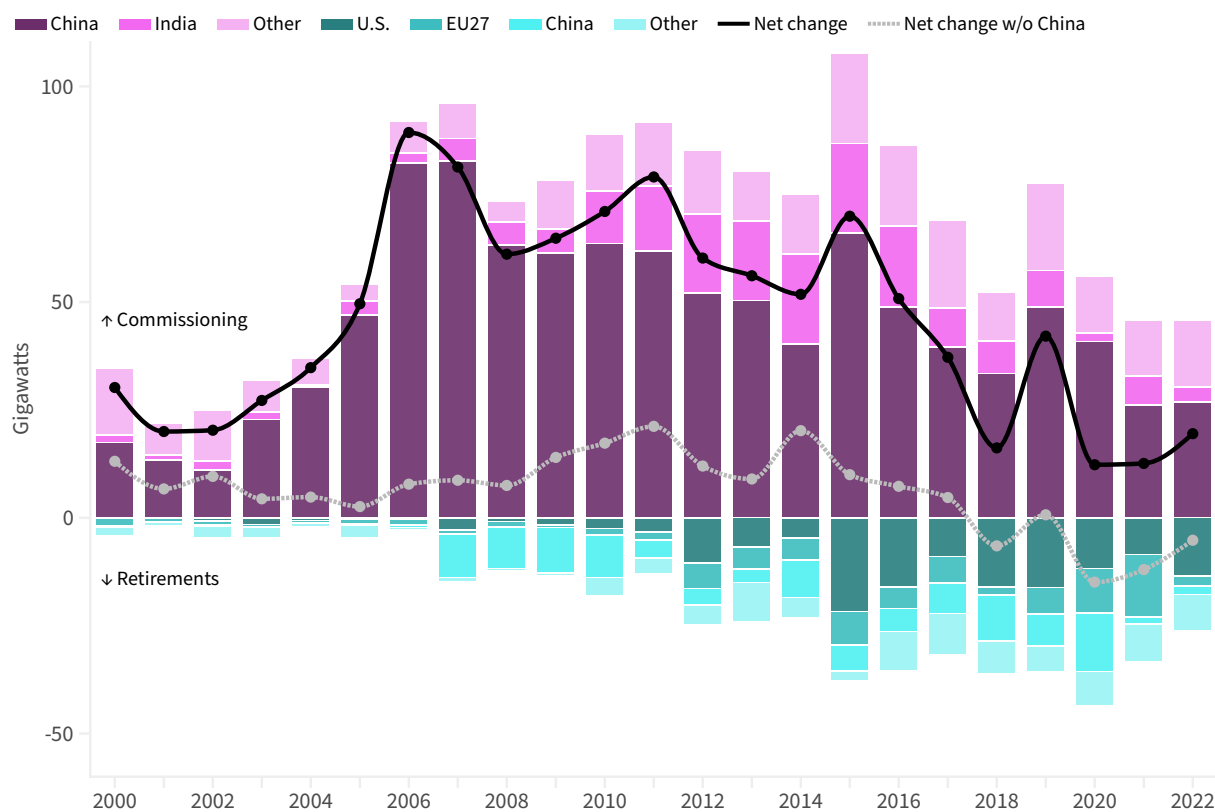
China’s steady new coal plant additions (26.8 GW) offset coal plant retirements in the rest of the world (23.9 GW) in 2022 and resulted in an uptick in overall global capacity (Figure 1). In total, 45.5 GW of global coal power capacity was commissioned in 2022 while 26 GW was retired, causing a net increase in the global coal fleet of 19.5 GW (black line). In 2021, the net increase was 12.6 GW, resulting from an equal number of new capacity additions as in 2022 (45.6 GW) but a greater number of global retirements (33 GW).

China’s new coal plant additions made up 59% of global additions in 2022 (Figure 1). The country retired less than 3 GW of coal power capacity in 2022, one of its lowest annual retirements in more than a decade.¹

Some countries have been scaling back their coal plans for years, leading global coal power capacity outside China to remain stable or decline every year since 2018 (dotted line). However, this trend slowed in 2022 from the rate of retirements. After a record high of 14.6 GW retired in 2021, the European Union (EU) dropped to an almost record low of 2.2 GW retired in 2022—as explained in the EU and United Kingdom (UK) section below—representing only 8% of the global capacity retired that year. Meanwhile, the U.S. closed some of the gap with 13.5 GW retired in 2022.

In total, 17 countries retired coal capacity in 2022, the same number as in 2021. Outside of the U.S. and China, only four countries retired or converted more

Figure 1: Newly operating and retired coal capacity and the net change, 2000–2022



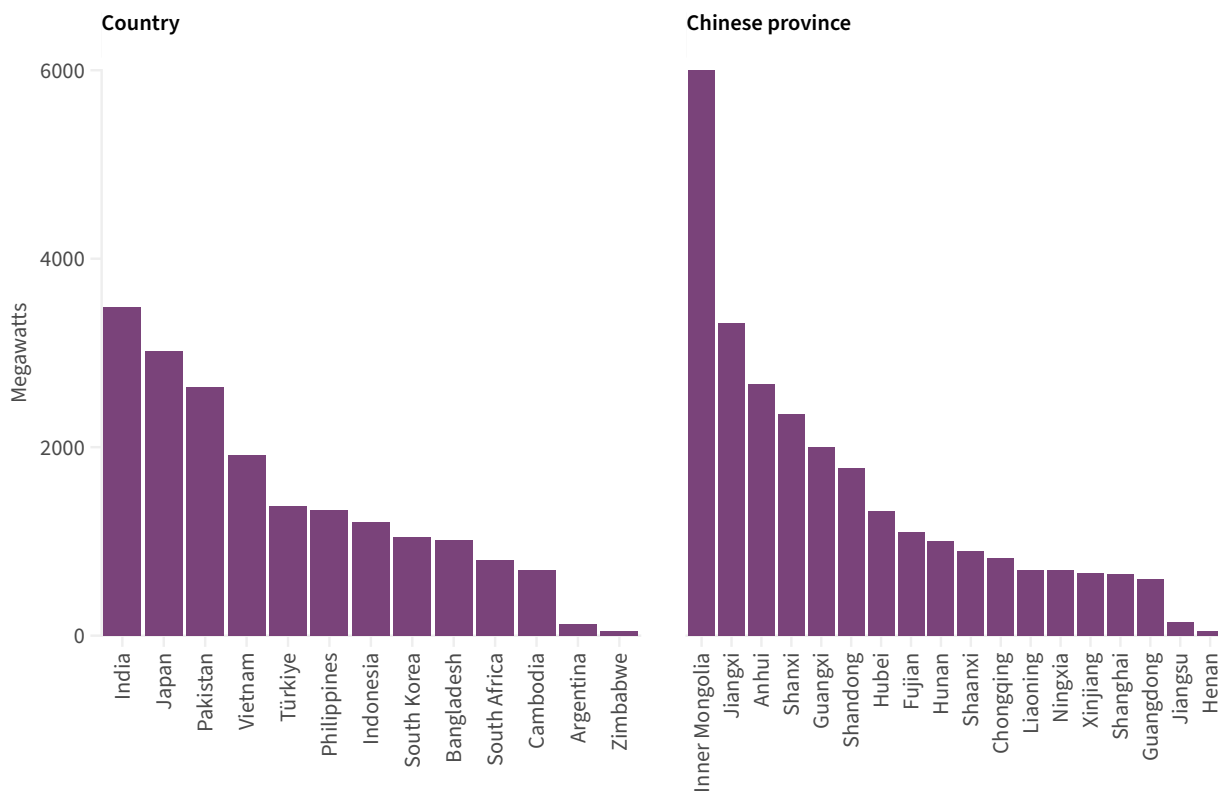
1. This only includes capacity retired at units 30 MW and above. Based on provincial Development and Reform Commission and NDRC data available as of March 2023, at least 4.1 GW of coal capacity retired at units 4.5 MW and above in 2022.

than 1 GW of coal capacity during the year: Ukraine (1.3 GW), the United Arab Emirates (1.2 GW), South Africa (1.2 GW), and the United Kingdom (1.1 GW). In 2022, Peru and the [United Arab Emirates](#) retired or converted their last operating coal plants, joining four other countries that have phased out coal (Austria, Belgium, Sweden, and Portugal).

In total, 14 countries commissioned new coal power in 2022. More than half (59%) of the newly commissioned capacity was in China (25.2 GW), with a remaining 16% in South Asia (India, Pakistan, and Bangladesh), 11% in Southeast Asia (Vietnam,

Philippines, Indonesia, and Cambodia), 9% in East Asia (Japan and South Korea), and 5% in other regions. The annual capacity additions for many individual Chinese provinces topped the capacity additions of entire countries. Inner Mongolia (6 GW) surpassed India (3.5 GW) despite India being the country with the most coal commissioned in 2022 after China (Figure 2). In fact, Inner Mongolia nearly had more new capacity than the next two countries after China combined (India and Japan). China’s dominance is expected to continue into 2023 and beyond when looking at the coal power capacity being developed.

Figure 2: Coal capacity beginning operation in 2022 by country outside of China and by Chinese province

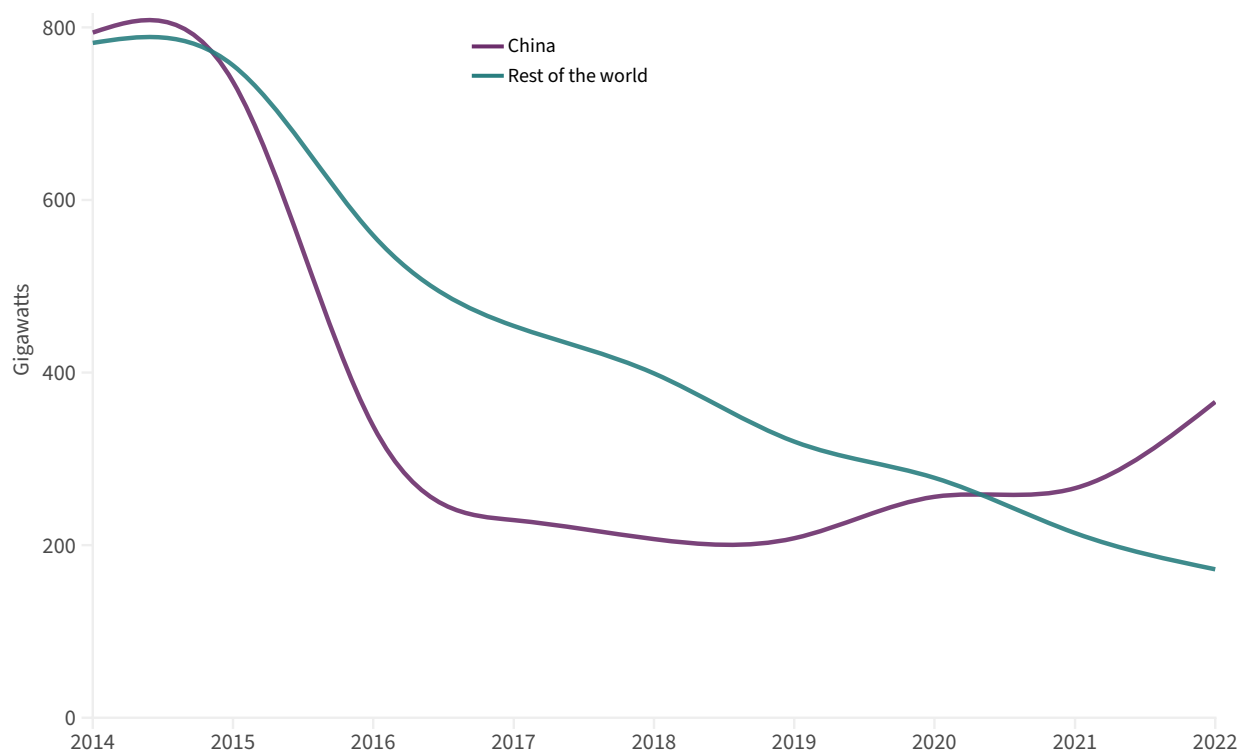


Total coal power capacity under development (including announced, pre-permit, permitted, and construction stages) has been around 500 GW, plus or minus 50 GW, since 2019, a significant collapse from the 1,576 GW under development globally in 2014. The figure hit a record low of 479.4 GW in 2021, and inched back up to 537.1 GW in 2022, a 12% one-year increase.

China is responsible for this increase. In 2021, the capacity under development in China started exceeding the capacity under development in the rest of the

world for the first time in years (Figure 3). In 2022, this gap widened, with the capacity in China increasing by 38% (265.6 GW to 365.5 GW), and the capacity in the rest of the world decreasing by 20% (213.8 GW to 171.5 GW). China's share of coal under development increased from 55% in 2021 to 68% in 2022, meaning that China accounts for over two-thirds of the capacity under development in the world for the first time. As noted below, the same is true when looking at pre-construction capacity alone, where China now accounts for 72% of global pre-construction capacity.

Figure 3: Coal capacity in construction and pre-construction in China and the rest of the world, 2014–2022

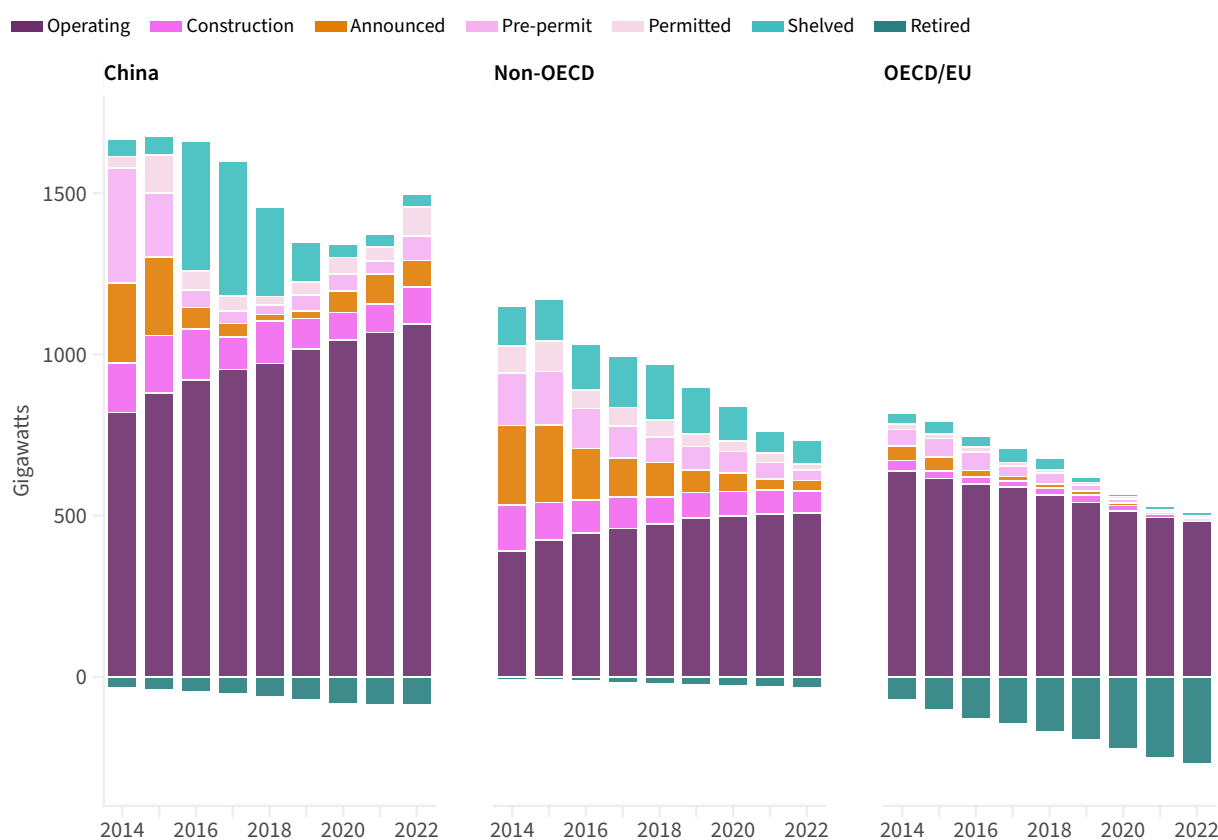


DRIVING FORWARD: WORLD OUTSIDE CHINA CLOSES IN ON “NO NEW COAL”

The period since the 2015 Paris climate agreement was signed has seen a dramatic contraction in the scale of new coal under consideration globally. Over the last nine years, proposed coal capacity has shrunk by 72%. In 2022, this positive trend continued as almost all countries and regions experienced either an ongoing

decline, or a plateau in the scale of new coal capacity under consideration. Despite clear [signals](#) that China would “strictly control” coal, its renewed coal power boom in 2022 offsets progress away from new coal in the rest of the world.

Figure 4: Coal capacity and proposals by status, 2014–2022²



2. Note: Figure excludes “mothballed” and “cancelled” coal capacity.

As of January 2023, 346.8 GW of pre-construction capacity remains under development globally. This includes 118.3 GW of announced new projects, 117.7 GW at pre-permit status, and 110.8 GW with permits in place, distributed across 33 countries. Of this 347 GW, however, China accounts for 72% (250 GW) (Figure 5), up from 58% last year.

The rest of the world now has less than 100 GW of capacity proposed. Beyond China, 18% of the remaining 346.8 GW of planned coal capacity (Figure 5)—or nearly two-thirds (63%) of the non-China capacity—is in the five countries with the next-largest capacities of pre-construction coal projects (India, Türkiye, Indonesia, Laos, and Mongolia). The final 10% is thinly spread across 27 countries, 13 of which have only a single proposed plant still under consideration. Among these, five countries—Madagascar, Niger, Tanzania, Ukraine, and Cambodia—have coal projects that were previously seeking financing from China, which has committed to end its overseas coal power financing. These projects are small (only 2.2 GW in total capacity), providing a clear opportunity for replacement with clean energy alternatives.

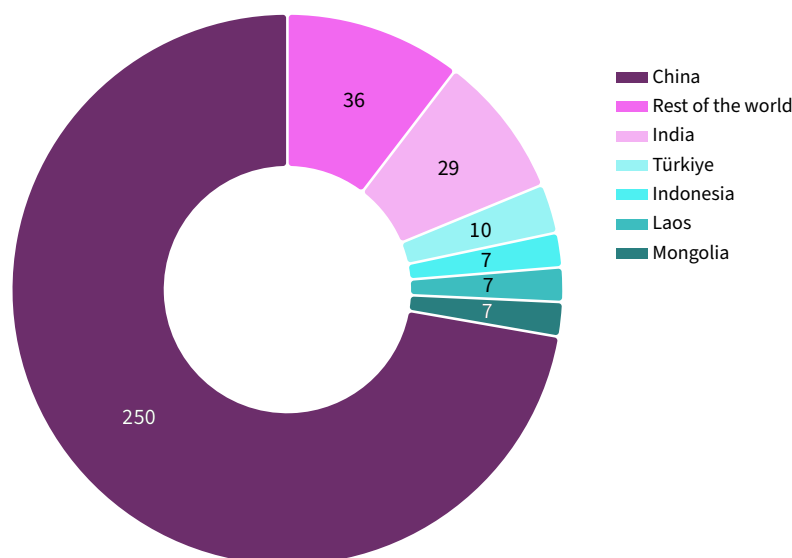
There are no new coal projects under consideration anywhere in either North America or the EU for the first time since data collection began, while no new coal plants have entered into construction across the OECD and EU since 2019. The remaining proposed projects in Australia, Japan, and Türkiye are all unlikely to proceed, leaving the OECD close to achieving No New Coal.

The OECD / EU as a whole is nearly at the milestone of having no new coal projects under consideration. Total capacity in the region has collapsed by 90% since 2015 (Figure 6). The total pre-construction capacity in the OECD is 11.9 GW, accounting for only 3% of global planned coal capacity.

Only three countries left in the OECD / EU are still considering new coal capacity. Australia and Japan each have one coal project under consideration with small capacities, leaving only Türkiye with more than one proposed coal project.

In the non-OECD countries outside China, the total planned coal capacity has decreased by 83% since

Figure 5: Coal capacity in pre-construction by country, 2022 (Gigawatts)



2015 (Figure 6), primarily due to a significant drop in Southeast Asia. In non-OECD countries, Vietnam saw most of its remaining planned coal capacity shelved or cancelled in 2022 (17.7 GW), resulting in it dropping out of the top five countries outside China for planned pre-construction projects. Brazil is now the only country with pre-construction capacity in all of the Americas.

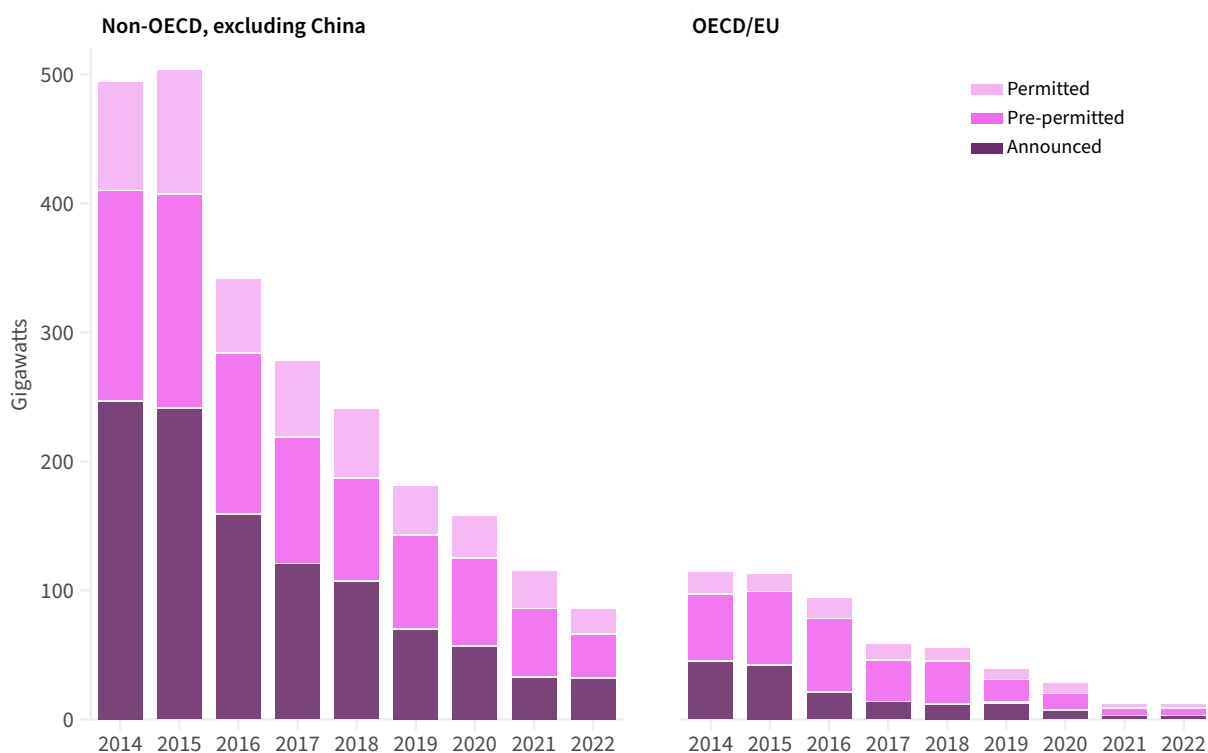
Between 2015 and 2023, 18 non-OECD countries have scrapped their proposed coal projects and currently have no new projects under consideration. Of these, nine countries formally committed to No New Coal through becoming a member of the [Powering Past Coal Alliance \(PPCA\)](#) or [No New Coal Power Compact \(NNCPC\)](#) or signing the [COP26 Coal to Clean Power Transition Statement](#).

South-East Asia, which was traditionally considered as a center for new coal capacity outside China, has experienced a particularly dramatic shift away from new coal. Total planned capacity in the region has

decreased by 86% since 2015, including 17% of the decline in the last year alone.

South Asia (39 GW) has seen its pre-construction capacity collapse by 86% since 2015 but still accounts for more than a third of all planned new coal outside China. This is principally due to India's large number of planned projects. India saw a net increase of 2.6 GW of planned new coal over the course of 2022. However, over recent years multiple projects in India have been paused due to unfavorable business conditions and the heightened risk of stranded investments, including some projects halted mid-construction. Bangladesh has reduced its total pre-construction capacity by 39% since last year, but still technically has 6.7 GW under consideration, despite electricity system overcapacity. Ongoing updates to the 2016 Integrated Power Sector Master Plan could increase Bangladesh's clean energy ambitions and shelve further pre-construction coal capacity. The Pakistan section below provides information on its announced [pivot](#) back to coal in February 2023.

Figure 6: Coal capacity in pre-construction by status in the OECD/EU and in non-OECD countries, excluding China, 2014–2022



Central Asia is the only region outside China that saw its planned coal capacity grow over the course of 2022. Its pre-construction capacity grew significantly over the first half of 2022, though it declined slightly in the second half of the year as a result of changes in Mongolia's new coal plans. This growth has been driven by developers in Mongolia, Uzbekistan, and Kyrgyzstan announcing or re-announcing proposed projects. Mongolia's planned coal capacity has remained at a similar scale in recent years, despite experiencing project turnovers. This was the case in 2022, with a new proposal for a 0.4 GW addition to the [Ulaanbaatar-3 plant](#). Almost in parallel, the three-unit (0.45 GW) [Ulaanbaatar-5](#) proposal was cancelled. Despite the considerable risks associated with constructing new coal projects, Uzbekistan and Kyrgyzstan have proposed previously shelved projects within 2022. These countries returned to the list of countries with remaining pre-construction capacity.

PARIS CLIMATE GOALS BECOMING MORE ELUSIVE

Coal-fired power generation is the largest source of energy-related CO₂ emissions globally. To achieve the Paris climate agreement's goal of limiting global temperature growth below 1.5 degrees, reducing the use of coal for power generation is the single most important source of emissions reductions in emissions pathways. To align with that goal, modeling by the [International Energy Agency](#) and [others](#) finds OECD countries should eliminate coal power by 2030 and the rest of the world by 2040.

In 2022,

- OECD coal plants continued to retire and announce retirements, inching towards alignment with the 1.5 degrees pathway. The largest retirements and retirement announcements were made in Germany, the United States, Australia, and Poland. Romania, Slovenia, and the Czech Republic announced national phase out policies, although only Romania by 2030. The OECD's projected coal power capacity in 2030 fell by 18 GW as a result.

Total planned capacity in Latin America and the Caribbean is at its lowest since 2015, with only 1.7 GW of pre-construction capacity remaining in Brazil.

The African continent has a pre-construction capacity of 9.7 GW, accounting for only 3% of the global total. This capacity is distributed across eleven countries and is comprised of mostly small projects. In six countries, there is only one project under consideration, with the projects in [Madagascar](#), [Niger](#), and [Tanzania](#) relying on some form of Chinese support.

For more information on how countries across the world are progressing, see E3G's March 2023 briefings: [Driving forward: world outside China closes in on no new coal](#) and [Diverging pathways: China's new coal boom takes it on a detour](#). E3G's [introduction to what No New Coal means](#) and [No New Coal Tracker](#) also provide more context and data.

- China's projected coal power capacity in 2030 grew by 128 GW due to the increase in new projects and re-activation of previously shelved projects.
- In the rest of the non-OECD, projected coal power capacity in 2030 fell significantly, by 29 GW, due to projects being cancelled and shelved and few new projects being announced. The projected capacity fell the most in Vietnam, Bangladesh, and Indonesia, while increasing in India.
- Looking at project-by-project status changes in 2022 without considering projections and country level commitments, the amount of planned coal-fired capacity in non-OECD countries, excluding China, fell by 23 GW, and China's increased by 126 GW. Globally, in 2022, around 25 GW received an announced close-by date of 2030.

Even with the fall in coal plant development and use in some regions in 2022, the world is not on track for the steep reductions in coal power necessary to meet the Paris climate agreement. Generally speaking, phasing out operating coal power by 2040 would require an

average of 117 GW of retirements per year, or four and a half times the capacity retired in 2022. An average of 60 GW must come offline in OECD countries each year to meet their 2030 coal phaseout deadline, and for non-OECD countries, 91 GW each year for their 2040 deadline. Accounting for coal plants under construction and in consideration (537.1 GW) would require even steeper cuts.

As detailed in [Boom & Bust Coal 2022](#), in the run-up to COP26 in Glasgow 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. In 2022, the gap in global retirements required over the next two decades—or 17 years to be exact—expanded, with China still planning a major expansion, and other countries, especially OECD countries such as Japan and Korea, still planning to operate their coal power fleets far beyond the 2030 deadline for phase out in developed countries. As of January 2023:

- 580 GW of capacity—or 28% of global capacity—has a phase out date, while another 1,400 GW is covered by carbon neutrality targets but stops short of a phase out decision. Only 110 GW, or 5% of the operating fleet today, are not covered by either type of commitment, which may have seemed impossible just a decade ago.
- At the same time, the data shows that the world is far from heading decisively in the Net Zero direction, and not all coal phase out decisions are aligned with the Paris climate agreement goals. Assuming Germany’s aspirational goal of phasing out coal “ideally” by 2030 can be firmed up, and assuming the United States’ 2035 Clean Power goal

Plant level progress

To measure progress on aligning plant-level plans for new capacity and retirements with the pledges and Paris climate 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

will mean a coal phase out by 2030, 330 GW, or 70% of OECD coal capacity, is scheduled to close by 2030. Outside the OECD, only 93 GW, or 6% of non-OECD coal capacity, has a closure date by 2040.

At COP27 in Sharm El Sheikh in November 2022, governments were [asked](#) to revisit and strengthen the 2030 targets in their national climate plans by the end of 2023. They were also urged to accelerate efforts to phase down unabated coal power and phase out “inefficient fossil fuel subsidies.” The decision text recognized that the current global energy crisis brings into focus the need to quickly transform energy systems for greater security, reliability, and resilience by speeding up the transition to renewables during this crucial decade.

Yet there is also a lot of work to do to translate national coal exit commitments into plant-by-plant retirement plans. The promising new developments of 2022, including new Just Energy Transition Partnerships, must ensure that any emissions caps and plans are not only consistent with Net Zero targets, but also a 1.5 degree pathway and timely coal phase out.

It is important to note that in many developing countries, especially those heavily dependent on coal, a 2040 coal exit translates to a transition at record speed and brings up important equity considerations. The international community must support these countries 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.

announced retirement or coal phase out date retire at the average age for each region to date.

The Global Coal Plant Tracker database provides insight into how the outlook for global coal power capacity has changed, and allows tracking progress

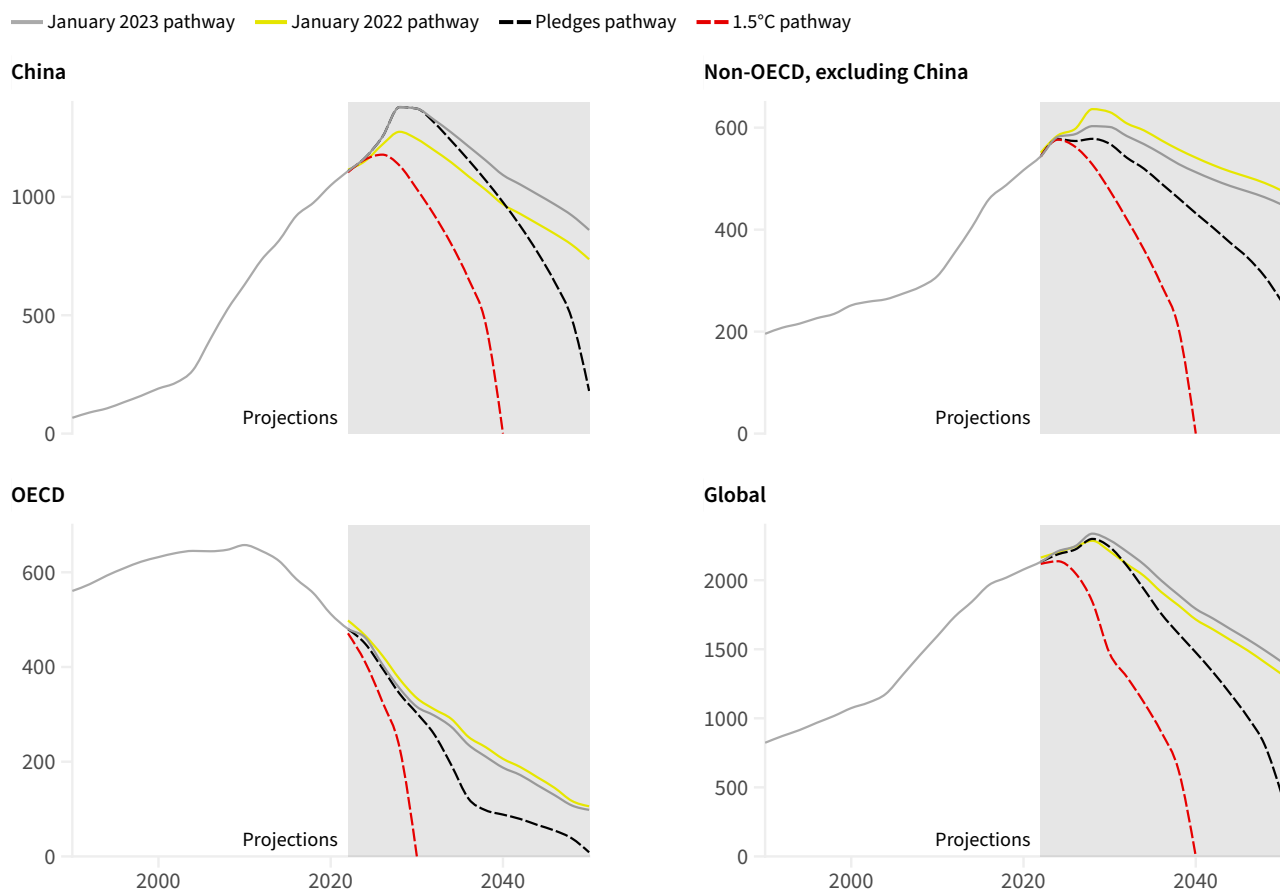
towards phasing out unabated coal in line with the 1.5 degree pathway. Coal phase out schedules are generally based on a 2018 [report](#) by Global Energy Monitor and Greenpeace, which developed regional pathways consistent with the projected coal-fired generation in the IPCC scenarios for holding global 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. (More information about assumptions is available in Appendix C of [Boom & Bust Coal 2022](#); China’s “pledge pathway” presumes the build out of proposed capacity out to 2030.)

As Figure 7 demonstrates, while China’s 2060 carbon neutrality target implies that most coal-fired capacity will need to be retired by 2050 (black dashed line), the

country’s power industry is still planning an expansion in coal-fired capacity over this decade that takes the country’s capacity pathway (gray line) increasingly out of sync with the Paris-aligned trajectory (red dashed line).

However, other non-OECD countries have not reversed course on making progress in scaling back future coal capacity. Although this progress slowed in 2022, it did not backtrack despite many claiming that coal was making a “comeback.” The pathway as of January 2018 data estimated non-OECD coal capacity at 724 GW by 2040, and this dropped to 541 GW as of January 2022 data, and to 513 GW under the current pathway (January 2023 data). In other words, the projected non-OECD capacity by 2040 under “business as usual” dropped 29% in just five years. Taking into consideration pledges, non-OECD coal

Figure 7: Historic and projected coal capacity by region (1990–2050), current pledges, and the gap to 1.5 degrees



capacity by 2040 is expected to drop to 417 GW. To close the gap to zero by 2040, more ambitious commitments—as well as much more planning, support, and implementation—are needed.

OECD countries have also continued to make progress towards phasing out coal power, although they are still far from a 2030 phase out aligned with the Paris climate agreement goals. The pathway as of January 2018 data estimated OECD coal capacity at 447 GW by 2030, and this dropped to 334 GW as of January 2022 data, and to 316 GW under the current pathway (January 2023 data). These figures total a 29% drop in just five years. Accounting for OECD pledges, coal capacity is projected to fall to 300 GW by 2030. The decline is promising, but 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, South Korea, Türkiye, Germany, Poland, and Australia. Out of these stragglers, Türkiye is still planning the most sizable coal power expansion.

PRIVATE FINANCE COAL POLICY TRENDS IN 2022

In 2022, 99 private financial institutions adopted new or updated coal policies. The Reclaim Finance [Coal Policy Tool](#) now counts a total of 300 financiers with at least a basic coal policy. As in previous years, however, the great majority of 2022 policies are insufficient to align banks, insurers, and investors with a trajectory of limiting planetary temperature increases to 1.5 degrees Celsius.

Only 12 of these new or updated policies are strong enough to halt support for the developers of new coal mines and power plants, or set deadlines to end all coal power-related finance by the dates required by the International Energy Agency's (IEA) net zero emissions scenario (2030 in the OECD and 2040 elsewhere). Among the significant new policies issued in 2022 are those from [Lloyds Bank](#), which now has

Ultimately, progress in many OECD and non-OECD countries has been offset by the continued announcements and construction starts for new projects in China. Comparing the “business as usual” pathways as of January 2022 data (yellow lines) with the current “business as usual” pathways (gray lines) makes this clear. For China, last year's projected pathway lies below this year's projected pathway (yellow line below the gray line). For the OECD and non-OECD countries excluding China, last year's projected pathway lies above this year's projected pathway, reflecting improvement for those countries (yellow line above the gray line). In the end, when looking at the global picture, steeper cuts are required this year than were last year. China's proposed coal expansion means the Paris climate goals are becoming ever more elusive.

Globally, the projected coal-fired capacity in 2030, if pledges are implemented, is around 2,241 GW, while the amount of capacity consistent with a 1.5 degree pathway is estimated to be about two-thirds, or 1,470 GW. An additional 800 GW will need to be cancelled or retired to meet the emission budgets consistent with limiting global warming to 1.5 degrees.

the strongest policy on restricting finance to coal developers among large UK financial institutions; the asset manager arm of Spanish group [MAPFRE](#), which tightened its coal developer policy; and [Agirc-Arrco](#), one of the major players in the French retirement system, which adopted a robust coal phase out policy in December 2022.

While the great majority of updates to existing policies represent an increase in ambition, Italian bank [UniCredit](#) backtracked on its previous policy by introducing some exceptions to its requirement that its clients provide plans to phase out coal use by 2028. French asset management giant [Amundi](#), part of the [Crédit Agricole](#) group, also introduced a loophole by weakening its commitment to exclude financing for coal developers.

Adopting a strong coal policy is only step one for a bank that is committed to exiting the sector. The next vital step is for banks to actually apply their policies. Reclaim Finance research in early 2022 found that [Crédit Agricole bank](#), which published a globally leading coal policy in 2020, was not fully applying this policy, including by continuing to finance coal developers like Glencore and Marubeni. The lack of mechanisms to ensure compliance with financial sector policies is an ongoing concern.

One unfortunate trend that continued in 2022 saw companies decarbonizing their balance sheets by selling coal plants to new owners, rather than closing the plants down via just transition processes. In November 2022, Malaysia's Sembcorp Industries approved the US\$1.5 billion [sale](#) of its Indian coal power stations, [Bander](#) and [Muthukur Mandal](#), to an Omani-owned company. Sembcorp claimed that the deal “accelerates the transformation [of its] portfolio from brown to green.” According to the Financial Times, the deal [allows](#) Sembcorp to avoid triggering higher interest payments on a sustainability-linked bond. The evasion of responsibility for the coal plants' emissions is particularly egregious in this case as Sembcorp “will also finance the assets for the next 15 years because it said restrictions on non-green investing would mean any buyer could find it difficult to secure financing for coal.”

Interest among major global private financial players in promoting Just Energy Transition Partnerships (JETPs) continued in 2022. JETPs, which are one of the

priorities for the Glasgow Financial Alliance for Net Zero (GFANZ), are focused on financing a just transition to clean energy in heavily coal dependent countries in Asia and Africa.

At the G20 Summit in November 2022, a group of governments issued a [joint statement](#) noting that they would work to mobilize US\$20 billion for a JETP for Indonesia, half to come from donor governments and multilateral banks, and half from private banks and investors coordinated by GFANZ. The following month a similar statement was issued on a JETP for Vietnam which pledged to mobilize US\$15.5 billion, also split equally between public and private sources. Additional details are available in the Indonesia and Vietnam sections below.

While an early shut down of coal power plants in Asia is essential for hitting a 1.5 degrees Celcius target, there remains much uncertainty over the terms on which private actors are willing to finance JETPs, how much new money donor governments will provide, and how much host governments might push for JETPs to finance dirty energy such as fossil gas, biomass, and dirty hydrogen. None of the GFANZ members initially named as potential financiers of these JETPs—including Bank of America, Citi, Deutsche Bank, HSBC, Macquarie, MUFG, and Standard Chartered—have significant policies to end their support for coal developers, which casts doubt on the seriousness of their commitment to financing just transitions out of coal.

CHANGES TO CHINA'S OVERSEAS COAL PROJECTS

Since President Xi's pledge to “not build new coal-fired power projects abroad” was made in September 2021, the development of overseas coal plants backed by China has slowed but has not halted completely.

Analysis of coal projects receiving either financing or engineering, procurement, and construction (EPC) contracts from Chinese firms estimates that 19%

(21 GW) of the approximately 108 GW of China-backed overseas coal capacity planned at the time the announcement was made have been cancelled or presumed cancelled, mainly due to policy changes in countries like Vietnam, South Africa, and Indonesia. This trend emphasizes the importance of host countries' policies in driving which technologies are prioritized in the energy transition.

On the flip side, nearly 40% of China-backed coal projects have moved forward. In the face of various forces, including the shake up of commodity prices in 2022, some countries chose to expedite or restart existing coal power developments. Pakistan, for instance, resurrected plans for China to finance the 300 MW [Gwadar plant](#). Over 13 GW were commissioned in the last year. Another 7.6 GW entered into construction, bringing the current capacity under construction to 18 GW. These projects are not considered ‘new’ under China’s pledge, having secured financing or been in construction at the time of the 2021 announcement. However, their addition to the global coal under development is significant and will be capacity that host countries will have to contend with phasing down by 2040 to align with climate targets.

National plans to increase fossil fuel-based generation risk the diversion of vital financing to other polluting sources with high stranded asset risk, rather than from coal to clean. China’s pledge and the National

Development and Reform Commission’s Guidance on Greening the Belt and Road Initiative (BRI) still have the potential to remove 58 GW of coal projects backed by Chinese firms that remain in limbo. Cancelling the remaining proposed coal plants or converting them to renewable projects could avoid adding 265 million tonnes of CO₂ emissions from coal power annually. Of these projects, an estimated 60% (37 GW) have yet to reach financial closure and can be cancelled by governments and the other stakeholders involved to avoid stranded asset risks. The remaining 18 GW in early development stages could be converted to renewable energy to avoid adding 88 million tonnes of CO₂ from coal annually.

A September 2022 report by CREA and People of Asia for Climate Solutions titled [1-Year Later: China’s Ban on Overseas Coal Power Projects and Its Global Climate Impacts](#) provides additional context on the pledge.

CHINA: MASSIVE SURGE IN NEW PLANT PERMITS

Coal power plant permitting, construction starts, and new project announcements accelerated dramatically in China in 2022, with new permits reaching the highest level since 2015. The coal power capacity starting construction in China was six times greater than the rest of the world combined.

50 GW of coal power capacity started construction, a more than 50% increase from 2021. Many of these projects had their permits fast-tracked and moved to construction in a matter of months. A total of around 100 GW of new coal power projects were permitted, the equivalent of two large coal power plants per week.³ The amount of capacity permitted more than quadrupled from 23 GW in 2021.⁴ Of the projects

permitted in 2022, 60 GW were not under construction in January 2023, but were likely to start construction soon, indicating even more construction starts in 2023. In total, 86 GW of new coal power projects were initiated, more than doubling from 40 GW in 2021.

26 GW of new coal power capacity was added to the grid in 2022, unchanged from 2021. Capacity additions will likely accelerate in the next few years when the projects that broke ground in 2022 start to come online. Plant retirements slowed down further in 2022, with 4.1 GW of coal-fired capacity closed down. Current policy encourages either retrofitting older plants or keeping them online as-is for back-up capacity, rather than retirement and deconstruction.

3. The size of coal-fired power generating units varies widely. Note: The January 2023 Global Coal Plant Tracker identifies 91.5 GW of capacity with permits issued in 2022 (125 units at 61 different plant sites). Some units without known permitting dates also appear to have moved into construction in 2022. Future Global Coal Plant Tracker releases will include refined 2022 data if more information is identified.

4. The January 2023 Global Coal Plant Tracker identifies 11.7 GW of capacity with permits issued in 2021.

What is driving new coal power projects?

The Chinese central government's policy on new coal power plants has been gradually loosened since the outbreak of the COVID-19 pandemic in early 2020. In summer 2022, the country experienced a record-breaking heatwave and drought that led to very low availability of hydropower and increased electricity demand for air conditioning. This situation led to concerns about the sufficiency of generating capacity to meet peaks in electricity demand. Those concerns seem to have prompted central and provincial governments to pursue an increase in coal power plant development as a costly and sub-optimal solution, especially in major electricity demand centers and provinces neighboring them.

As prices for imported gas skyrocketed in 2022, the coastal provinces that have relied on gas-fired power plants to cover demand peaks seem to be replacing or at least building alternatives for gas power.

Some large wind and solar power developments in remote areas require new thermal power to regulate the voltage and frequency of the grid.

An additional enabling factor is that despite impressive acceleration in clean energy installations, the year-over-year power generation additions still haven't reached the level where they match annual growth in electricity demand, resulting in continued growth in demand for power generation from coal. The point when all demand growth is covered from clean sources is however likely to be reached soon, as the targets for annual wind and solar installations, in particular, keep increasing.

While China's National Energy Administration has [supported](#) an increase in coal power development, it also [said](#) in February 2022 that new coal power plants should not be permitted solely for the purpose of bulk power generation, but only to support grid stability or the integration of renewable energy. While some

of the new coal power projects follow this rationale, many do not.

- Of China's six regional grids, the South and East grid are the only ones that don't suffer from a clear thermal power overcapacity problem. Yet, 50% of newly announced projects and 40% of construction starts took place in the grids with overcapacity.
- The provinces permitting a large amount of new coal power plants try to justify the projects as "supporting" power capacity to ensure grid stability and renewable energy integration. These justifications don't hold water, however, as the plants are intended to run at baseload utilization, and these specific provinces are laggards in growing clean energy generation to meet their demand growth.

Currently, local governments are allowed to issue permits with very little, if any, scrutiny or justification, and they are rushing to permit as much new coal capacity as possible while this remains the case.

Local governments are always keen on any kind of new construction project, as they bring in economic activity and demand for construction materials and services from local state-owned enterprises while the risks are borne by the central government-controlled banking system.

New coal power projects don't seem attractive to developers. However, encouragement from the central government to build more coal-fired capacity creates an expectation that investors will be made whole, for example through cuts to coal prices or increases to electricity tariffs, increasing profitability. At the very least, central government-controlled banks will absorb any losses.

The government is also preparing capacity payments for coal power plants, and the anticipation of such payments can make investments more attractive.

What are the implications for CO₂ emissions?

The massive addition of new coal-fired capacity doesn't necessarily mean that coal use or CO₂ emissions from the power sector will increase in China. Provided that growth in non-fossil power generation from wind, solar, and nuclear continues to accelerate, and electricity demand growth stabilizes or slows down, power generation from coal could peak and decline. President Xi has also pledged that China would reduce coal consumption in the 2026–30 period. This would mean a declining utilization rate of China's vast coal power plant fleet, rather than a continued growth in coal-fired power generation.

The Chinese government is actively considering the introduction of capacity payments for coal-fired power plants, which could make falling utilization more palatable for plant owners. Not only would it be possible to earn revenue on the electricity generated, but also through the regulated capacity provided to the system.

But even so, hundreds of brand-new coal power plants will make meeting China's climate commitments more complicated and costly. The politically influential

owners of the plants have an interest in protecting their assets and avoiding a rapid build-out of clean energy and phase out of coal.

While China is making rapid progress in scaling up clean energy, the country's power system remains dependent on coal power capacity for meeting electricity peak loads and managing the variability of demand and clean power supply. The continued addition of new coal power capacity implies insufficient emphasis on overcoming the power system and power market constraints that perpetuate dependence on coal.

The worst-case scenario is that the pressure to make use of the newly built coal power plants prevents a steep fall in utilization and leads to a moderation in China's clean energy buildout and/or the promotion of energy-intensive industries to consume the electricity. This scenario could mean a major increase in China's CO₂ emissions over this decade, undermining the global climate effort, and could even put China's climate commitments in danger.

Are there alternatives?

While many of the recently permitted projects cannot be justified under the policy of coal power playing a "supporting" role, the wave of new projects does show a real challenge: China is making rapid progress in scaling up clean energy, but the power system remains dependent on coal power capacity for meeting electricity peak loads and managing the variability of demand and clean power supply.

As China needs to start reducing coal-fired power generation and electricity demand for cooling increases,

other solutions to manage the variability of demand and clean power supply are needed. They include increased investment in electricity storage, flexibility, and transmission within grid regions. The growth in peak loads could be effectively mitigated through strengthened energy efficiency requirements for A/C units and for new buildings, and by introducing a program of large-scale energy efficiency improvements for existing buildings.

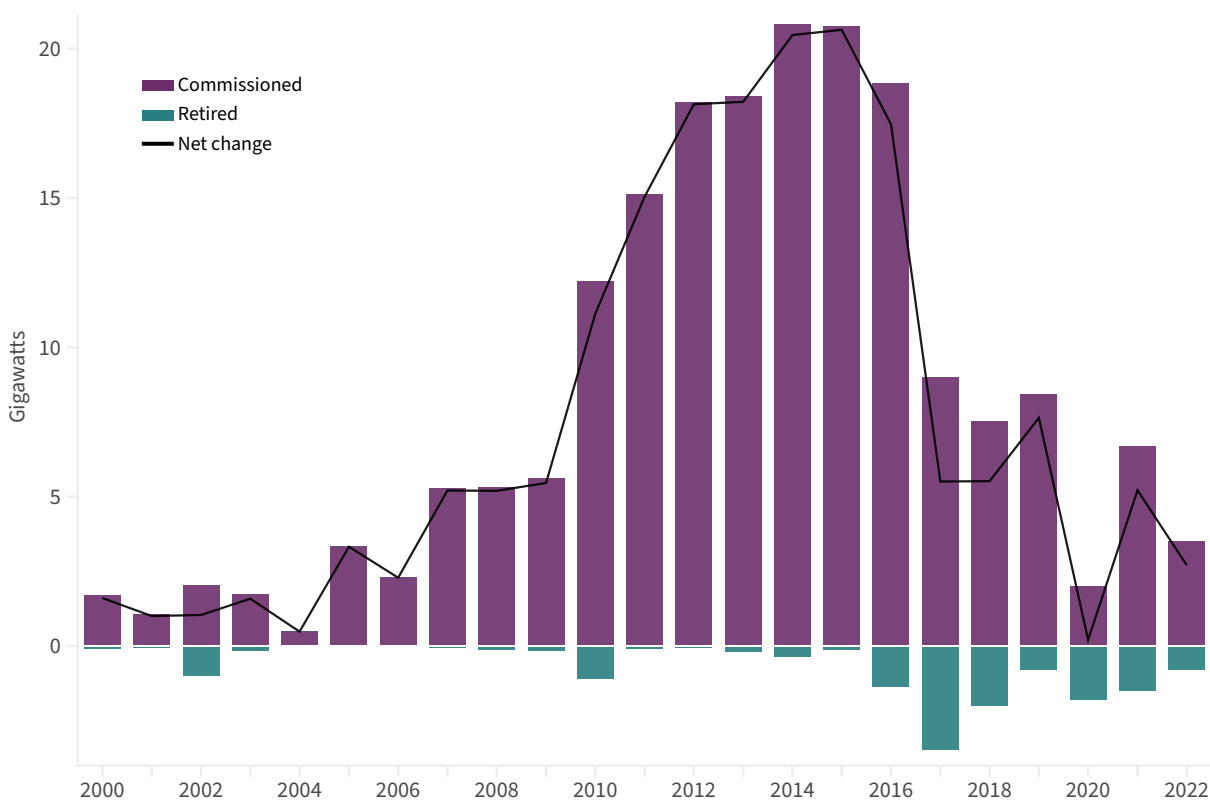
INDIA'S MIXED SIGNALS: UNCERTAIN FUTURE FOR THE END OF COAL

India has the most operating and proposed coal plant capacity in the world after China. In 2022, the country sent mixed signals regarding its future coal use. While the government has committed to eventually [phase down](#) coal, it has not set a formal timeline. In September 2022, India's Power Minister [shared](#) that India would add nearly 56 GW of coal power capacity by 2030, nearly a quarter of the existing 234 GW fleet—absent a drop in the cost of electricity storage. The move is intended to prioritize “providing reliable power to spur economic growth” in addition to investments in renewable energy. In January 2023, the government [asked](#) utilities to hold off on retiring coal plants until 2030 to meet electricity demand, after last year's unusually early and brutal [heat wave caused](#) power shortages and affected millions.

The Coal Ministry continues in tandem to open new coal blocks for commercial auction. The temporary coal shortage last year emboldened the Indian government to press ahead with plans to [develop](#) 99 new coal projects with production of 427 million tonnes per year. Already in 2023, a tranche of new coal auctions continues to acquire bidders. The prospect of mining new coal blocks is in strategic conflict with the government's pledge to achieve net zero emissions by 2070 and the fact that 36% of operating capacity at existing mines goes unused.

In terms of promising coal power phase-down signals, India only commissioned 3.5 GW of new coal power capacity in 2022. Excluding a pandemic slump in 2020, this was the lowest annual addition since a 2014 peak at 20.8 GW (Figure 8). From 2015 to 2022, Indian

Figure 8: Newly operating and retired coal capacity in India by year, 2000–2022

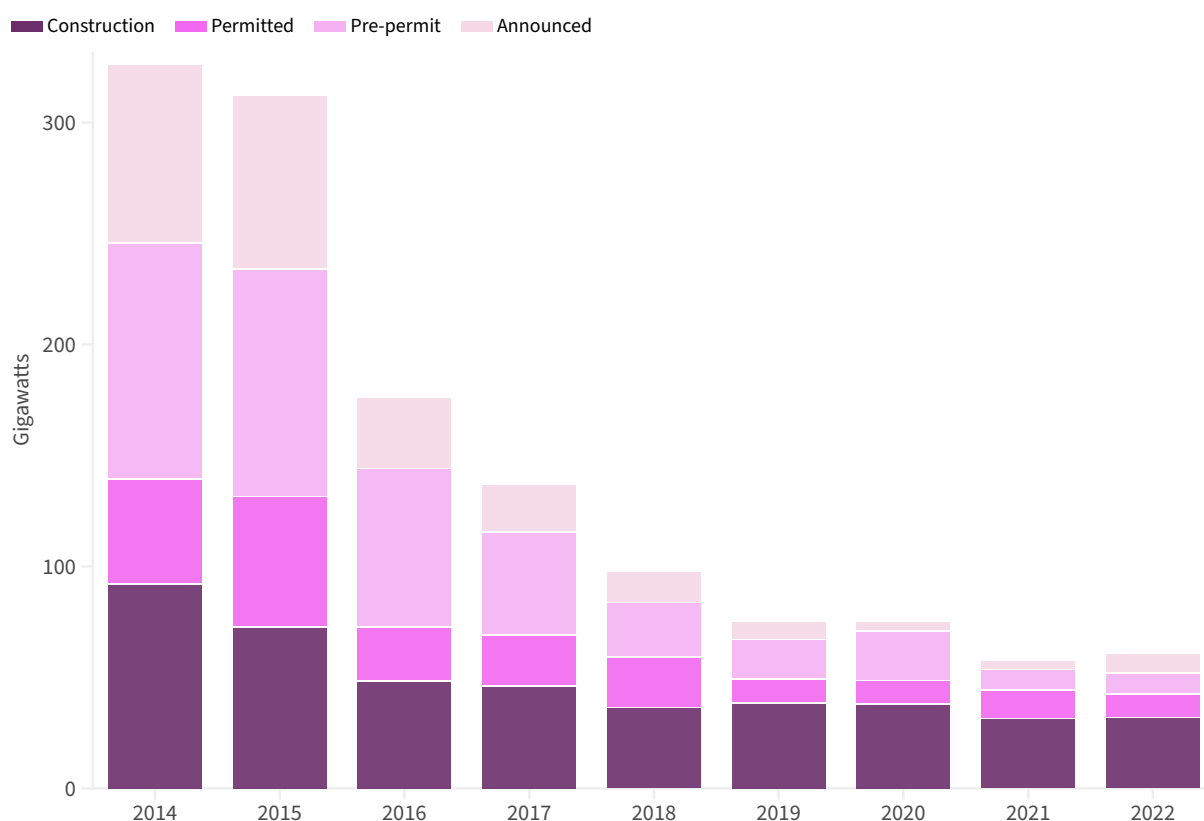


pre-construction coal power capacity also decreased by nearly 88%, from 239.1 GW to 25.9 GW—and up just 2.6 GW in 2022, to 28.5 GW (Figure 9).

For the first time in years, zero new non-captive coal plants were granted environmental clearance in 2022. Only one captive coal plant, the fiercely opposed [JSW Utkal Steel plant](#)—a 900 MW coal and “by product” gas based plant in Odisha—received an environmental

clearance in April 2022 (i.e. was permitted). As a previous analysis by India’s Legal Initiative for Forest and Environment notes, the trickle in new project approvals [reflects](#) how difficult it is becoming to set up new coal plants in India. It was also a record low year for new coal plants breaking ground: the 120 MW [Bodal captive coal plant](#) appeared to be the only site where construction on a new project began in 2022.

Figure 9: Coal capacity in construction and pre-construction in India, 2014–2022



However, it is clear that new coal continues to be actively considered in India. The country has 28.5 GW of coal power capacity planned, about a third of which is already permitted, and 32 GW of coal power capacity under construction. Tamil Nadu, Odisha, and Uttar Pradesh lead the way in terms of new coal power development overall (Figure 10).

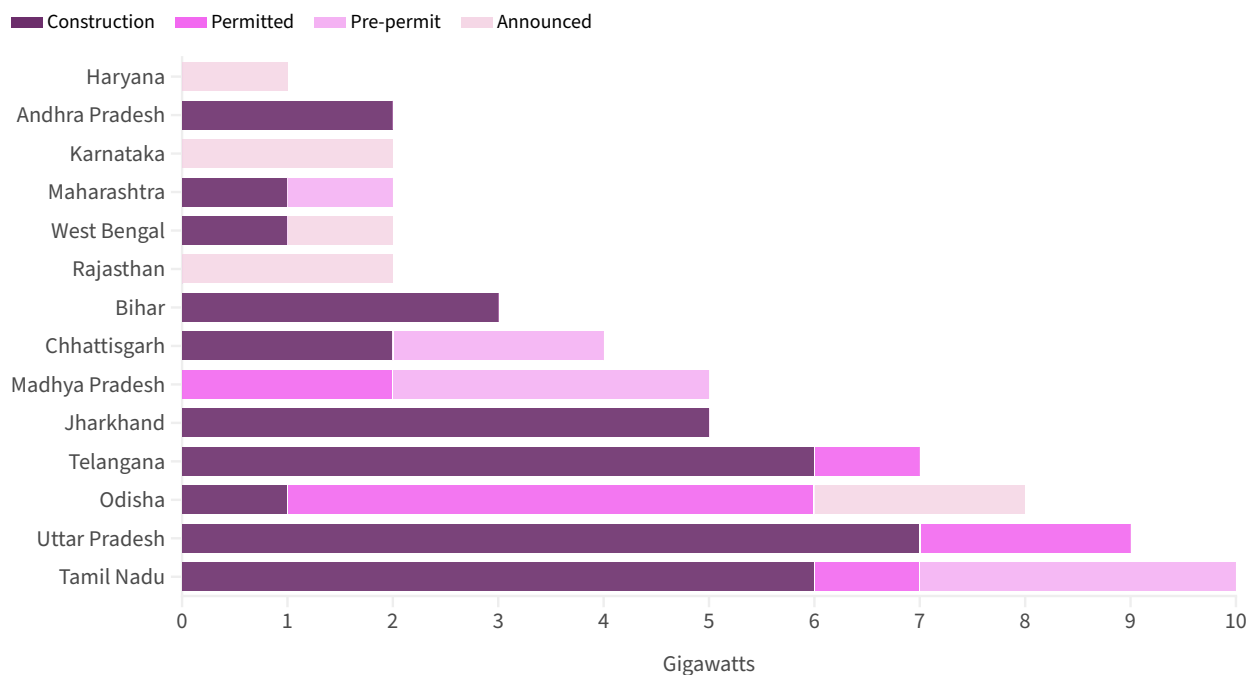
A few new proposed coal plants sought out and/or were granted Terms of Reference (ToR) in 2022. For example, in July 2022, the Chief Minister of Rajasthan announced proposals to set up new coal capacity at the [Chhabra Thermal Power Station](#) and [Kalisindh Thermal Power Station](#) in a move to [help](#) the state “become self-reliant in power generation” and also “increase employment opportunities and local area development.”

Various pre-construction projects previously considered to be shelved or cancelled also appeared reactivated, including at the proposed [Basundhara](#), [Bithnok](#), [Deenbandhu Chhotu Ram](#), Lara, [Raghunathpur](#), and [Udangudi](#) power stations. There were also signs of momentum to potentially unblock various “stressed”

coal plant sites, which meant halted construction projects were considered to be revived. Back in 2018, a special parliamentary committee identified 34 stressed power assets totalling 40 GW that were struggling or otherwise not making progress to be commissioned. Despite efforts by the government, lenders, and project supporters over years, the underlying issues have generally persisted over the years, such as cost overruns, coal supply disruptions, and a lack of power purchase agreements.

Within the last year, Odisha saw the stalled [Jharsuguda Ind-Barath plant](#) acquired by JSW Energy, which is now reportedly expected to be fully operational within two years, and the [Malibrahmani plant](#) acquired by Jindal, which is reportedly projected to provide power to a steel plant in Angul within a year. The Thermal Expert Appraisal Committee also re-granted ToR for the stalled [KSK Mahanadi Power Project](#) in Chhattisgarh as the plant moved through insolvency proceedings. In Andhra Pradesh, the [Meenakshi Energy Thermal Power Project](#) appeared on track to be acquired by Vedanta.

Figure 10: Coal capacity in construction and pre-construction in India by state, 2022

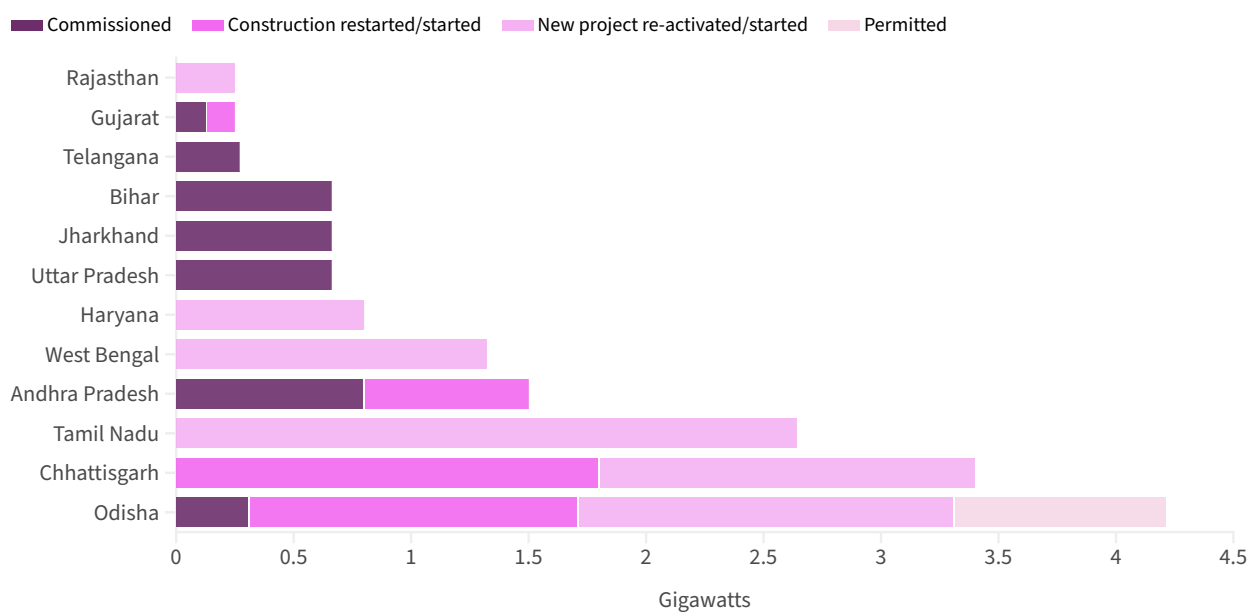


India faces a very real crunch that requires careful near- and long-term planning. In March 2023, for the second year in a row, India [invoked](#) an emergency law to force power plants that run on imported coal, which are typically uncompetitive compared to power generated from cheap domestic coal, to maximize output ahead of an expected surge in power demand this spring and summer. As a CREA [analysis](#) highlighted in May 2022, the emergency measures reflect two things: First, the country has enough power generation capacity, and second, the domestic coal based power stations aren't stocking enough coal before summer peaks and monsoons when demand is high and there is restricted coal mining and transport capacity. In other words, related power deficits are the result of a management crisis rather than a fuel shortage or power generation infrastructure shortage. At the same time, the country also faces the worsening public health and environmental impacts of coal. The environment ministry introduced more stringent pollution standards for coal plants in 2015, but the deadline to comply with the standards was [pushed back](#) yet again in September 2022. As Manthan Adhyayan Kendra [highlighted](#), poor coal ash management is impacting

local communities and power generation. The country has only retired 15.7 GW to date. With more than 30 GW of operating coal capacity at units above 30 years old, India should pursue mechanisms to retire old, polluting units as soon as possible and repurpose the sites to support renewables.

Ultimately, India has the opportunity to accelerate the global coal to clear energy transition [under G20 leadership](#), addressing the twin needs of energy access and energy security. As is the case for China and other countries, simultaneously investing in both coal and renewables will only result in a messier energy transition for India. It is time for the country to finalize and implement a bold no-new-coal plan to ensure energy and economic development plans are in line with its climate change and net zero commitments. India's targets for clean power capacity could enable the country to start phasing down coal well before 2030, even assuming power demand growth continues. With the low costs of renewable energy, it is crucial to anticipate the closures of existing coal plants and unprofitable mines to avoid stranded coal assets and unnecessary hardships for coal communities.

Figure 11: Changes in project status in 2022 for coal capacity under development in India by state



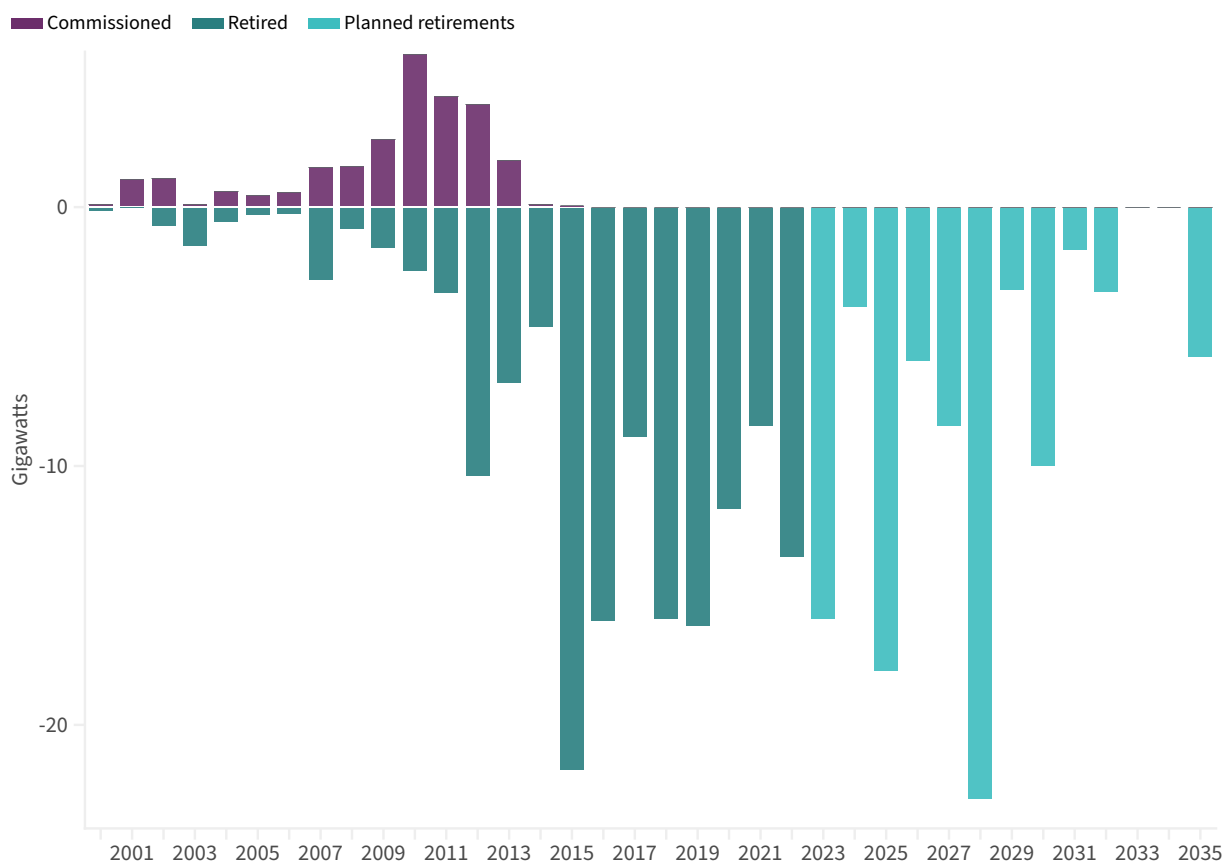
THE U.S. LEADS THE WAY IN COAL RETIREMENTS, AS MOMENTUM AWAY FROM COAL NEEDS TO CONTINUE INCREASING

The U.S. continues to transition away from coal, with over 13.5 GW retired in 2022 alone. According to the Sierra Club, 139 GW has ceased burning coal since 2010. Of the 212 GW still operating today, another 37% has been committed to retire prior to 2031. Over 19 GW of announced retirements were made in 2022 alone, which was greater than five of the previous six years. Moreover, no new coal plants have come online in the U.S. since 2014, and no new plants are being proposed. However, despite the steady progress toward retiring existing coal, the U.S. still operates the third largest coal fleet in the world behind China and India. The White House has announced a goal

of an 80% carbon-free power sector by 2030. Toward that goal, Sierra Club and partners are advocating to ensure all coal in the country is retired no later than 2030. This requires an average of 17 GW of capacity retirement announcements each year prior to the end of the decade.

The 2022 Inflation Reduction Act (IRA) offers incentives to manufacture and deploy small and large-scale clean energy and storage, as well as programs to alleviate existing [coal debt](#) and tax credits to site clean energy projects in communities currently and historically reliant on coal. With the passage of the IRA, an

Figure 12: Newly operating and retired coal capacity in the U.S. (2000–2022) and planned retirements through 2035



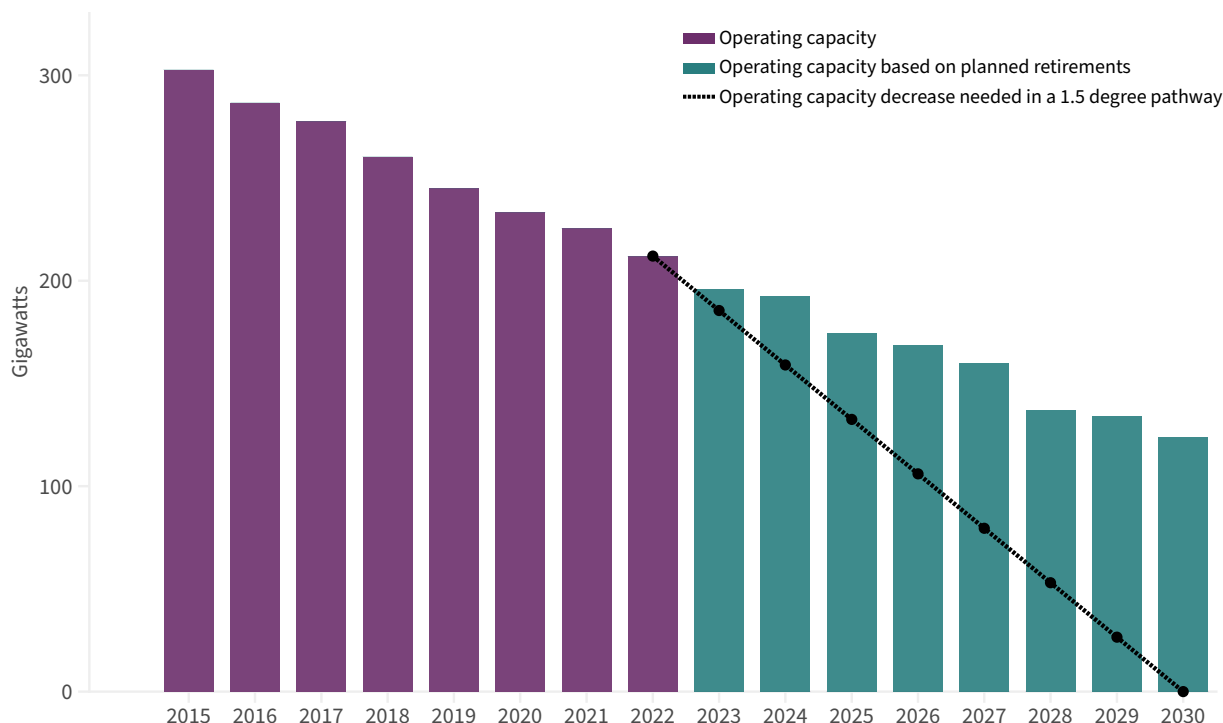
[estimated](#) 99% of coal plants are now more expensive to run than new solar and wind. However, there is much to be done to ensure that the funding in the IRA is distributed properly and that utilities that are entrenched with the fossil fuel industry take advantage of these federal programs.

At the same time, the U.S. must continue to act 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. In 2022, advocates called on the Environmental Protection Agency (EPA) to pursue a comprehensive regulatory strategy to address power sector pollution, and by early 2023, [expressed concern](#) that the agency was [falling behind](#) on nine of ten key power sector rules. Without picking up the pace, the administration risks leaving critical steps either unfinished at the end of President Biden's

first term or subject to the [Congressional Review Act](#). The U.S., like many other countries, must also ensure its coal fleet is not replaced by [new gas-fired capacity](#).

The impacts of coal's legacy in the country remain a challenge. In 2022, even though many more mine closures are expected than investments, several new coal mines opened, including the [Longview coal project](#) in West Virginia. Other troubling cases such as the 2022 deal for a cryptocurrency mining operation at the [Merom Generating Station](#) in Indiana could keep power projects online beyond their initial targeted retirements. Other plants, including the Edgewater Generating Station in Wisconsin, have also had their upcoming retirement dates pushed back by several years due to some combination of supply chain disruptions, grid reliability issues, and delays in project conversion.

Figure 13: U.S. historic and projected coal capacity (2015–2030) and the gap to 1.5 degrees



Industry plans to extend the life of the U.S. coal fleet through Carbon Capture and Storage (CCS) have not, as of yet, proven to be successful. For example, the Petra Nova CCS project at the [Parish Generating Station](#) in Texas has been on-again off-again for over a decade, with NRG Energy declaring the project uneconomical in 2021 and disposing of their shares in 2022. (See “The Role Of ‘Clean Coal’ Technologies In Decarbonizing The Coal Power Sector” in [Boom & Bust Coal 2022](#).) Despite these failing pilot projects, CCS proposals are increasing and gaining traction due to funding in the IRA.

The proposed [CONSOL Energy Mining Complex plant](#) in Pennsylvania was lauded as an “advanced carbon-negative power plant” when it was initially funded through the US Department of Energy (DOE) Coal FIRST program, and it was the only coal project

in the US under development in the last year. CONSOL claimed that its technology could result in a zero emissions coal plant on the market by 2030. A dangerous promise, the project exemplified how the pursuit of “clean coal” takes time and funding away from renewable alternatives. As of January 2023, the project was presumed shelved but has not been confirmed as cancelled.

New reports continue to highlight the urgent need to phase coal out. For example, groups demonstrated that the utility industry is [violating](#) coal ash regulations in every state where coal is burned, and that U.S. coal plants are responsible for [3,800 premature deaths](#) a year due to fine particle pollution from smokestacks. In November 2022, the [Gavin plant](#) in Ohio became the first coal plant [ordered](#) by the EPA to halt coal ash dumping in [unlined](#) ponds.

COAL IS NOT MAKING A COMEBACK: LAST RESORT MEASURES IN THE EUROPEAN UNION AND UNITED KINGDOM

The European Union (EU) and United Kingdom appear to have ended the development of coal-fired power stations: there are currently no coal power plants in pre-construction and just [one](#) project under construction. While the [gas crisis](#) prompted a slowdown in coal retirements in 2022, the EU [banned](#) imports of Russian coal and [phased down](#) imports of Russian gas and oil after the country’s invasion of Ukraine, as well as [stepped up commitments](#) to build renewables. An unprecedented amount of solar power capacity was [built](#) in the EU, with 41.4 GW [connected](#) to the grid and significant growth driven by [prosumer](#) installations.

Still, the gas crisis prompted seven countries to [permit](#) to restart or extend operations at 26 coal-fired units due to energy security concerns—19 (73%) of those in Germany. But thanks to ample solar and wind power, combined with a mild European winter, these units had low generation rates. What appeared to be a spike in coal capacity added only 1% to total EU coal generation in 2022.

Last year, two additional crises created a 7% deficit in EU power generation: a once in 500 years drought reduced hydro generation, and outages at French nuclear plants contributed to the lowest nuclear generation since at least 2000. Nevertheless, the EU filled much of the shortfall with wind and solar generation, according to Ember. Coal generation, meanwhile, comprised only one-sixth of the shortfall, which [boosted](#) generation 28 TWh, a 6.7% increase since 2021 (419 TWh to 447 TWh).

The anticipated boom in coal plant restarts also failed to materialize in much of the region. The Austrian Parliament voted against a temporary reopening of the [Mellach power station](#) and other power stations carried through with planned retirements, including one unit of the [Megalopoli power station](#) in Greece and the [Mintia-Deva power station](#) in Romania. In the UK, retired capacity of coal-fired power stations doubled from 15 GW in 2015 to over 30 GW in 2022, with no backtracking in 2022. In Germany, it more than doubled from 12 GW to 25 GW in the same time period.

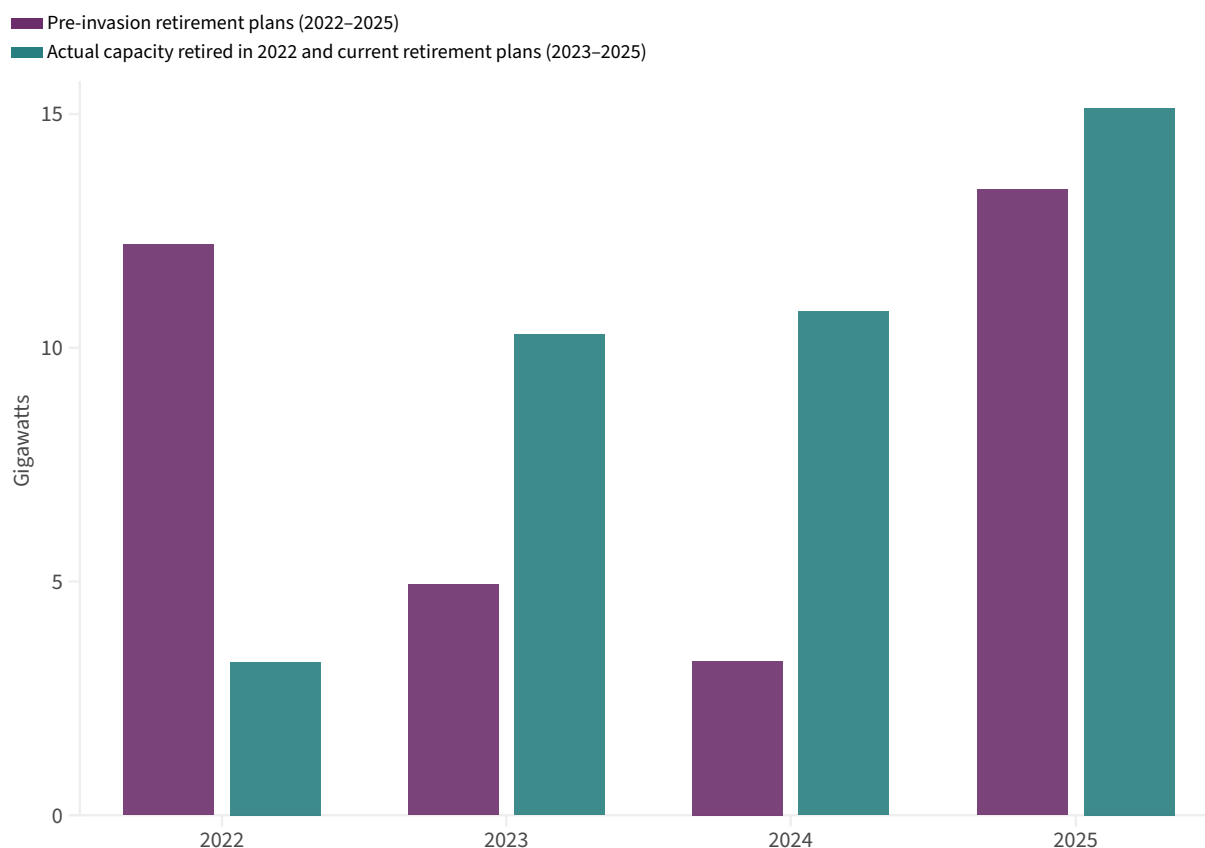
The region's temporary restarts and extensions are also generally expected to wind down in 2023 and 2024, and the rebound in retirements in the next few years could make up for the lower than expected retirements in 2022 (Figure 14). So far, an additional 60 GW of capacity is expected to be retired by 2030. Although some of this capacity is slated for replacement by nonrenewable and uneconomical alternatives, like LNG and biomass, renewable developments promise long-term, reliable potential for the region.

Despite the overwhelming majority of European countries only considering and engaging in very short-term coal measures so far, there are a few exceptions to the rule. For example, in Hungary, which has a 2025 coal exit date, the possibility of extending the lifetime of the lignite-fired generation units at the [Mátra plant](#)

until the end of 2029 is being [considered](#), but this would hardly qualify as an unavoidable, short-term measure and [must be abandoned](#). In Greece, which now has a [2028 coal exit date](#), the government recently [announced](#) that the new [Ptolemaida V](#) lignite-fired power unit could remain in the system as a strategic coal reserve unit after 2028.

All told, four countries have phased out coal (Austria, Belgium, Sweden, and Portugal) and the majority of nations have a coal exit planned. But voluntary commitments may not be as strong of an indicator as was once hoped. A few years ago, France's 2022 phase out target appeared within reach. But over 2.5 GW remains in operation in January 2023. A supervisor at the [Emile Huchet plant](#), which rehired workers for a November 2022 recommissioning, called the decision

Figure 14: Planned coal capacity retirements in EU + UK by year (as of January 2022 versus January 2023)

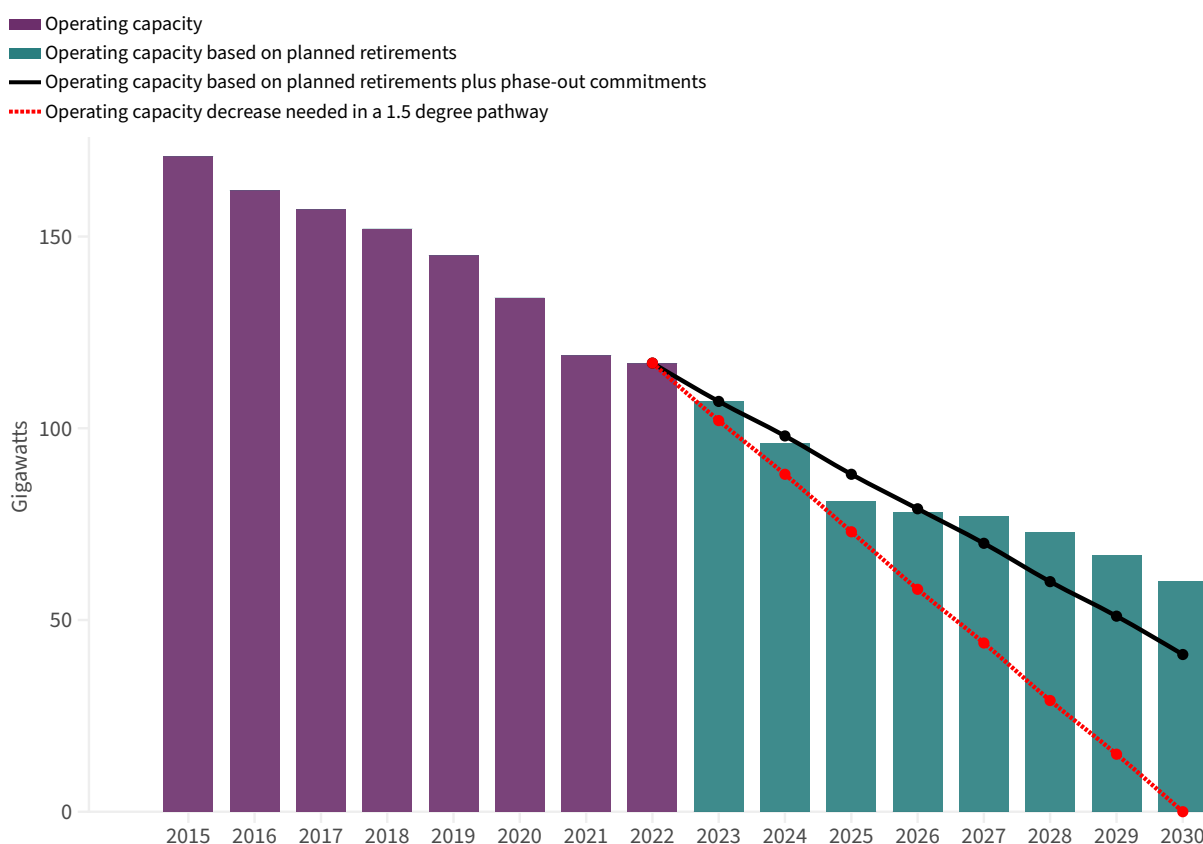


a “necessary evil.” Times of crisis, such as that caused by Russia’s invasion of Ukraine, can easily throw a spanner in the works for fragile, non-binding policies.

Although a steeper decline in coal capacity is needed to align with a phase out of all coal in the EU and UK by the end of 2030 (Figure 15), the region is expected to continue as one of the leaders in the world’s transition away from coal. In 2022, a report [found](#) that

the majority of European countries had significantly stepped up their ambition in terms of renewable energy deployment since 2019, while decreasing planned 2030 fossil fuel generation to shield themselves from geopolitical threats. With the exception of a few very public cases in the UK and Germany—where a new coal mine was [approved](#) and a large mine [expanded](#)—coal output in Europe continues to fall.

Figure 15: EU+UK historic and projected coal capacity (2015–2030) and the gap to 1.5 degrees



TÜRKIYE

Türkiye ranks third in the world for proposed coal power capacity under development, behind only China and India. As of 2022, around 11 GW of projects are announced, pre-permitted, or permitted. But all of these projects have struggled to obtain financing, and operating and planned projects have suffered a series of legal setbacks. Just one 1.3 GW coal-fired power station—the [Emba Hunutlu plant](#)—was synchronized to the grid in 2022 (potentially one of the last overseas coal plants financed by Chinese institutions). The fate of a dozen other projects hangs in the balance.

Türkiye’s Ministry of Energy and Natural Resources has signaled a shift towards more sustainable energy sources. By 2035, it plans to add over 65 GW of wind and solar capacity to the grid and only 3.2 GW of coal capacity. The discrepancy between projects currently under development (around 11 GW) and the Ministry’s projects (3.2 GW) suggests that a considerable number of projects could be cancelled within the decade. This would continue a trend since 2016 when Türkiye began to cancel coal capacity, or at least ensure projects were not actively under consideration so they could be presumed cancelled, with greater urgency.

Air pollution, water pollution, and concerns about the climate crisis have contributed to the loss of the coal industry’s social license to operate. According to a [recent survey](#), two thirds of the population believes that coal fired power generation needs to be substituted by cleaner options. In October 2022, a report from the Climate Change, Policy, and Research Association, an interdisciplinary NGO in Türkiye, found that the [Çayırhan plant](#) was out of compliance with flue gas regulations and burning coal from an unpermitted mine. The plant was also at risk of imminent collapse. The [Yunus Emre plant](#), which is fully constructed but unable to operate because the plant’s boiler is unsuited for the coal in the area, remains [standing](#) as a dead investment. The initiatives to sell the plant have failed several times this year, and Yıldızlar Holding bought the plant, but the details of the purchase remain unknown. At the same time, the [Afşin-Elbistan A plant](#) continues to operate without [fulfilling](#) its legal

responsibilities in accordance with environmental legislation, all while initiating an application for the construction of two new 344 MW coal units at the site. It is still unclear how the earthquake on February 6, 2023 affected the Afşin A and B power plants in Kahramanmaraş, the epicenter of the humanitarian crisis, but the Turkish Office of Strategy and Budget [estimates](#) that the public and private electricity sectors in the region incurred damages totalling around 570 million TL (US\$30 million).

Like in many other parts of the world, Türkiye’s courts continue to play a role in determining the fate of proposed coal projects. The Kahramanmaraş Administrative Court blocked the [Afşin-Elbistan C plant](#) (the decision is on appeal), and Türkiye’s Energy Market Regulatory Authority revoked the generation license of the [Ilgın plant](#). Ilgın was also one of two projects with precarious Chinese financing involvement since China’s September 2021 overseas funding pledge; the other, the [Kirazlıdere power complex](#), secured an EPC contract with Energy China over two years ago and has not had any apparent developments since. Financing also continues to be a challenge broadly, with many “announced” projects still lacking the private funding that they seek.

Between 2013 and 2018, operating coal capacity in Türkiye increased by 50%, from 12.5 to 18.8 GW. Since 2018, the increase in coal capacity has significantly slowed down, reaching 20.8 GW operating by 2022. The coal industry’s recent struggles suggest that many new projects may ultimately be shelved and abandoned, so operating coal capacity in Türkiye may have arguably reached its peak despite pending plans.

Despite mounting environmental problems, the Turkish Minister of Environment, Urbanization, and Climate Change announced at COP27 that emissions from the country would not [peak](#) until 2038, effectively delaying the country’s energy transition and broader net zero target established as 2053 just one year prior. In addition, the risk of coal mine expansions to feed the existing coal power capacity remains a concern. In

October 2022, a mine explosion in Amasra killed over 40 workers, and trapped a dozen more, in one of the worst coal mining disasters in recent years. The incident provided a stark reminder of the deadly hazard

UKRAINE

Even before Russia's invasion of Ukraine in February 2022, its fleet was [struggling](#) with high incidences of operational failure and a lack of coal supplies. Several coal-fired power stations, many built before 1973, were already facing a half-century of wear and tear and operating at a limited capacity. Coal supplies from the Donbass region stopped almost entirely in mid-2014 and 2015 due to the wreckage of coal mines and transportation infrastructure following Russia's seizure of Crimea. In the years since, production data in the Donbass has remained spotty.

Russian attacks have continued to cause significant damage to Ukraine's energy infrastructure. Russia fired [more than 1,000 missiles](#) at substations, transformers, and power stations in Ukraine in October and November 2022 alone. Every thermal power station in the country has been impacted.

Russian occupiers took control of four of Ukraine's coal plants in 2022: the [Luganskaya](#), [Myronivskiy](#), [Vuglegirska](#), and [Zaporizhia](#) power stations. Several other coal plants are in the hot battle areas. Although Ukraine defied Russia and [initiated](#) electricity exports to the EU to help with energy shortfalls in neighboring countries, exports had to be [scaled back](#) following missile strikes in the fall. In December 2022, Ukraine's [energy deficit](#) was estimated at around 2.5 GW, and by March 2023, it appeared [resolved](#).

Damage to infrastructure and the resulting grid volatility has resulted in blackouts across the country, which

INDONESIA

Indonesia is one of the world's largest coal producers and consumers. In 2022, Indonesia's operating coal capacity increased 3% from 39.4 GW to 40.6 GW, and is up 60% from 25.4 GW in 2015. The country also had

that coal mine methane poses to local communities, in addition to its climate impact. The country's ongoing mine projects continue to face strong local opposition.

also impacted district heating and water supplies in many cities. The operational capacity of coal plants in the country was more than halved between January 2022 and January 2023, and the true generation capacity was likely even lower. The [Burshtyn plant](#) (2 GW pre-war) in western Ukraine, which had operated as an independent energy island for many years, was re-synchronized to the national grid in early 2022 and is now vital to the country's energy security. Despite incurring major damage from rocket strikes, Burshtyn was contributing capacity to the national electricity system at the end of the year.

Following [announcements](#) in 2021 by the government and DTEK, the biggest private investor in the country's energy sector, Ukraine committed to phase out coal between 2035–2040. Even as Russian hostilities continue, the Ukrainian government and its National Council for the Recovery of Ukraine [kickstarted](#) plans for a green reconstruction after the war. As Ecoaction [writes](#), stakeholders must ensure that coal mining towns are not only on the front line of the country's resistance, but also at the heart of a vision to rebuild a fairer, safer, and greener Ukraine. In February 2023, DTEK's CEO also [summarized](#): "We should think about what Ukraine will be like after the victory, about its future as a post-war country. I am convinced that Ukraine should become the platform for scaling all innovations and global technologies in reconstruction."

18.8 GW of coal power considered under construction by the end of 2022, an amount exceeding all other countries except China and India. Some of this capacity appeared on the cusp of commercial operation,

including units at [Jawa-4](#), [Jawa Tengah](#), [Lontar Exp](#), and [Sulsel Barru 2](#) that the Ministry of Energy and Mineral Resources (MEMR) [classified](#) as “achievements” in 2022.

It has long been clear that Indonesia would not move away from coal [without the aid](#) of the international community, so 2022 was a breakthrough year for the country. In November 2022, a Just Energy Transition Partnership (JETP) [promised](#) US\$20 billion in financial support (see Private finance coal policy trends in 2022). While the details are set for release sometime in 2023, the JETP [aims](#) to peak power sector emissions by 2030, faster than the initial target of 2037, and to cap CO₂ emissions levels about a quarter lower than previously expected by the same time. It is one of five different Energy Transition Mechanisms (ETMs) being [implemented](#), with others being led by the Asia Development Bank, the national electricity company PLN, the government’s Indonesia Investment Authority, and the state-owned infrastructure company PT Sarana Multi Infrastruktur (Persero). It is still unclear how all these schemes will function collectively. The ambitious measures and committed funds are short of what is [required](#) in a 1.5 degrees Celsius pathway but are a welcome sign of progress.

Between the coal capacity in construction and pre-construction still in the mix, Indonesia may still

PAKISTAN

Pakistan’s coal fleet boomed from a mere 150 MW in 2016 to more than 7.6 GW by early 2023. An additional 0.7 GW is under construction. Due to its dependence on energy imports and a financial crisis in 2022, Pakistan was particularly susceptible to fuel shortages, soaring LNG costs, and numerous [blackouts](#). In July 2022, the government reportedly [decided](#) to convert its existing power plants to run on domestic, as opposed to imported, sources of coal.

In the last year, 2.6 GW of coal capacity was commissioned at the [Port Qasim Lucky](#), [ThalNova](#), [Thar Block I](#), and [Thar Energy Limited](#) plants. Construction also appeared to begin at two small captive coal plants:

be a ways away from seeing its last coal plant commissioned. Although more than 8 GW of coal was cancelled in 2022, the country still has around 7 GW of coal capacity in pre-construction and 8 GW of shelved plans. Recent developments do not guarantee it will all be cancelled. In fact, the JETP reaffirmed a moratorium on “new” on-grid coal power generation, but allows exemptions for captive coal plants in accordance with a key presidential regulation issued in September 2022 ([Perpres 112/ 2022](#)) and coal plants previously identified in the Electricity Supply Business Plan (RUPTL) for 2021–2030.

Around 13 GW (58%) of the capacity under construction and in pre-construction is at proposed “captive” coal plants, meaning “off-grid” plants that exclusively power [industries](#) like aluminum smelters (like the proposed 2.2 GW [Adaro plant](#)) and processing facilities for minerals like cobalt and nickel that are used in electric vehicle and battery supply chains. Industrial Parks are national strategic projects for Indonesia, but as it stands, the lack of strategic and sustainable planning around meeting power demand from such projects could become a real challenge for the country’s net zero ambitions. For China, a major [investor](#) of captive coal in Indonesia’s industrial sector, the ongoing developments have been running counter to its pledges to stop supporting overseas coal plants and green BRI investments.

a 40 MW expansion at the [Faisalabad Sitara Chemical power plant](#), and 36.5 MW at the [Sheikhupura plant](#) to supply power to a Mughal Steel project.

The country has another 4 GW of pre-construction capacity at various stages of development. Previously rumored to be replaced with a solar plant, the proposed 300 MW coal-fired [Gwadar plant](#) is expected to [move forward](#) with Chinese financing. The project flies in the face of both China’s 2021 pledge to withdraw from overseas coal and Pakistan’s stated [moratorium](#) on new imported coal projects. In February 2022, Islamic Development Bank and Organization of the Petroleum Exporting Countries (OPEC) Fund

loans for a second 660 MW unit at the [Jamshoro plant](#) were reportedly [cancelled](#) at Pakistan's request; however, by the end of the year, Karachi's investor-owned utility company was [urging](#) for the project to be switched to local coal and developed in coordination with Saudi Arabia.

In February 2023, Energy Minister Khurram also announced Pakistan was [reversing](#) a long-held strategy to import more fuels including LNG. Instead, it would aim to [expand](#) four-fold the country's coal-fired power capacity that relies on domestic coal resources, from 2.31 GW to a potential 10 GW. Such an increase would surpass and defy the coal projects [contemplated](#) in the [Indicative Generation Capacity Expansion Plan](#) for 2022–31. Moving forward, “must-run” obligations and long term contracts must be seriously considered to avoid locking in unnecessary emissions and expenses. An analysis by TransitionZero and IEEFA

BANGLADESH

Under the 2016 Power System Master Plan “Revisited” (PSMP) released in November 2018, coal power capacity in Bangladesh 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 2022, another 6 GW of coal capacity moved from pre-permitted or shelved to presumed cancelled, increasing the amount of capacity abandoned since 2014 to 28.8 GW.

The country's last remaining coal proposals, which total 6.7 GW, seem increasingly unlikely following China's pledge to end overseas coal financing: the [Orion plant](#) and the Phulbari power stations ([Gezhouba & Sinohydro](#)). However, in September 2021, 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 and a [large open pit mine](#). (Bangladesh Power

also [highlighted](#) both the volatility to coal and gas power competitiveness, and the need for reforms to ensure renewable and storage costs continue falling.

Meanwhile, coal in Pakistan continues to wreak havoc on people and the environment. In an October 2022 report, the Policy Research Institute for Equitable Development (PRIED) [highlighted](#) the adverse impacts of [coal mining](#) and power in Thar on the livelihood of agro-pastoralist communities: “Apart from contaminating local water resources and degradation of land, changing land use pattern has exposed Tharis to severe livelihood challenges.” The country's coal projects—many proposed under the China-Pakistan Economic Corridor (CPEC) framework—have been plagued by delays, corruption, and opposition, leading to socio-political conflicts as well as a significant rise in Pakistan's debt.

Development Board's Monthly Progress Report for February 2023 only listed 1.9 GW of proposed coal: the [Orion plant](#), with a comment about location uncertainty, and the [Maheshkhali plant](#), projected for June 2030 but absent from BPDB's recent annual reports.)

At the same time, 2022 saw one new unit commissioned at the [Barisal plant](#), the [first](#) independent power producer (IPP) project invested, constructed, and operated by PowerChina and controlled by a Chinese-funded enterprise in Bangladesh. In addition, one unit was finally commissioned at the controversial [Rampal](#) plant. The plant had to [suspend](#) production only 29 days after it started operating because of coal shortages, and by February 2023, its power cost was nearly [double](#) initial estimates due to the global coal market and US dollar exchange rate.

Construction also continued at five plants in 2022. If completed, the additional 5.7 GW of coal power capacity would nearly triple the 2.9 GW coal power capacity currently operating in Bangladesh. Included in this

in-construction capacity is a Chinese-backed Phase II of BCPCL's [Payra plant](#), which was initially expected to be axed after China pledged it would not build new coal-fired power projects abroad.

Bangladesh's power system [overcapacity](#) problem continues to grow and is made worse by guaranteed

VIETNAM

Vietnam has very substantially adjusted its plans for new coal power plants, but there is still a way to go. Over the last two years, drafts of the country's new Power Development Plan VIII (PDP8) have cut progressively more coal power, often switching coal projects to gas and adding more renewables. A July 2022 draft of the PDP8 listed fifteen coal-fired power stations planned for 2021–2030. Several of these projects were still in the contract negotiation stage, and even more (equivalent to over 7 GW) were listed as struggling to secure capital.

Prior to COP27, negotiations between Vietnam and G7 countries surrounding a Just Energy Transition Partnership (JETP) had failed. By December 2022, the countries were able to [agree](#) on US\$15.5 billion in funding to support Vietnam's energy transition, including the expectation that it would reach peak emissions by 2030 rather than 2035. Additionally, Vietnam would install less than 6 GW of additional coal capacity, down from the over 12 GW previously targeted and the over 18 GW included in the July draft of PDP8.

A new December 2022 draft cut the list of coal projects to twelve, several of which have struggled to attract investors and appear to be pivoting to gas. Some development projects, such as the long-delayed [Quang Tri plant](#), were explicitly cancelled in 2022. Phase 3 of the [Vinh Tan plant](#), which was originally planned to begin construction in 2010, has never been cancelled yet has been labeled as “troubled” and has faced a slew of roadblocks since inception.

power purchase agreements that have forced the country to pay for unused power. As fiscal pressures [mount](#) due to decreasing foreign currency reserves, the country must stop investing in new coal- and gas-fired capacity, and instead shore up cost-competitive renewables, invest in its grid, and focus on energy storage to ensure energy security and affordability.

Five power stations, equivalent to the entire 6 GW new coal capacity target, are already under construction. The [Long Phu plant](#), the [Quang Trach plant](#), Phase 2 of the [Thai Binh plant](#), the [Van Phong plant](#), and Phase 2 of the [Vung Ang plant](#) are at varying stages of completion as of January 2023. Should all of these projects reach commercial operation, the remaining proposed capacity must be cancelled in order for Vietnam to stay aligned with its JETP agreement.

The existing operational capacity in the country, which has more than doubled in the last decade, consists of over 70 units across 25 power stations. The coal fleet is very young, with 95% of the capacity installed in the last 20 years and nearly 80% installed in the last 10 years. Coal remains central to the livelihood of many residents of the country, with nearly two dozen [operating mines](#). Should Vietnam successfully phase out coal-fired electricity generation and mining over the long term, an equitable energy transition must take this population into consideration. The country's 2050 net-zero target is achievable, but it requires thoughtful deployment of JETP funds and an upgrade to the country's transmission grid to accommodate its rapidly-growing renewables sector. In addition, as human rights groups and others have been [highlighting](#), the government must uphold the highest human rights standards to strengthen and achieve its commitments. A just transition [requires](#) “true participation, the release of political prisoners, and restorative justice.”

PHILIPPINES

Coal plant proposals in the Philippines have been rapidly shrinking since the 2020 moratorium on plants for which the permitting process had not already begun, with capacity in pre-construction declining 84% from 10.1 GW in 2019 to 1.6 GW in 2022. The moratorium was [reaffirmed](#) by incoming President Ferdinand Marcos in August 2022, whose administration is [seeking](#) to replace existing and planned coal power projects with nuclear energy.

The Philippines ranked sixth in the world for new capacity in 2022, commissioning the 1.3 GW [Dingin plant](#). The operational capacity in the Philippines has doubled in the last decade, but annual capacity additions are starting to plateau. Two plants are currently under construction, the 600 MW [Mariveles plant](#) and a second 135 MW unit at [Concepcion](#).

SOUTH KOREA

South Korea announced an official 2050 coal exit year in 2021 but has yet to develop any concrete plans to execute a Paris-aligned coal phase out. According to the 10th Basic Plan for Electricity Supply and Demand (2022–2036), Korea plans to have 41 coal units operating in 2030 with a total capacity of 31.7 GW. This is only 7.4 GW less than the current operating capacity of 39.1 GW, or a 19% reduction, and completely out of line with the country's Nationally Determined Contribution (NDC) under the Paris climate agreement, which aims to reduce 40% of total national greenhouse gas emissions by 2030 compared to 2018.

Despite the strong demand for a coal phase out, Gangneung's [Anin unit 1](#) started operating in November 2022 and three new units ([Anin unit 2](#), [Samcheok units 1 and 2](#)) are scheduled to go online in 2023 and 2024. However, the financial market is increasingly turning away from coal businesses, and only 3.5% (KRW 8 billion, or US\$ 6.1 million) of the corporate bonds to finance the Samcheok Blue Power project [were sold](#) in 2023.

Estimated completion dates for the remaining 1.6 GW in pre-construction have been steadily slipping in the Department of Energy's project listings, as financing for new projects vanishes and Philippine energy companies move to shed their existing coal assets. Ayala has been [selling off](#) its coal assets in recent years, and in July 2022 its subsidiary ACEN [secured funding](#) through an Asian Development Bank-inspired ETM that will be used to retire the six-year-old [Puting Bato plant](#) by 2040, fifteen years ahead of schedule. The Manila Electric Company (Meralco) is not planning to [exit coal](#) until sometime between 2041–2050, and pins even this late exit date on the government's ability to replace coal power with nuclear.

In fact, the financial risks of coal dependency are already manifesting at a national scale. Due to its high coal exposure, the recent global energy price increase due to the Russian invasion of Ukraine has directly contributed to the financial crisis Korea Electric Power Corporation (KEPCO) is facing. In 2022 alone, the majority-state-owned utility [suffered](#) over a 32.6 trillion KRW (US\$25 billion) deficit, around 30% of which was directly attributable to coal power. Despite KEPCO's implementation of a series of [emergency measures](#), the crisis has had impacts beyond the utility's own balance sheet. For instance, there is [political pressure](#) on the National Pension Service to purchase KEPCO's bonds to help absorb the impacts of the crisis. Although it is unclear whether the Pension, which announced a coal exit in 2021, would respond, the decision to do so would spread the coal risks to future generations. It has thus become clear that retiring coal plants is a prerequisite to fundamentally ensuring the stability of KEPCO and the country's financial market.

Meanwhile, the social costs and negative impacts of a coal exit on workers and the regional economy are increasingly entering policy discussions. Communities that depend heavily on coal power generation require just transition measures to prevent job losses and economic downturns in the run-up to the upcoming closure of existing coal power plants in South Korea, as they do in the rest of the world. In the case of the South Chungcheong province (or Chungnam), where 30 out of Korea's total 80 operating coal plant units are located, 14 units are scheduled to be closed between 2025 and 2036. Voices demanding a just transition are resonating in the region, and the subnational

government established its own [Just Transition Fund](#). Although the fund sends a strong signal to the national government to take responsibility for the government-led coal expansion in the province, the KRW 10 billion (US\$7.7 million) fund is far from sufficient. The Chungnam governor publicly [demanded](#) that the national government enact an act to support coal-regions and provide a 1 trillion KRW fund to the province. In addition to Chungnam's demands, a comprehensive just transition plan is needed to create jobs and revitalize the local economy by transitioning from fossil fuels to renewable energy-based industries at the national scale.

JAPAN

The volume of coal projects under development in Japan has been steadily shrinking, and just one new coal-fired unit has been announced since 2018. However, operational capacity remained on the rise in 2022, with over 3 GW of new units connected to the grid. Over 1 GW of this capacity came from the [Taketoyo plant](#); the project progressed in opposition to recommendations from Japan's Ministry of the Environment in 2015 and 2017, the year construction began. Units at the [Kobe](#), [Misumi](#), and [Tokuyama East](#) plants also began operating, each of which faced social and/or legal opposition prior to completion. Three under-construction power station units are also slated for completion by 2024.

Just one [500 MW coal gasification facility](#) in pre-permit development stands between Japan and a claim of "no new coal" in the country. This is in contrast to the nearly 10 GW that was in the works just two years prior.

Throughout 2022, various stakeholders in Japan ranging from environmental groups to [shareholders](#) called for companies in the power sector to take greater responsibility for helping Japan meet its commitments under the Paris climate agreement and fulfill its 2021 pledge to slash greenhouse gas emissions by 46-50% by 2030. Maintaining the fourth largest operational coal capacity in the world, these companies could determine the fate of Japan's trajectory towards a

fossil fuels phase-down. Many coal plants are owned by companies that proposed sustainability agendas in 2022, but [lack](#) binding commitments for emissions reduction targets.

Strategies to co-fire some plants with alternate fuels in Japan may reduce emissions from coal-fired power stations in the short run while increasing net emissions in the long run, especially if the use of alternate fuels gives coal plant operators an excuse to delay retirements. At least 9.8 GW across over 30 power stations co-fires at some ratio with biomass. The government also [promoted](#) ammonia/hydrogen co-firing and carbon capture and storage in so-called "Green Transformation" (GX) policy documents. In order to encourage co-firing, the Japanese government is not questioning the embedded emissions or production methods of [ammonia](#) and hydrogen, and there is currently no prospect for the supply of "green" ammonia needed to achieve the 20% co-firing target. These strategies [lack](#) significant potential to negate the carbon emissions that would be eliminated altogether by retiring coal facilities in favor of renewable energy development.

Just nine coal-fired units in Japan have a known planned retirement year. This is equivalent to less than 5% of operational capacity and signals that many power stations are targeting operation beyond

alignment with country-level climate commitments. Announced retirements, such as of Chugoku Electric Power's [Mizushima plant](#), are focused on the oldest and least efficient projects. Those in the newest vintage

group, including over 6 GW of ultra-supercritical capacity built in the last nine years, are not likely to receive a planned retirement target without an industry-level policy overhaul or country-level mandate.

AUSTRALIA

After a five-year lull in which no Australian coal plants were retired, 2022 saw operators beginning to rush for the coal exit, with multiple plants accelerating their retirement plans amidst rising public concern about the climate crisis, the defeat of staunchly pro-coal Prime Minister Scott Morrison in the May election, and a spate of bad legal and economic news for the coal industry.

The country's largest coal plant, [Eraring](#), will now be retired in 2025 instead of 2032, and the country's dirtiest, [Loy Yang A](#), will be retired in 2035, a decade earlier than planned. The [Liddell plant](#) retired 0.5 GW of capacity 2022 and plans to retire its remaining 1.5 GW in April 2023. Operating coal plants continued to lose money, with EnergyAustralia's coal portfolio [losing](#) AU\$1 billion in 2023.

Australia has the most [proposed coal mine projects](#) of any OECD country, but in recent months, those developments have faced a series of legal challenges and setbacks. In November 2022, the Queensland Land Court recommended that the massive [Galilee](#)

[Coal Project](#) be cancelled on the grounds that burning coal from the mine would contribute to further climate change that limits the human rights of people in Queensland, including the cultural rights of First Nations. This was a remarkable decision given that much of the coal would have been burned overseas, and the court found this to be as serious a human rights issue as coal burned domestically. In February 2023, Waratah Coal [dropped](#) its appeal of this decision, and the Galilee project, like other proposed projects in the area, appears to have no way forward. The same month, the environment minister [rejected](#) the [Central Queensland Coal Project](#) on the grounds that it would harm the Great Barrier Reef.

While new Prime Minister Anthony Albanese is accelerating plans to transition the country to renewables, he did [continue](#) his predecessor's support for Australian coal exports, claiming that reducing exports would actually increase global warming because importers would switch to coal of inferior "quality" to Australia's. Environmentalists dismissed this notion as a myth.

NORTHERN AFRICA AND THE MIDDLE EAST

In 2022, there were no new coal-fired power station proposals in Northern Africa and the Middle East, and it is possible that the 650 MW [Tabas plant](#) under construction in Iran will be the region's last new coal plant. Capacity under development has seen a staggering decline, with nearly 2.5 GW cancelled in the United Arab Emirates last year alone.

Of the 8.6 GW of operating coal capacity in the region, over half is expected to retire or end coal use by 2026. The units left without known planned retirement years, all located in Morocco, are not likely to be phased-out in the short term. In addition,

the country's large [Jorf Lasfar power station](#) has an extended power supply agreement through 2044.

Planned coal exits did not always play out exactly as expected, as is often the case across the world. The retirement of coal-fired power stations such as the [Orot Rabin plant](#) in Israel, for example, was slated for 2022. Because of market disruptions, operation of these units appears extended for another year or more. The four-unit [Rutenberg plant](#) also saw its planned 2022 retirement delayed at three units, this time by litigation surrounding the replacement gas project.

Many countries in Northern Africa and the Middle East have separate “conditional” and “unconditional” national climate commitments. The “conditional” commitments are much stronger: for example, Morocco has pledged to reduce emissions by 18.3% by 2030 or 45.5% if given international support. Oman has

pledged to reduce emissions by 4% by 2030 or 7% if given international support. An expedited energy transition in the region, away from both coal and gas, could be supported by global climate finance mechanisms such as grants and concessional investments.

SUB-SAHARAN AFRICA

Vanishing financing for new coal projects—especially China’s announced exit from coal finance in other countries—is slowing but not stopping the projects under development in sub-Saharan Africa. Legal victories against coal development and strong public opposition have also contributed to project delays. But, with nearly 50 GW of operational capacity and an additional 10 GW under development, sub-Saharan

Africa is at a crossroads in determining how energy security will be achieved in the coming years.

In 2021, coal’s fate in the region was in serious jeopardy after billions of US dollars in international climate finance was pledged and a series of company-level coal disposals were announced. Yet, it was clear in 2022 that the scale had not yet tipped

CASE STUDY: COAL IN SOUTH AFRICA KEEPS POCKETS HEAVY FOR A FEW AND LIGHTS OFF FOR MANY

South Africans faced a remarkable 205 days of rolling blackouts in 2022. A constant stream of unit breakdowns at Eskom’s aging coal-fired power stations was compounded by dozens of incidents of theft and other controversies. The utility’s CEO survived an attempted assassination in January 2023 and has since been ousted from his position for claiming that Eskom was losing around 1 billion rand (US\$55 million) every month as a “feeding trough” of money siphoning for the African National Congress (ANC).

Literal fuel siphoning is also a major concern. Arrests were made in relation to millions of rands worth of fuel stolen from the [Kriel plant](#). Eyewitness accounts reported over 50 people stealing copper cables from the [Majuba plant](#) rail project. 2022 also saw the arrest of two thieving truck drivers each at the [Matla](#) and [Kendal](#) plants.

Other concerning developments at Eskom power stations continued in 2022. Rocks were delivered to the [Majuba plant](#) instead of coal, which were just the right size to pass through steel filters. At the [Camden plant](#), an incorrect valve was opened, contaminating a steam turbine’s water supply and temporarily taking the entire 1.6 GW power station offline; one month later, a pulled plug allowed oil to fully drain and damage a bearing. A warming valve cable was cut “just outside the sight” of the facility’s cameras at the [Tutuka plant](#), where the President of South Africa called malicious

activities an “enormous” challenge. Cables were also cut at the [Matla plant](#) and [Hendrina plant](#).

A former Eskom chief executive was accused of insider trading when it was discovered that his step daughter netted a profit of 20 million rand (US\$1.1 million) by becoming a shareholder in a contractor of the [Kusile plant](#). They were arrested on corruption charges but maintain their innocence. In January 2023, fifteen year old internal emails [revealed](#) that after investing just 1.2 million rand (US\$65,000) into Kusile, the ANC’s investment arm, Chancellor House, received 97 million rand (US\$5.2 million) in “success fees” (an 8,000% return on investment). One month later, the North Gauteng High Court in Pretoria froze assets, including luxury cars and properties, allegedly purchased through a corrupt tender at the same site. Criminal investigations over alleged corruption are also underway at several other power stations, including the [Tutuka plant](#).

GroundWork’s 2022 report [Contested Transition](#) warns that “corporate South Africa looks for a just transition to bail it out of dirty, dead end businesses and fix capital in bright new ‘green’ megaprojects, but without disturbing the underlying logic of the system.” It provides an essential reminder that communities want to see a just transition for all, one that upends unequal relations of power to transform the lives of ordinary people and make for a society founded on justice.

in favor of alternative energy sources; non-binding agreements were walked back and political and economic interests helped even the least logical projects stay alive.

After touting the profitability of the [Medupi plant](#) for years, the African Development Bank conceded in June 2022 that the project would never turn a profit. The [Musina-Makhado plant](#), which was expected to be replaced by solar plans as of late 2022, appeared to be revived in the eponymous Special Economic Zone. Community and environmental groups highlighted that nearby coal mines were slated to resume operations in early 2023. The same was true of Beifa Investments' broadly unpopular [proposed](#) plant, which was also connected to a nearby mine project. Unlike Northern Africa and the Middle East, new coal-fired power station proposals continued in 2022 as well.

In South Africa, the disastrous load-shedding crisis caused by state-owned utility Eskom continued to escalate in 2022, with Stage 6 load-shedding introduced (equivalent to eight hours of power cuts in a 24-hour period) and the government considering the declaration of a national state of disaster. Eskom has loosened requirements for companies and municipalities looking to commission new projects, and in early 2023 the government sought to [fast-track](#) new energy infrastructure development because of the urgent need for reliable grid capacity. These plans include potentially easing environmental assessments and other administrative and legal requirements, which could ultimately encourage coal proposals to keep

LATIN AMERICA

New coal plant development in Latin America has slowed to a trickle in recent years, leaving only Brazil with pre-construction coal capacity and Argentina with coal capacity under construction. By the end of 2022, the region only had 1.8 GW of coal power in the pre-permit, permitted, or construction stages, an 82% decrease from the 10.1 GW that was under development in 2015. Colombia and Mexico continue to operate their existing coal fleets, but government officials

pushing forward. See the box below for more information on South Africa's energy crisis.

Outside of South Africa, there are nearly 50 coal-fired units under development in the region. Seventeen of these are in Zimbabwe, which is the most of any country in Africa and the fifth most globally. However, the operational capacity in Zimbabwe has remained almost unchanged in 30 years. Projects are not being cancelled at a sufficient rate, particularly as public pressure continues to highlight environmental and public health concerns over coal projects under development. For example, the company Rio Zimbabwe Limited (RioZim) has been attempting to finance the 2.8 GW [Sengwa plant](#) for a decade, which "remains alive despite the challenges."

Hopeful signs for the region include the 2022 cancellations of the [Lamu plant](#) in Kenya and the [Mbeya Coal to Power Project](#) in Tanzania, and the [Sechaba plant](#) in Botswana appears to have stalled out as well. When Eskom's [Komati plant](#) retired in October 2022, it became a flagship just energy transition [initiative](#). While a rush towards new gas power infrastructure has generally followed, the US\$8.5 billion in international climate finance secured by South Africa at the end of 2021 can support both power sector decarbonization and economic diversification. If replicated elsewhere, aging coal infrastructure has great potential to be decommissioned and repurposed as a significant tool for an equitable renewable energy transition in sub-Saharan Africa.

in both countries have ruled out the construction of new plants. Peru [closed](#) its last operating coal unit in 2022, Panama expects to shutter its lone remaining plant in 2023, and Chile has accelerated the pace of its national decarbonization plan announced in 2019.

After a decade of delays, Argentina's [Río Turbio plant](#) began supplying electricity to the grid in November 2022, becoming Latin America's first newly

commissioned coal plant since 2019. Owner YCRT is proceeding with construction plans for Unit 2 in 2023, even though Río Turbio's 120 MW Unit 1 has not yet operated at full capacity.

Brazil's [10-year energy expansion plan](#) calls for 1.4 GW of new coal power by 2031, and many government officials in the coal-producing states of Santa Catarina and Rio Grande do Sul continue to support new coal development. However, all three of Brazil's currently proposed coal plants remain stalled. The 600 MW [Ouro Negro plant](#), listed as the lone coal-fired participant in Brazil's October 2022 energy auctions, lost out to more competitive hydro, solar, wind, and biomass projects. Brazil's most modern coal plant, [Pampa Sul](#), was sold to new owners, leaving the future of its proposed 340 MW unit 2 in limbo. Meanwhile, a series of judicial decisions has indefinitely suspended the licensing process for the 726 MW [Nova Seival plant](#).

In Chile, three more coal-fired units—[Bocamina 2](#), [Tocopilla 14](#), and [Tocopilla 15](#)—were decommissioned in 2022, in accordance with the [national decarbonization plan](#) announced by the Chilean government in 2019. The nation's coal fleet is still on track for complete phase out by 2040, with five more units scheduled for decommissioning or conversion to other fuels between 2023 and 2025. However, some companies have failed to commit to firm closure dates for their coal-fired units, including AES (eight units at the [Cochrane](#), [Angamos](#), [Norgener](#), and [Ventanas](#) plants), Capital Advisors (five units at [Guacolda](#)), and Colbún (one unit at [Santa María](#)).

In Peru, Engie closed the country's only operating coal-fired unit, [Ilo 21](#), in December 2022.

Panama's last coal-fired power plant, the 306 MW [Cobre Panamá plant](#), will stop generating power

by the end of 2023, in accordance with the national coal phase out policy announced in June 2021. Cobre Panamá has signed contracts to purchase renewable energy from AES starting in January 2024, and will convert its existing coal-fired units to run on a mix of renewables and natural gas between 2025 and 2030.

Colombia's new president, Gustavo Petro, has signaled a sea change in Latin America's largest coal-producing nation. The leftist Petro administration plans to gradually reduce coal exports and has ruled out the construction of new coal plants or open-pit coal mines, but will continue operation of the country's five existing coal plants.

Mexico's three coal-fired power plants increased electricity production by 63% in 2022 under the fossil fuel-friendly policies of President Andrés Manuel López Obrador. While the government has so far stuck by its November 2021 pledge not to expand Mexico's coal fleet, its growing focus on domestic hydrocarbons production and gas imports poses a serious threat to Mexico's stated emissions targets.

Among Caribbean nations, the Dominican Republic stands out for its continued reliance on coal. Coal represents 22% of installed capacity and accounts for up to 37% of annual electricity generation. The [national energy plan for 2022–2026](#) calls for steady use of coal at current levels for the next decade and a half, though coal's share of the electricity matrix is forecast to shrink as renewables and gas-fired plants are brought online to meet growing demand. The 752 MW [Punta Catalina plant](#) has been controversial since its commissioning in 2019, with environmentalists calling for its [shutdown or conversion](#) to meet European environmental standards, even as the government touts its reliability and supports its ongoing operation.

APPENDIX

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

Country	Pre-construction	Construction	All Active Development	Shelved	Operating	Cancelled 2010–2022
Albania	0	0	0	0	0	800
Argentina	0	120	120	0	495	0
Australia	1,000	0	1,000	4,720	23,977	8,716
Austria	0	0	0	0	0	800
Bangladesh	6,700	5,724	12,424	1,670	2,855	28,805
Belarus	0	0	0	0	0	1,400
Belgium	0	0	0	0	0	1,100
Bosnia and Herzegovina	1,350	0	1,350	1,680	2,073	2,170
Botswana	450	0	450	2,550	732	4,950
Brazil	1,666	0	1,666	0	3,177	4,990
Brunei	0	0	0	0	220	0
Bulgaria	0	0	0	0	4,709	2,660
Cambodia	700	315	1,015	0	1,405	4,880
Canada	0	0	0	0	4,707	1,500
Chile	0	0	0	0	4,323	9,527
China	250,069	115,472	365,541	35,192	1,092,889	599,120
Colombia	0	0	0	1,585	1,646	1,250
Côte d'Ivoire	0	0	0	0	0	700
Croatia	0	0	0	0	210	1,300
Czech Republic	0	0	0	0	7,445	1,380
Denmark	0	0	0	0	1,560	0
Djibouti	0	0	0	150	0	0
Dominican Republic	0	0	0	0	1,064	2,040
DR Congo	0	0	0	500	0	0
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	0	0	0	90	0	0
Finland	0	0	0	0	1,468	385
France	0	0	0	0	2,507	180
Georgia	0	0	0	0	0	300
Germany	0	0	0	0	40,505	20,413
Ghana	0	0	0	0	0	2,100
Greece	0	660	660	0	2,225	1,250
Guadeloupe	0	0	0	0	64	0

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

Country	Pre-construction	Construction	All Active Development	Shelved	Operating	Cancelled 2010–2022
Guatemala	0	0	0	0	1,172	300
Guinea	0	0	0	0	0	330
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	28,503	32,000	60,503	20,710	234,256	584,841
Indonesia	7,480	18,849	26,329	8,170	40,647	41,710
Iran	0	650	650	0	0	0
Ireland	0	0	0	0	915	0
Israel	0	0	0	0	4,325	1,260
Italy	0	0	0	0	6,166	6,795
Jamaica	0	0	0	0	0	1,140
Japan	500	2,450	2,950	0	52,978	12,177
Kazakhstan	756	65	821	130	13,033	2,260
Kenya	64	0	64	960	0	1,716
Kosovo	0	0	0	0	1,290	830
Kyrgyzstan	600	0	600	0	826	0
Laos	7,036	0	7,036	300	1,878	0
Latvia	0	0	0	0	0	435
Madagascar	30	0	30	0	120	0
Malawi	400	0	400	120	0	3,100
Malaysia	0	0	0	0	13,280	4,900
Mauritius	0	0	0	0	195	110
Mexico	0	0	0	1,400	5,378	1,850
Moldova	0	0	0	0	0	0
Mongolia	7,030	50	7,080	250	960	3,160
Montenegro	0	0	0	0	225	1,664
Morocco	0	0	0	0	4,257	1,670
Mozambique	1,200	0	1,200	1,050	0	3,770
Myanmar	0	0	0	0	190	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	0	0	500
Nigeria	0	0	0	0	285	4,545
North Korea	0	0	0	0	3,250	300

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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 2010–2022
North Macedonia	0	0	0	0	800	730
Oman	0	0	0	1,200	0	0
Pakistan	4,010	732	4,742	163	7,638	24,040
Panama	0	0	0	0	306	0
Papua New Guinea	0	0	0	52	0	0
Peru	0	0	0	0	0	135
Philippines	1,620	735	2,355	5,120	11,893	12,660
Poland	0	100	100	500	29,130	22,383
Portugal	0	0	0	0	0	0
Romania	0	0	0	0	2,955	5,705
Russia	3,173	70	3,243	1,226	39,925	11,495
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	1,635	1,600	3,235	0	43,624	15,650
South Korea	0	3,140	3,140	0	39,154	7,500
Spain	0	0	0	0	2,210	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	0	0
Taiwan	0	0	0	0	19,244	14,000
Tajikistan	0	0	0	0	400	650
Tanzania	600	0	600	390	0	1,375
Thailand	600	0	600	2,000	6,138	8,726
Türkiye	10,438	145	10,583	405	20,093	87,853
Ukraine	660	0	660	0	9,320	2,060
United Arab Emirates	0	0	0	0	0	5,470
United Kingdom	0	0	0	0	4,140	9,968
United States	0	0	0	300	212,042	28,168
Uzbekistan	600	0	600	0	2,493	300
Venezuela	0	0	0	0	0	2,800
Vietnam	1,210	6,120	7,330	18,860	24,637	47,315
Zambia	300	0	300	0	330	1,940
Zimbabwe	4,570	940	5,510	950	1,000	7,240
Total	346,800	190,287	537,087	115,293	2,082,581	1,752,137