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DIVERGING PATHWAYS: CHINA'S NEW COAL BOOM TAKES IT ON A DETOUR

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Countries across the world are driving forward towards the milestone of "No New Coal" power plants. However, one country's route is diverging from the rest. Our analysis of the latest data finds that the renewed coal boom in China sees it heading in the opposite direction.

Ending the construction of new coal power is a critical milestone towards achieving the goals of the Paris Agreement. The IPCC and the IEA are clear that no new unabated coal power plants should be built if the world is to limit warming to 1.5 °C.

Despite this clear imperative, and President Xi's commitment that China would "strictly control" coal,[1] the second half of 2022 saw the largest ever increase in pre-construction capacity in China. This accompanied significant spikes in new project proposals and construction starts.

A continued surge in new coal construction would see China taking a costly detour that would load its economy with stranded assets, undermine its global leadership on renewables deployment, and challenge the credibility of its climate commitments.

This briefing paper compares the latest No New Coal dynamics between China and the rest of the world. It is launched together with a companion analysis that provides a detailed picture of the positive dynamics in the world outside China.[2]

[1] Xinhua, 2021, **Full Text: Remarks by Chinese President Xi Jinping at Leaders Summit on Climate**

[2] E3G, March 2023, **Driving forward: World outside China closes in on "No New Coal"**

Both papers use the latest data from Global Energy Monitor's Global Coal Plant Tracker, published in February 2023.[3]

E3G produces regular analysis of the global new coal power landscape. Visit our No New Coal explainer[4] for further information on why the world must stop building new coal power stations – and what governments and other actors can do to progress this agenda. The E3G website is also home to the No New Coal Progress Tracker,[5] an interactive tool tracking progress towards the end of new coal power, updated at regular intervals across the year to reflect the latest data and political commitments.

Key findings

Capacity clash

> China's planned new coal capacity grew by 77 GW in the second half of 2022, the largest amount over a six-month period since 2015, taking China's total pre-construction coal project pipeline to 250 GW.

> This is in stark contrast to the rest of the world, which during the second half of 2022 saw its combined project pipeline drop below 100 GW for the first time in modern history. A 9% (10 GW) decrease sees just 97 GW remaining in all OECD and non-OECD countries excluding China.

Share of the spotlight

> China now accounts for 72% of global pre-construction capacity, up from 66% in July 2022.

> The next five largest countries account for 18% of remaining global capacity (India, Turkey, Indonesia, Laos, Mongolia). The remaining 10% is thinly spread across 27 countries, 13 of which have only a single project and are in touching distance of the No New Coal milestone.

[3] The Global Coal Plant Tracker categorises proposed new coal plant projects according to their progress through the different stages of the project development "pipeline": Announced; Pre-Permit; Permitted; Under Construction; Operating. It also tracks whether a proposal has been Shelved (through inactivity) or Cancelled. This briefing concentrates on projects that are in the first three "pre-construction" categories.

[4] E3G, March 2023, **Explained: what does "No New Coal" mean?**

[5] E3G, updated March 2023, **No New Coal Progress Tracker**

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Earth-shattering construction starts

> In the second half of 2022, China saw 41 GW of new construction starts, contributing to more than 50 GW for the full year. This includes over 10 GW of new capacity not previously identified by the Global Coal Plant Tracker, with multiple projects fast-tracked through permitting and into construction.

> By contrast, OECD / EU countries have seen no new coal plant construction starts since 2019. In the five-year period 2015–2019, OECD / EU saw just 24 GW of new coal plant construction starts. Similarly, the scale of China's new construction starts in the second half of 2022 is greater than that across all non-OECD countries since July 2019 (40 GW).

Surge in new coal project proposals

> All world regions outside China saw a decline or plateau in the scale of new coal under consideration in the second half of 2022. Only seven coal projects were proposed in the entire world outside China: six reactivated projects in India and one new project in Indonesia.

> By contrast, China saw a massive increase of 50 new or reactivated projects with pre-construction status. That is more than seven times as many projects as the rest of the world combined.

Global coal collapse vs China coal relapse

> Since 2015, proposed new coal power has collapsed by 90% in OECD / EU countries, and by 83% in non-OECD countries.

> As of July 2022, the aggregate global reduction of new coal proposals stood at 75% since the Paris Agreement in 2015. The scale of China's renewed coal boom has reduced this to 72% by the end of 2022.

> In 2019, China's 'traffic light' restriction mechanism on new coal construction had seen it reduce proposed new capacity by 88% since 2015, this has risen year-on-year and is now at 61% below 2015 levels.

> China's coal relapse has seen it lose its leadership position. Back in 2019, the OECD had only reduced its new coal plans by 53% and the non-OECD by 52%. The rest of the world have picked up the pace; now China is being left behind.

China's new coal plans in global context

As of January 2023, 347 GW of pre-construction capacity remains under development globally. This includes 118 GW of announced new projects, 118 GW at pre-permit status, and 111 GW with permits in place, distributed across 33 countries. Of this 347 GW, however, China accounts for 72% (250 GW) (Figure 1), up from 66% in July 2022. The rest of the world now has less than 100 GW of capacity proposed.

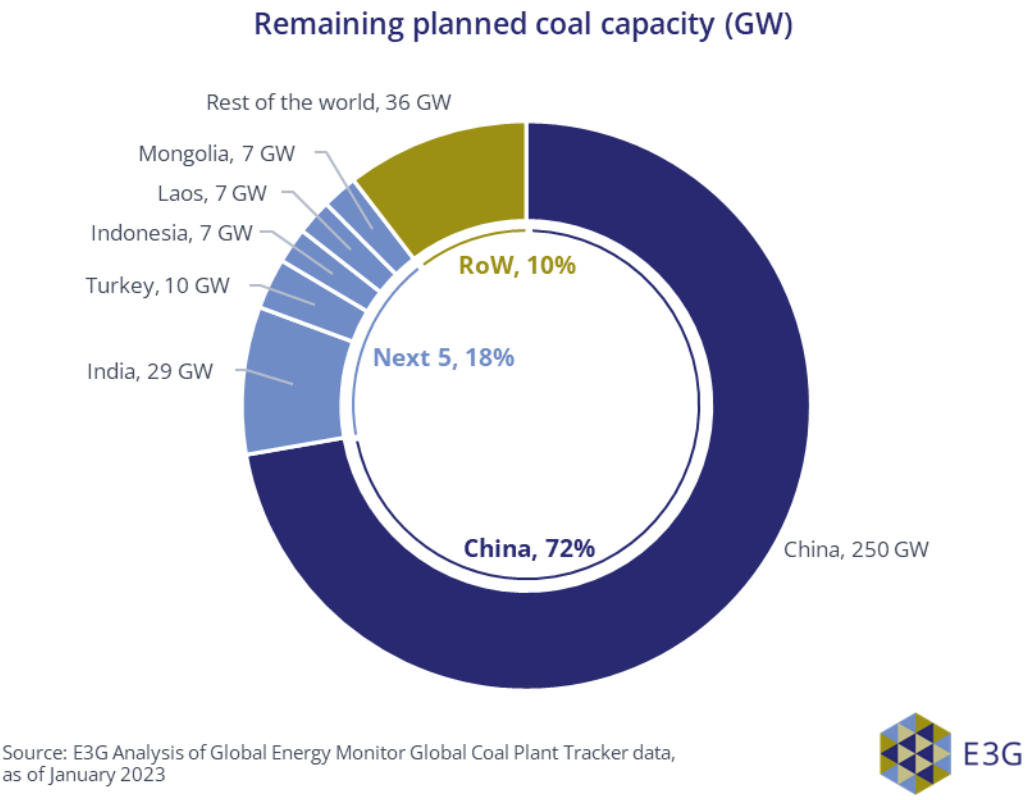

Figure 1: 72% of the world's remaining new coal power projects are in China.

Beyond China, 18% of the remaining planned coal capacity (Figure 1) is in the five countries with the next-largest project pipelines (India, Turkey, Indonesia, Laos and Mongolia). The final 10% is thinly spread across 27 countries, 13 of which have only a single project still under consideration. Among these, five[6] 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 GW in total capacity), providing a clear opportunity for replacement with clean energy alternatives.

[6] Madagascar, Niger, Tanzania, Ukraine and Cambodia.

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

In the non-OECD, Viet Nam has seen more than four-fifths (7 GW) of its planned coal capacity shelved or cancelled since July 2022, resulting in it dropping out of the top 5 countries outside China for planned pre-construction projects. Brazil is now the only country with pre-construction capacity in all of the Americas.

India and Indonesia are the only countries other than China to have seen their coal power project pipeline grow in the second half of 2022, but by miniscule amounts in comparison to China.

For further analysis of the country and regional landscape of proposed new coal power outside of China please see E3G's companion briefing "Driving forward: World outside China closes in on 'No New Coal'".[7]

China's renewed coal boom runs counter to rest of the world trends

The Paris Agreement in 2015 was a high-watermark for new coal proposals. As governments and companies internalised the implications of global commitments on climate change, it rapidly became apparent that coal power generation needed to be the first and fastest fossil fuel to exit the stage.

Figure 2 and Table 1 below illustrate the rapid collapse in new coal power proposals in the years following 2015. By January 2019, the scale of planned global coal capacity had collapsed by 70%, with China leading the way with an 88% reduction in new coal projects at pre-construction stages of development.

China's proposed new coal capacity declined by 88% over the period 2015-2018 following the successful introduction of 'traffic light' controls by the central government as a means of restricting runaway permitting by provinces.[8] By January 2019, pre-construction capacity in China had fallen to 76 GW and was a

[7] E3G, 2023, **Driving forward: World outside China closes in on "No New Coal"**

[8] For details see Global Energy Monitor Wiki **China's Restrictions on Development of Coal-Fired Power Capacity** and Unearthed, 2017, **China suspends permits for coal plants as new policy bites**

21% share of the global total. At that time, the OECD had only reduced its new coal plans by 53% and the non-OECD by 52%.

Since 2019, however, China's trend line has reversed course. A loosening of the traffic light restrictions has resulted in increased proposals, permitting, and construction of new coal power plants in China. The rapid growth in project proposals during 2022 has resulted in a tripling of pre-construction capacity since January 2019.

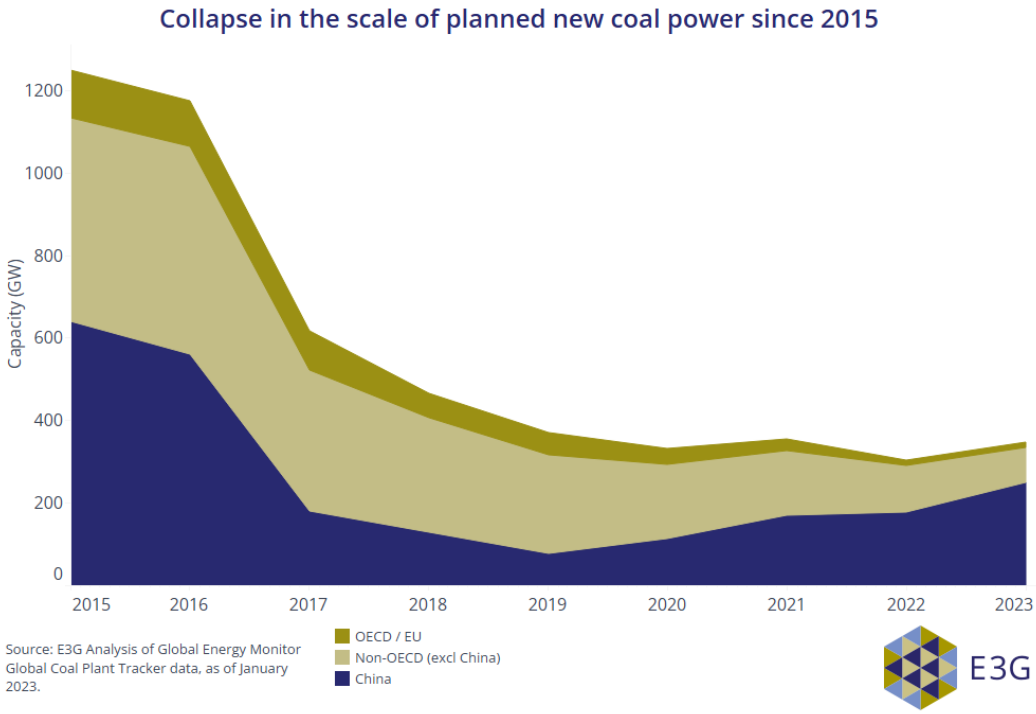

Figure 2: Change in planned coal capacity in OECD / EU, China, and the rest of the non-OECD since Paris.

Figure 3 below illustrates this initial contraction and subsequent expansion of China's proposed coal capacity. As of January 2023 this is now 250 GW, which is 61% beneath its 2015 level. However, this contrasts with the continuing collapse of proposed new coal capacity in the world outside China.

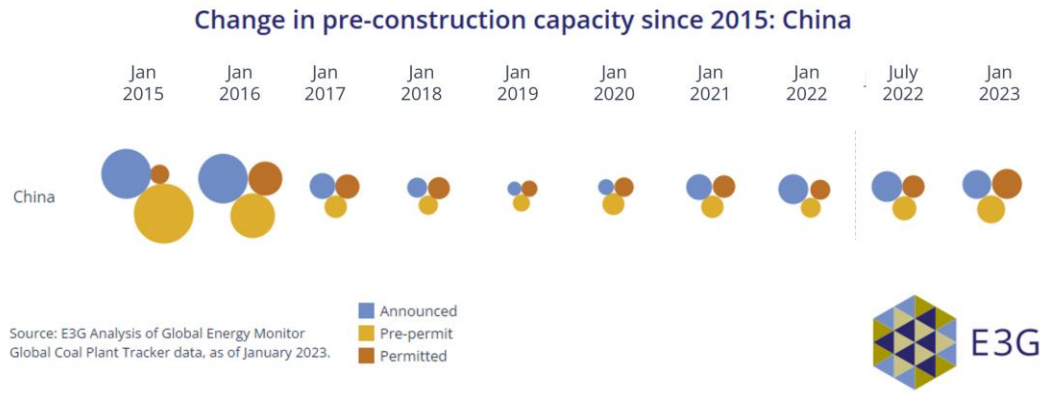

Figure 3: China's pre-construction capacity has decreased by 61% since 2015.

As of July 2022, the aggregate global collapse of new coal proposals stood at a 75% reduction since the Paris Agreement in 2015. The scale of China's renewed coal boom has reduced this to 72% by the end of 2022.

Conversely, OECD / EU countries have now reached 90% reduction in proposed capacity, with only a handful of projects remaining. Similarly, the level of capacity proposed across the non-OECD has fallen by 83%, taking many countries within touching distance of No New Coal status (Table 1, below).

Table 1. Change in planned coal capacity since January 2015.

	Change in planned coal capacity since 2015								
	Remaining capacity (GW)					**% reduction** compared to 2015			
	2015 baseline	Jan 2019	July 2021	July 2022	Jan 2023	Jan 2019	July 2021	July 2022	Jan 2023
OECD / EU	114	54	17	13	12	53%	85%	89%	90%
Non-OECD	494	239	136	94	85	52%	72%	81%	83%
China	640	76	185	206	250	88%	71%	68%	61%
World	1248	369	339	312	347	70%	73%	75%	72%

Source: Global Energy Monitor Global Coal Plant Tracker dataset, as of January 2023.

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Data updates and changes to headline indicators

E3G analysis in September 2021[9] found that the amount of new coal under consideration globally had collapsed by 76% since 2015 with subsequent analysis in November 2022[10] showing that the trend had remained stable. These figures were calculated based on Global Energy Monitor's Global Coal Plant Tracker dataset released in July 2021 and July 2022.

The most recent GCPT data release in February 2023 includes retrospective additions of newly identified projects. As a result, we recalculate that the development pipeline of pre-construction projects had contracted globally by 73% by mid-2021, and by 75% by mid-2022.

Huge spike in Chinese coal power projects entering construction in the second half of 2022

Since the Paris Agreement, the majority of proposed coal projects have been halted and eventually cancelled, as opposed to entering construction and becoming operational. Globally, for every 1 GW of new coal capacity that was built over this period, a further 2.5 GW were scrapped.

As with the other data sets tracking global coal dynamics, this trend also diverges across blocs. China has seen the largest proportion of its proposed coal projects continue through to construction, with a cancellation ratio of 1 : 1.6. Conversely, the ratio in non-OECD countries is 1 : 3.95, while OECD countries have similarly seen 3.7 GW shelved or cancelled for every GW that came online.

The varying ratios between projects entering construction and those being shelved and cancelled demonstrate China's "success" in taking projects from early stages through permitting, into construction, and ultimately into operating. Other countries have seen multiple projects cancelled because of diverse factors including worsening economics; competition from renewables; changes to company strategy; updates to national legislation; provision of guidance from climate change advisory bodies; or opposition from civil society. In China, the central government's concerns over energy security combine with the presence

[9] E3G, September 2021, **No New Coal by 2021**

[10] E3G, November 2022, **Approaching the milestone: The impending end of new coal power plant construction**

of an ecosystem of actors pursuing the development, permitting, construction, and operation of new coal power plants.

Figure 4 below illustrates the disparity between the levels of new coal capacity entering into construction across OECD, non-OECD and China since 2015. The most recent data for the second half of 2022 saw 41 GW of proposed capacity moving into the construction stage in China, significantly more than any period since the first half of 2019, and far outstripping new construction in the rest of the world.

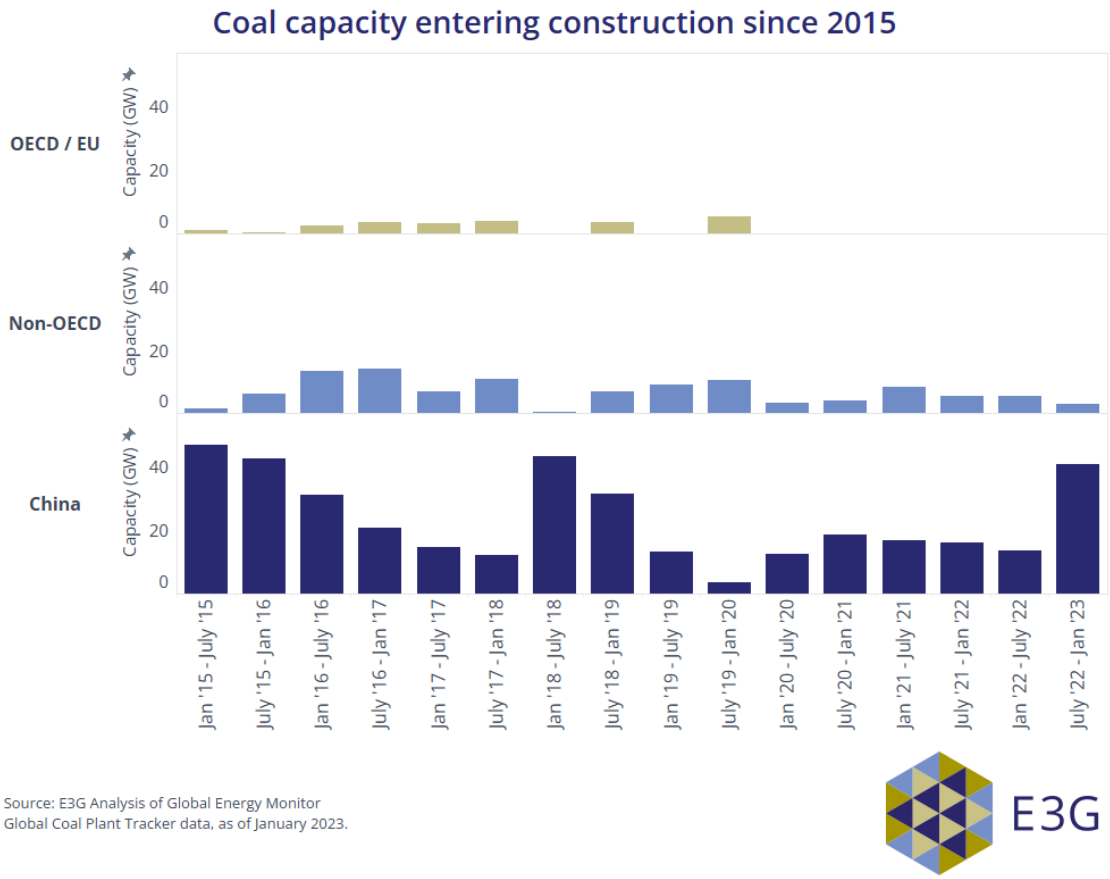

Figure 4: Projects entering construction in China grew significantly in the second half of 2022, diverging from the trend in the rest of the world.

Recent analysis by the Centre for Research on Energy and Clean Air (CREA) and Global Energy Monitor (GEM)[11] identified that this new coal plant construction in China includes 23 GW that was already scheduled in regional five-year plans. It

[11] CREA and GEM, 2023, **China permits two new coal power plants per week in 2022**

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also includes over 10 GW of new capacity not previously identified by the Global Coal Plant Tracker, with multiple projects fast-tracked through permitting and into construction. This represents a significantly accelerated permitting timeline which occurred outside standard processes. Finally, a further 7.3 GW of previously shelved or cancelled projects were re-animated and jumped straight into the construction stage.

By contrast, the OECD / EU saw no new coal plant construction starts since 2019, while the non-OECD saw only 3.1 GW enter construction in the second half of 2022.

The 41 GW of new construction starts in China in the second half of 2022 contributed to more than 50 GW for the full year. Previously, across the five-year period 2015–2019, the OECD / EU saw just 24 GW of new coal plant construction starts. Similarly, the scale of China's new capacity entering construction in the second half of 2022 is greater than all non-OECD construction starts since July 2019 (40 GW).

China's reaction to energy crunch undermines prior commitments and international credentials

The surge in China's coal project pipeline, particularly over the course of 2022, is at odds with President Xi's 2021 pledge to "strictly control" coal power.[12]

Energy security concerns have been escalated to the top of Chinese policymakers' priorities since the power shortages in 2021. The energy crunch resulted from the combination of mismatched price signals,[13] extreme weather,[14] and insufficient cooperation on electricity transmission[15] between provinces. Efforts to mitigate the economic impacts of the COVID-19 pandemic and the subsequent growth in energy demand have further exacerbated these challenges. Expanding coal capacity and production has become the government's go-to response to address a mix of short-term shocks, perverse incentives created by existing policies, and long-term energy security concerns.

[12] Xinhua, 2021, **Full Text: Remarks by Chinese President Xi Jinping at Leaders Summit on Climate** "China will strictly control coal-fired power generation projects, and strictly limit the increase in coal consumption over the 14th Five-Year Plan period and phase it down in the 15th Five-Year Plan period"

[13] Caixin, 2021, **Expert: The role of coal power needs to adapt to construct a new power system**

[14] Sina News, 2022, **How to address Sichuan's power crunch if extreme weather persists?**

[15] Yicai, 2022, **'Heated' exchange: energy and power system under stressed spurred questions on market regulation**

In addition to the record numbers of project power project approvals, the central government has set up a $31bn programme[16] for so-called "clean and efficient" coal and mandated an increase in coal production to 300 million tonnes, in order to rebuild coal stocks after the energy crunch.[17]

Over recent years, Chinese project developers and equipment manufacturers have been lobbying for increased construction of coal power plants.[18] China's 2021 decision to end support for international coal projects further intensified this dynamic, as companies had faced the challenges of an end to export markets, the prospect of shrinking domestic opportunities for new coal plant construction, and their own limited diversification into renewables.

Despite the rapid expansion of pre-construction and construction stage coal power plants, the growth in the amount of power generated by coal, which is directly linked to greenhouse gas emissions, has been relatively moderate. The total share of generation from coal increased by 1.43% in 2022 on the previous year. Increased electricity demand in 2022 was largely met by non-carbon-emitting sources, including wind and solar (69%) rather than coal-fired power (35%).

Many of the plants permitted in 2022 have been justified on the basis that they are "supporting grid stability" or "supporting intermittent renewables". This rationale is superficially plausible, as China's coal power stations often run at relatively low load factors compared to those elsewhere,[19] increasing the relative costs of generating electricity.

The recent CREA and GEM analysis[20] identifies that many of these newly proposed projects would be built in provinces which are lagging behind their peers in terms of clean power deployment, and / or that the plants are actually being given permits that would allow them to provide baseload power. This undermines the argument that coal power would provide peaking capacity to support high renewables penetration, for which various other technologies

[16] Reuters, 2021, **China to set up $31.4 bln relending facility for cleaner coal use**

[17] Caixin Global, 2022, **China to Add 300 Million Tons of Coal Capacity This Year**

[18] For example, China Energy Engineering Corp has called for China to build more than 270 GW of thermal power capacity by 2025. See Bloomberg, 2022, **China May Boost Coal Power Plant Building Amid Energy Crunch**

[19] Chi et al., 2021, **Regional coal power overcapacity assessment in China from 2020 to 2025**

[20] CREA and GEM, 2023, **China permits two new coal power plants per week in 2022.** We recommend this analysis for further granular insights into the domestic dynamics influencing the increase in proposed new coal capacity within China.

would be more effective and affordable.[21] It therefore instead appears that the "supporting" role for coal is being used as a rhetorical cover for a last wave of new coal plant construction, but in the absence of regulatory requirements or carbon pricing sufficient to ensure that new coal plants are indeed limited to a low load factor role.

In parallel China's surge in new coal, the country is also rapidly and successfully scaling up its deployment of renewable power and has become the largest investor into renewables globally.[22] This is both a cause and consequence of rapidly falling costs of renewable energy as compared to coal power.[23] China's ability to build and deploy homegrown, cost-competitive renewable energy at speed and scale further calls into question the economic viability of new coal projects into the future.[24]

China's coal fleet is relatively young at an average age of 14 years, compared to 34 and 41 years in Europe and the US respectively.[25] Positively, China has historically tended to retire coal-fired power plants earlier than other countries and regions.[26] Nevertheless, adding further new coal plants now risks further lowering the average age of China's fleet, and creating a significant lock-in trap for China, that will heighten stranded asset exposure and make China's energy transition more costly.

Conclusion

In 2021, President Xi told the world that China would "strictly control" coal power investment. In the two years since then, policymakers in China (and indeed the rest of the world) faced substantial and significant energy security challenges. Uniquely in China, "more new coal power" has been chosen as their answer to many of these questions. Other countries are answering in different ways.

While China's energy security challenges are real, the response is a direct challenge to President Xi's "strictly control" pledge. It also risks undermining

[21] Carbon Brief, 2020, **Mapped: The world's coal power plants**

[22] Reuters, 2023, **Column: China widens renewable energy supply lead with wind power push**

[23] Bloomberg, 2023, **China's coal mining boom is running on fumes**

[24] Transition Zero, 2022, **Fuel Switching 2.0: Carbon Price Index for Coal-to-Clean Electricity**

[25] International Energy Agency, 2021, **World Energy Outlook 2021**.

[26] CUI ET AL, 2022, **A U.S.–China coal power transition and the global 1.5 °C pathway**

China's aspirations as an international climate leader and only stands to make China's energy transition more costly. This is despite the positive role China is playing globally in ambitious clean energy innovation and investment.
China's coal boom risks creating a diverging world energy landscape, locking in significant newly operational coal capacity and constructions starts for the next five years, just as the rest of the world increasingly recognises the economic jeopardy of new coal.

Many proposed new coal plants in China are yet to initiate construction. The question is whether the central government can swiftly rein in provinces and power companies before new constructions proceed, putting a lid on new coal ahead of China's next Five Year Plan in 2026. Doing so is the best way for China to showcase its commitment to the energy transition and demonstrate its role as a front runner on climate.

The analyses presented here and in E3G's accompanying briefing "Driving forward: World outside China closes in on 'No New Coal'"[27] highlight how close the rest of the world is to arriving at the significant and necessary milestone of No New Coal. These positive global trends provide an opportunity for China to engage proactively in deploying clean energy alternatives to coal, both at home and abroad.

About E3G

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

E3G builds broad-based coalitions to deliver a safe climate, working closely with like-minded partners in government, politics, civil society, science, the media, public interest foundations and elsewhere to leverage change.

More information is available at **www.e3g.org**

[27] E3G, 2023, **Driving forward: World outside China closes in on "No New Coal"**