

4.5 times as much overseas coal capacity linked to China cancelled or shelved than progressed to construction

Key findings

Over the last 5 years, more coal-fired power capacity linked to China was shelved or cancelled than commissioned. This indicates that despite massive construction at home, overseas coal projects faced significant political and financial challenges in most host countries.

- Over 120 GW of coal-fired capacity operating today can be linked to China. Between 2000 and 2017, Chinese firms invested approximately US\$115 billion in overseas power plants.
- Since 2017, a wave of project cancellations has hit China-backed coal power investments: 4.5 times as much capacity has been shelved or cancelled than entered into construction.
- Project cancellations can be attributed to weakening economic competitiveness of coal, public opposition and concerns about negative environmental and social impacts, as well as existing overcapacity in recipient countries.
- Overseas coal projects with Chinese involvement have far higher air pollutant emissions than allowed for coal power plants in China. Chinese-backed overseas projects for which official data (from EIAs or permits) was available declared emissions limits that were on average 6, 4 and 7 times as high as the NO_x, PM and SO₂ emissions limits in Chinese regulation.
- In terms of CO₂ emissions intensity, only three out of the 16 projects for which we found data met China's domestic standards for thermal efficiency. On average, the projects had 8% lower thermal efficiency than the minimum under China's thermal efficiency standards.
- The data shows that so far the drop in Chinese-backed coal projects entering construction is driven by host country policies and trends. Recent policy signals from recipient countries might well have made Chinese banks and suppliers more cautious about engaging in new projects; our data is not able to measure this yet. While policy change around coal is a good start, recipient countries must also send clear market signals around their interest in developing and backing renewable energy technologies.
- Chinese leadership has repeatedly vowed to “green” the Belt and Road Initiative, and there is an opportunity for China to meet the urgent need for energy transition by shifting lending policies towards clean energy and strengthening the environmental standards and oversight for all overseas projects backed by Chinese public or state-owned institutions.

Introduction

China has been the world's largest investor in overseas coal projects in the past decade. In 2020, the country's policy banks alone provided [US\\$4.6 billion to foreign energy sectors](#), increasing their total energy finance since 2000 to US\$245.8 billion. The bulk of these investments were arranged between 2015 and 2017, and heavily favored coal projects in emerging economies. In addition, the top 10 banks responsible for global coal financing since the 2016 Paris Agreement were found to be Chinese banks, [led by Bank of China, the Industrial and Commercial Bank of China \(ICBC\), and China CITIC Bank](#).

Today, around 12 percent of all operating coal plants outside of China can be linked to Chinese state-owned banks, utilities, equipment manufacturers and construction firms. Involvement runs the gamut of direct investment and mergers-and-acquisitions to Engineering, Purchasing and Construction (EPC) contracts and boiler, generator, and turbine technology sales. Such agreements supported expansion strategies of influential Chinese enterprises and power companies, and reinforced the leadership's political and economic initiatives for trade with the rest of the world.

Enthusiasm for coal was reciprocated in many emerging economies, as foreign investment in the power sector filled a local financing gap and aided in meeting growing demand for electricity, which was hoped to fuel the economy.

However, the policies and economics around coal have drastically changed, and [development has begun to slow outside of China](#). This is a result of waning demand growth and existing overcapacity, calls for reform and transition of the sector to combat climate change, and [competition from cleaner, less-polluting power sources](#). Countries and institutions that have played a major role in coal development in the past have announced moves away from the fuel. In June 2021, the [G7 countries](#) announced that they would stop all new financing for overseas coal projects by the end of this year, as well as a "[Clean Green Initiative](#)" to support sustainable development in developing countries.

There are indications of China moving in the same direction; [experts from the environment ministry](#) recently recommended that coal investments on the Belt and Road Initiative (BRI) be discouraged. At the US Climate Summit in April 2021, President Xi Jinping re-iterated a commitment to green the BRI.

Following the high rates of shelving and cancellations analysed in this briefing, an exit from coal would likely allow China to focus on more renewable energy and green transition investments that are less risky in the long-term, and that could contribute significantly to meeting global climate targets.

Trends in Chinese-backed coal projects

Our analysis of how China-backed overseas coal projects have progressed since 2017 suggests that the appetite for coal in recipient countries has started—and continues—to wane considerably, contributing to the [observed overall slowdown in coal development outside of China](#). We compared the status of Chinese-backed coal-fired power plants in January 2017 and 2021, using various global databases such as the [Global Coal Plant Tracker](#), [Natural Resources Defense Council](#), and [Boston University's China Global Power Database](#). The focus on China-backed projects in this briefing is due to its role as the largest financier of overseas coal and the only one that hasn't announced official restrictions on coal financing.

We found that a wave of project cancellations has hit China-backed coal power investments in the last five years. The ratio of cancelled to commercialized coal capacity was 3.5 to 1; up from [a global failure rate of 2:1 in 2014](#). In addition, coal construction has slowed; the number of projects entering construction since 2017 was four times less than what was shelved or cancelled. This is the lowest it has been since coal projects ramped up in 2007-08.

Setbacks to the remaining 80 GW of China-backed coal capacity in construction and pre-construction are expected. Our findings show that emissions limits on key pollutants and carbon dioxide (CO₂) on several proposed China-backed projects do not meet the standard that China applies to coal plants at home. Local opposition stemming from environmental concerns around issues like air pollution could further derail projects.

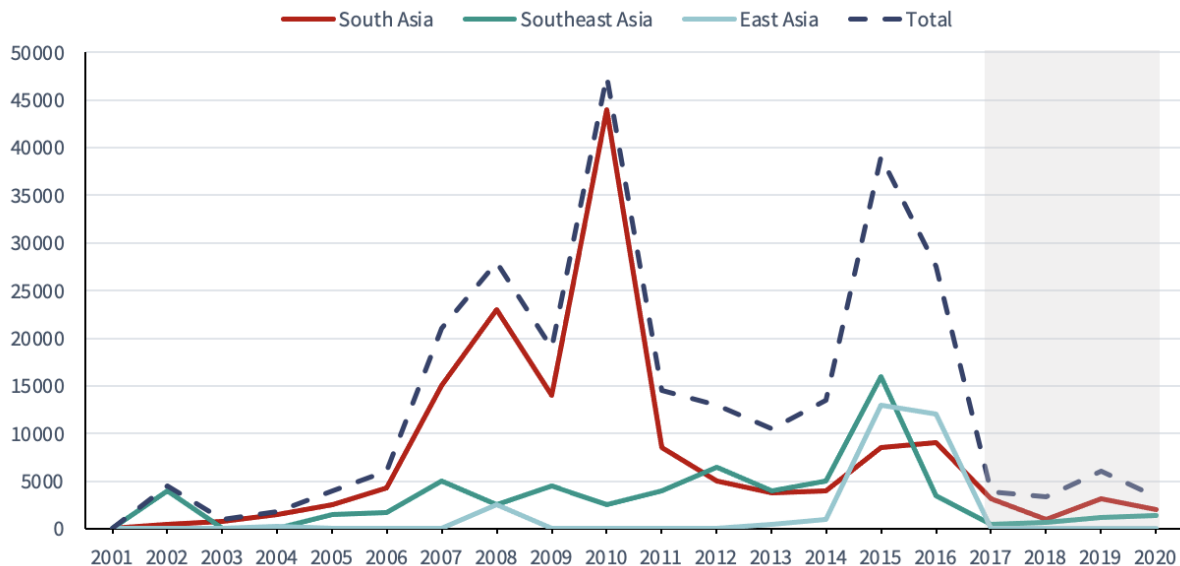
Considering current delays in development, worsening global financial outlook on coal, and ongoing changes in host countries' policies towards fossil fuels, a pivot towards renewable energy investments rather than continued backing of coal should be pursued.

Secular drop in new projects entering construction

In 2017, Chinese-back coal projects in the planning and permitting stage totaled 138 gigawatts (GW). Since then, almost half of this capacity (73 GW) has either been shelved or cancelled — this is 4.5 times more than the 18 GW of capacity that entered construction over the same period of time. An estimated 290 million tonnes of carbon emissions a year— equivalent to the total CO₂ emissions of Poland, the third largest emitter in the EU — have been avoided by their cancellation, in addition to avoided environmental degradation and air pollution in recipient countries, many of which have been [dealing with worsening air quality](#).

Total capacity under construction has also decreased from 38 GW in 2017 to 27 GW at the start of 2021. BRI coal projects that have started construction in the last 5 years are the lowest they have been since 2008 (*Figure 1*). Furthermore, in an unusual change in the fortunes of coal power projects, approximately 6.2 GW of capacity in construction in 2017 was cancelled after construction began. Such changes in the project pipeline driven by this level of shelving and cancellations indicate a clear slowdown in coal development from waning domestic interest and/or decreasing need for additional coal projects.

Figure 1: Capacity (MW) of Chinese-backed coal projects that entered construction phase per year



SOURCE: Data from 2001 to 2016 from [Global Environment Institute, 2017](#) / GCPT 2021

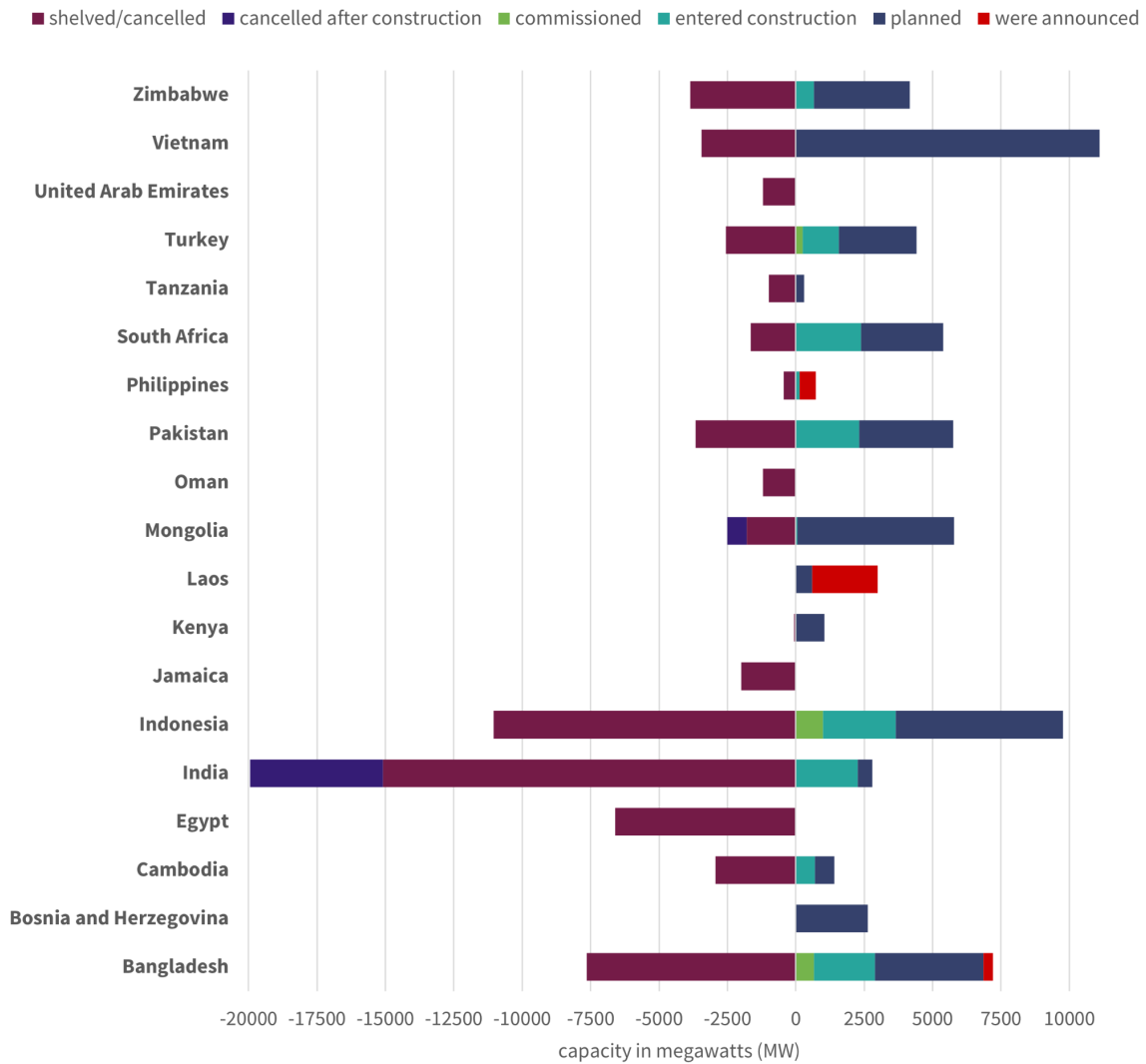
Regionally, this trend in cancellations and shelving can be observed across the board. The highest proportion of coal capacity abandoned was in Africa and the Middle East, where the ratio of plants cancelled to that being built was 5 to 1. South Asia and Southeast Asia, which account for the largest capacity of China-backed coal projects in both operating and planned stages, have also seen a noticeable deceleration.

In South Asia, the failure rate of cancelled to constructed capacity is 4:1. While the region has constructed the most coal projects after China, it is also responsible for 40 percent of all abandoned China-backed coal capacity globally since 2017, indicating a lower appetite for coal than previously expected. Most of the cancellations occurred in India, where China-linked projects are often under agreements for purchasing of turbine, boiler, or generator technology or EPCs due to limitations placed on foreign investments in the country's power sector. In Bangladesh, where the third highest capacity of coal plants were cancelled (*Figure 2*), almost 8 times more projects have been removed from the pipeline than operationalized, of which 95 percent were under arrangements for financing.

Southeast Asia saw a 2:1 ratio of cancelled capacity and newly operating plants, but capacity that progressed into construction versus that cancelled was 1 in 4. Indonesia had the largest share of capacity backed by financing, 11 GW of which have been cancelled since 2017. Approximately 7 GW were planned on the main Java-Bali grid, where [coal fired power plants near Jakarta contribute significantly to regional air pollution](#). Still, appetite for additional coal capacity remains relatively high. Over half of the 31 GW of proposed projects in the region are in Indonesia and Vietnam; these

two countries also have the largest share of China-backed coal capacity in pre-construction globally (Figure 2).

Figure 2: Change in China-backed coal capacity between 2017 and 2021



Source: CREA Analysis of GCPT 2021 data

Poor emissions controls

Over 80 GW worth of coal projects linked to China are still in construction or pre-construction globally. A total of 216 million tonnes of CO₂ emissions would be emitted annually if this capacity is built, which would severely affect our ability to meet Paris Agreement temperature targets.

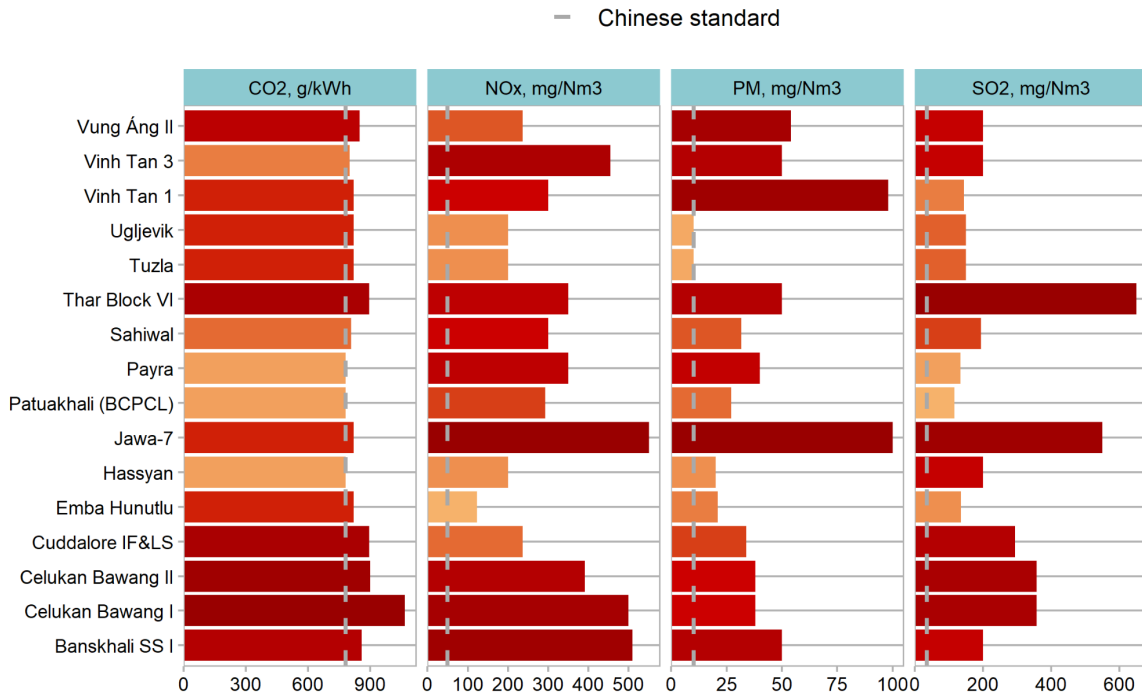
In addition to climate concerns, air pollution issues are a key driver behind public opposition to coal-fired power plants. Chinese officials and media have [trumpeted advanced coal technology as a key export to developing countries](#). Industry insiders argue that China's coal power technology will bring tangible environmental benefits by providing more efficient technologies than countries could otherwise afford; and even that [China is exporting mostly advanced generation technology](#), with most overall emissions [approaching natural gas powered plant equivalents](#).

We compiled information on emissions limits and design parameters from publicly available Environmental Impact Assessments (EIAs) and other documents issued by the project developers to assess whether the air pollutant and CO₂ emissions performance of proposed projects holds true against such claims.

Our review found that all 16 of the assessed coal projects have adopted emissions limits for nitrogen oxides (NO_x), particulate matter (PM) and sulfur dioxide (SO₂) that exceed the emission limits of China domestically.

Despite China having one of the most stringent emissions standards and the know-how to build lower-emission plants, emissions limits in Chinese-backed overseas coal projects are on average 6, 4 and 7 times as high as the NO_x, PM and SO₂ emissions limits required for a new plant at home. Countries like Pakistan and Indonesia, which are among the top 5 countries with China-backed capacity still planned, do not require adequate controls on their already large coal fleet. For example, SO₂ limits for the proposed Thar Block VI plant are 19 times as high as Chinese emissions limits. The Jawa-7 power station's emissions limit for NO_x is 11 times as high as China's standard; and for PM, it is 10 times as high as China's regulated standard (*Figure 3*). Emissions from these plants will contribute to poor air quality domestically, increasing the health and economic risk from coal-fired air pollution.

Figure 3: Comparison of emissions limits in Chinese overseas coal projects to Chinese standards for new coal projects



Source: CREA Visualization of emissions limits obtained from official project EIAs and/or permits

Even the “best” projects in the portfolio have dangerously high emissions limits for certain pollutants. While both the Tuzla Thermal in Bosnia-Herzegovina and Ugljevik Thermal in Serbia meet the PM limit for new Chinese coal plants, their SO₂ and NO_x limits are 4 times as high as required in China. SO₂ for the ultra-supercritical Patuakhali power station (BCPCL) in Bangladesh is 3 times as high as allowed by Chinese regulation, and the proposed Emba Hunutlu power station in Turkey has NO_x limits that are 2.5 times as high.

In terms of CO₂ emissions intensity, only three out of the 16 projects for which we found data met China’s domestic standards for thermal efficiency, which directly dictates CO₂ emissions per unit of power generated (g/kWh), when the type of coal used at the plant is given. On average, the projects had CO₂ emissions intensities 8% above the maximum level under China’s thermal efficiency standards.

Waning Interest in Host Countries

[Earlier research](#) has found that renewable energy made up more than half of the Belt and Road energy investments for the first time in 2020. The researchers [attributed](#) the shift to “a realisation from Chinese investors and host countries that carbon-intensive energy production carried both financial and environmental risks.” However, the high rate of project shelving and cancellations suggest that host country reluctance played a key role, not refusal by Chinese investors to provide financing.

Analysis of a sample of coal projects financed by South Korea and Japan found that the ratio of projects entering construction to projects cancelled over the last five years is far higher, with 3 times as many construction starts as cancellations. These projects are neither more efficient nor needed; as they have drawn similarly strong domestic pushback and recorded [lax environmental standards that have resulted in considerable health impacts to the local population](#). This differing trend indicates that projects pursued by Chinese firms are more risky, and less likely to get built given the massive pipeline.

However, recent policy signals from the government might well have made Chinese banks and suppliers more cautious about engaging in new projects in the first place, but our data is not able to measure this yet. A limitation of our dataset is that we cannot measure projects where Chinese actors could have had the chance to engage but decided not to — we are only able to look into projects where there is already an announcement of involvement from Chinese institutions.

Major commitments and concrete targets — backed by enabling policy and regulation — that disincentivize coal in recipient countries will have huge impacts on the remaining pipeline of coal as [international financing continues to dry up](#). Approximately 32 GW of the remaining China-backed pipeline are in the same stage of pre-construction as in 2017 — 57% of which are under direct financing agreements.

This could increase the failure rate of coal projects moving forward. In the past, lag times in fossil fuel infrastructure extended to 10 years, but the growing list of challenges that could delay development and increase costs for investors could influence even Chinese institutions to balk at re-financing that would be needed for many of these projects to progress from planning to operations. Subsidies and bail-outs have kept coal in most countries alive but new policies also signal that countries can no longer keep this up, or have little reason to do so.

Further setbacks for coal in the energy sector are expected, especially as COVID-19 has caused significant delays in project construction and permitting, and changes in host countries' outlook towards coal are becoming less favorable. For example, Vietnam's draft Power Development Plan 8 and Bangladesh's Integrated Energy and Power Master Plan are delayed for revision. South Africa's big 4 GW Limpopo coal project is not included in the country's Integrated Resource Plan 2019 (IRP 2019). Countries like India are currently mulling how to increase their climate ambition under the Paris agreement, with implications for coal-fired power that are likely to be significant. Late last year, Laos committed to '[net zero with support](#)' which puts its entire China-backed coal pipeline in question. In Mongolia, the situation is confusing; a few weeks ago, the Prime Minister said the country would diversify its economy away from coal, but also appeared to have re-activated two

previously shelved plant expansions. Even then, the record of coal in Mongolia is shaky at best; for example, the majority of planned projects linked to China have not progressed since 2017 and approximately 1.8 GW have been cancelled. The planned [Kolubara B coal power plant, which had already been shelved and revived with PowerChina](#), has been halted following a request from Serbia's Ministry for Mining and Energy, who has reportedly started to consider new energy transition policies.

Table 1: Changes in policy or commitments that would affect coal in recipient countries with the highest China-backed capacity in construction & pre-construction phase, as of January 2021

Countries	Total Capacity (MW) in the Pipeline	of which, are in construction	of which, are in pre-construction	Announcements or commitments by host countries that could affect future coal-based power development
Vietnam	14100	3000	11100	The draft PDP8 cancelled or postponed half of the coal power pipeline until after 2030; it is currently undergoing revision, which could further limit coal's role in meeting future energy demand .
Indonesia	9975	2875	7100	State-owned utility PLN announced a net zero carbon plan by 2060, as well as a moratorium on coal construction after 35 GW are completed in 2023. The plan reportedly targets decommissioning of ~10GW of coal plants by 2035, and have only Supercritical and Ultra-Supercritical plants operating from 2036-40.
Bangladesh	7864	2234	5630	In late 2020, the Power Ministry's energy plan reportedly cancelled 90% of planned coal projects, keeping only 5 plants where construction is underway
South Africa	6974	3974	3000	Announced goals for net zero emissions by 2050
Pakistan	6073	2640	3433	Moratorium on new coal. Government also seeks to renegotiate Chinese debt on China-Pakistan Economic corridor (CPEC) power projects
Mongolia	5780	50	5730	National environment ministry is now working on a roadmap targeting a peak emissions by 2030
India	4600	4060	540	No, but the country faces a chronic overcapacity situation leading to Non-Performing Assets (NPAs) and under-utilization of the current coal fleet. The Government is working on implementing stringent emission norms to control air pollution from coal plants.
Zimbabwe	4170	670	3500	No, but recently banned coal mining in its national parks , which affected joint ventures with Chinese firms to explore two of identified coal reserves.
Turkey	4155.5	1320	2835.5	No, continues to provide significant subsidies to coal through state-owned enterprises.
Laos	3000	--	3000	Committed to ' net zero with support .' Notably, all of Laos' planned coal capacity is being developed under BOTs contracts with the state-owned utilities of Cambodia, Vietnam and Thailand.

Conclusion

Moving forward, recipient countries must be vigilant in ensuring that overseas projects lean green, lest they run the risk of allocating investments towards less than favorable technologies like [coal-to-chemical](#) or gas-fired power plants, both of which have similar stranded asset risk to coal in many emerging economies. While policy change around coal is a good start, recipient countries must also send clear market signals around their interest in developing and backing renewable energy technologies.

Some countries have already started renegotiating Chinese-backed financing under the Belt and Road. In March 2021, [China's embassy in Bangladesh wrote to the Ministry of Finance](#) that “the Chinese side shall no longer consider projects with high pollution and high energy consumption, such as coal mining and coal-fired power stations.” Bangladesh, which had the third highest capacity of projects shelved or cancelled since 2017, has been in negotiations to repurpose over US\$ 3.6 billion in infrastructure, which could include planned coal. In Pakistan, a bid to preempt the possibility of raising power tariffs, led the [government to seek debt restructuring of US\\$ 3 billion](#) for energy projects covered by the China-Pakistan Economic Corridor (CPEC). China's response indicates some willingness to move away from coal investments, which should lead to more renewable investments under the BRI.

As the appetite for coal wanes, the market for new overseas coal power plants is now only a fraction of the market within China; in 2020, 85% of newly announced coal power projects [were in China](#). Coal development abroad is expected to face additional setbacks with the shrinking market for coal plants and host country policies moving away from coal.

China has the opportunity to proactively shift its investments in the same direction as the market and interest of recipient countries, rather than move forward with coal projects that have no assurance of returns in the face of growing financial and climate risk. This shift would also align overseas investments with the leadership's calls to green the Belt and Road Initiative. The shrinking market for new coal power outside of China means any potential reward from hanging on to high-emissions projects is fading rapidly.

The weak environmental performance and high emissions rates of overseas coal power projects also demonstrate the need for environmental safeguards and enforcement for all Belt and Road projects. This includes the adoption of best practices for Environmental Impact Assessments and emissions control technology. Many BRI countries have weak regulatory frameworks and standards, but it is hardly in China's interest to make use of these loopholes: cutting corners on environmental permits and exporting inferior technology doesn't seem to align with the image that the country wants to project of itself.

The question of when and how China will green its overseas investments remains unclear, but is an opportunity for the country to demonstrate climate leadership. The re-direction of investments towards renewable energy is a low-hanging fruit to ensure that neither recipient countries nor China locks-in on coal as a highly-polluting technology that is demonstrably on its way out.

Methods & Materials

For this study, the researchers used the [Global Coal Plant Tracker \(GCPT\)](#) database as reference data (as of January 2021), combining information on Chinese involvement and institutions per coal unit from databases maintained by S&P ([Platts World Electric Power Plants](#), 2020), Boston University ([China's Global Coal Database](#)) and NRDC ([Consolidated Coal and Renewable Energy Database](#)). The role of Chinese institutions in each project was grouped into 5 broad categories, namely: Financing; Mergers-and-Acquisitions (M&A); Engineering, Procurement & Construction (EPC); Equipment; and Advisory. Where projects had financial involvement or more (i.e. were backed by financing as well as EPCs, or purchased equipment from China on top of financing), the category used is financing.

The progress of coal projects is analysed according to the change in project status between 2017 and 2021, in line with the status definitions used by the GCPT. Calculations were made according to whether projects in the pre-construction phase in 2017 had (1) been commissioned, (2) started construction, (3) been cancelled after construction, (4) been shelved or cancelled, (5) been announced, or (6) remained in planning stage. For example, if projects were labelled “permitted,” “pre-permitted,” or “announced” by GCPT in 2017, but have a “construction” status in early 2021, these projects were summed to have “entered construction.”

Information related to coal-fired power projects’ emissions and countries’ commitments and policies around coal were obtained from public reports of relevant government bodies and enterprises and updated from news releases. While this study provides fairly comprehensive data and information on the general status of China-backed coal projects, there is limited public material that reports project status or other minor developments in most countries, meaning that all the relevant information on a project level may not be captured in this report.

Table A-1: Change in status of projects in pre-construction phase in 2017 by country

Country	commissioned	entered construction	cancelled after construction	have been shelved or cancelled	were announced	planned	<i>no change in 2017 pre-construction status</i>
Australia	0	0	0	1320	0	0	0
Bangladesh	660	2234	0	7650	350	3960	0
Bosnia and Herzegovina	0	0	0	0	0	2630	2030
Brazil	0	0	0	0	0	600	600
Cambodia	0	700	0	2940	0	700	0
Egypt	0	0	0	6600	0	0	0
Georgia	0	0	0	300	0	0	0
Germany	0	0	0	1100	0	0	0
Greece	0	0	0	450	0	0	0
India	0	2260	4850	15090	0	540	540
Indonesia	1000	2660	0	11040	0	6100	3900
Jamaica	0	0	0	1000	0	0	0
Kenya	0	0	0	64	0	1050	1,050
Kosovo	0	0	0	500	0	0	0
Laos	0	0	0	0	2400	600	0
Malawi	0	0	0	700	0	300	0
Mongolia	0	50	700	1800	0	5730	5730
Montenegro	0	0	0	254	0	0	0
Mozambique	0	0	0	0	0	500	0
Myanmar	0	0	0	405	0	0	0
Oman	0	0	0	1200	0	0	0
Pakistan	0	2310	0	3670	0	3433	3433
Philippines	0	135	0	450	600	0	0
Poland	0	0	0	1000	0	0	0
Romania	0	0	0	600	0	0	0
Russia	0	0	0	0	0	1000	0
Serbia	0	350	0	750	0	0	0
South Africa	0	2384	0	1650	0	3000	3,000
Tanzania	0	0	0	990	0	300	0
Turkey	255	1320	0	2560	0	2835.5	1886
UAE	0	0	0	1200	0	0	0
Vietnam	0	0	0	3440	0	11100	7980
Zimbabwe	0	670	0	3860	0	3500	2450
Grand Total	2485	15073	6200	72883	3650	4789	32599