Powering Down Coal — COP26's Impact on the Global Coal Power Fleet

Key findings:

- **370 more coal plants (290 GW) given a close-by date.** After the pledges presented in the run-up to and at the Glasgow Summit, 750 coal-fired power plants —equivalent to 550 gigawatts (GW)— around the world have a phase-out date, while another 1600 plants (1420 GW) are covered by carbon neutrality targets but stop short of a phase-out decisions. This is up from 380 plants (260 GW) with a phase-out date before the 2020–21 ambition-raising process that culminated in Glasgow.
- Only 170 plants (89 GW) are not covered by either type of commitment — 5% of the operating fleet today. This is down from 2,100 plants (1,800 GW) before the Glasgow process.
- **90 new coal power projects (88 GW) are likely to be cancelled** due to "no new coal" and no new fossil fuel financing pledges — this is two-thirds of all planned coal plants outside of China.
- Another 130 new projects (165 GW), most importantly in China and Indonesia, are called into question as there is no room for them to operate under the country's new zero-carbon targets.
- Not all coal phase-out decisions are aligned with the Paris Agreement goals. Only 250 existing coal power plants (180 GW) are scheduled to close by 2030 in the OECD and 130 plants (100 GW) outside the OECD have a closure date by 2050.
- With Germany's expected 2030 phase-out decision and assuming the United States' 2035 Clean Power Plan will mean a coal phase out by 2030, the number of coal power plants with a Paris-aligned phase-out date would increase to 590 (460 GW).
- India's new target for clean power capacity will enable the country to start phasing down coal well before 2030, even assuming power demand growth continues at pre-COVID-19 rates.

Introduction

As the most carbon-intensive fossil fuel, phasing out coal use is crucial in limiting global heating to 1.5°C above pre-industrial levels. In 2019, coal-fired power generation was responsible for 30% of global energy-related carbon dioxide (CO_2) emissions. A third of global electricity output comes from coal, and to devastating effects. In addition to its carbon footprint, fossil fuel combustion was estimated to cause 8.7 million premature deaths in 2018 with electricity production and industry as the dominant contributor. A coal phase-out would have tremendous benefits, including improvements in environmental quality, public health and economic savings.

Prior to Glasgow, the UK announced that a key pillar of the summit would be "consigning coal to history," in line with the IEA's recommendation that unabated coal generation should be phased out by 2030 in developed countries and 2040 for developing economies. In the wake of COP26, notable commitments have been made in pursuit of this goal to end public finance for coal, halt new coal construction and permitting, phase out existing coal, and create new mechanisms and financial support to accelerate such a zero-carbon transition.

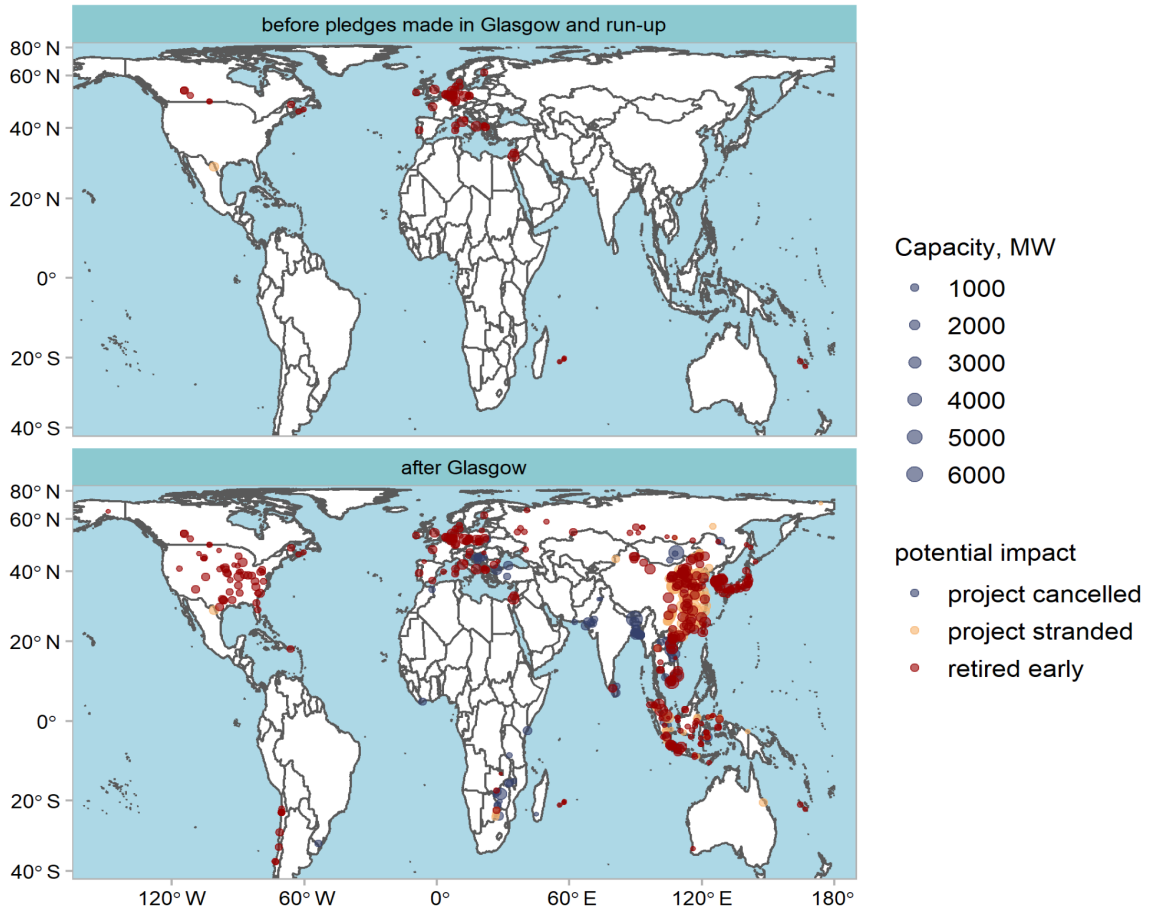
A collapse in the coal pipeline is already underway. Top public financiers like China, Japan, South Korea, and the G20 and OECD nations have pledged to end overseas coal financing. Several commitments have now been made to accelerate the transition to clean energy. A group of 25 countries including the UK, United States, Canada and Germany signed a joint statement to prioritise support for the clean energy transition, and end "new direct public support" for international unabated fossil fuel by the end of 2022. The $8.5 billion 'Just Energy Transition Partnership' to support South Africa's decarbonization efforts was followed by the Climate Investment Fund establishing a $2 billion pilot program to accelerate a clean energy transition in India, Indonesia, the Philippines, and South Africa. Indonesia and the Philippines announced a similar partnership with the Asian Development Bank to support the early retirement of coal-fired power plants.

Furthermore, it will be essential for countries to strengthen their 2030 goals, because current 2030 emission reduction targets are insufficient in keeping warming to no more than 2.0° Celsius within this century. A faster coal phase-out will be a key way to accomplish this, given the abundance of clean energy solutions.

Assessment of Pledges

The pledges presented in the run-up to and at the Glasgow Summit assign a phase-out date for 750 coal-fired power plants —or 550 gigawatts (GW)— around the world. Another 1600 plants (1420 GW) will potentially be covered by carbon neutrality targets. This accounts for 96% of the global operating fleet today, and would leave just 170 coal plants (89 GW) not covered by either type of commitment, most significantly in Turkey, Kazakhstan and the Philippines, followed by 30 other countries with less than 5 GW each.

Figure 1: *Potential Impact of Climate Pledges on the Global Coal Power Fleet*



At Glasgow, more than 40 countries have signed onto the '[Global Coal to Clean Power Transition Statement]', announcing their intention to halt new coal construction, phase out coal power in varied timeframes and levels of ambition, and rapidly scale up the deployment of clean power generation and energy efficiency measures.

Key coal consumers like Poland, Vietnam, and Ukraine, respectively ranked 11th, 14th, and 16th in coal consumption, committed to building no new coal plants and phase-out existing coal. Vietnam also has a commitment to reach net zero by 2050.

The phaseout date for several countries fall short of what is feasible for their economies. South Korea, the 10th largest economy and 5th largest coal user, pledged to a 2050 coal phase out while Poland, the 23rd largest, claims a 2049 date.

South Africa, Indonesia and the Philippines have not fully pledged to no new coal nor a phase-out this century, but stated that additional financial and technical support could spur an early retirement of their existing coal fleet, though the downward trajectory of coal can be observed prior to the Summit. Last year, the Philippines introduced a moratorium on greenfield projects that removed 8 GW of planned coal. Indonesia's state-owned utility PLN released a net-zero roadmap this year, and its most recent power development plan (RUPTL 2021-30) cancelled, converted or postponed over 11 GW of planned projects.

Notable hold-outs to the pledge include the United States, China, India, South Africa, and Australia, although many have made adjacent commitments to move away from the fuel. Both China and India have announced a net-zero target year. The United States, the third largest coal consumer, is scheduled to close a third of its coal fleet by the end of the decade; John Kerry recently stated that the country will "not have coal" by 2030. Bangladesh and Pakistan have cancelled a significant portion of their planned coal projects.

In addition to the Coal to Clean pledge, 28 new members signed up to the Powering Past Coal Alliance on phasing out coal by 2030, joining more than 160 countries, sub-nationals and businesses to now cover two-thirds of OECD and EU nations. Ukraine, which has the third-largest coal fleet. Chile also announced that it is working to accelerate its coal phase-out date from 2040 to 2030.

These pledges and the impact on the future of coal power generation are discussed in more detail in the succeeding sections.

New Projects

Impact of Country Pledges on Planned Coal Projects

- 88 GW directly affected and likely to be cancelled
- 165 GW could still go ahead but are called into question by carbon targets
- Only 56 GW of coal capacity are not affected

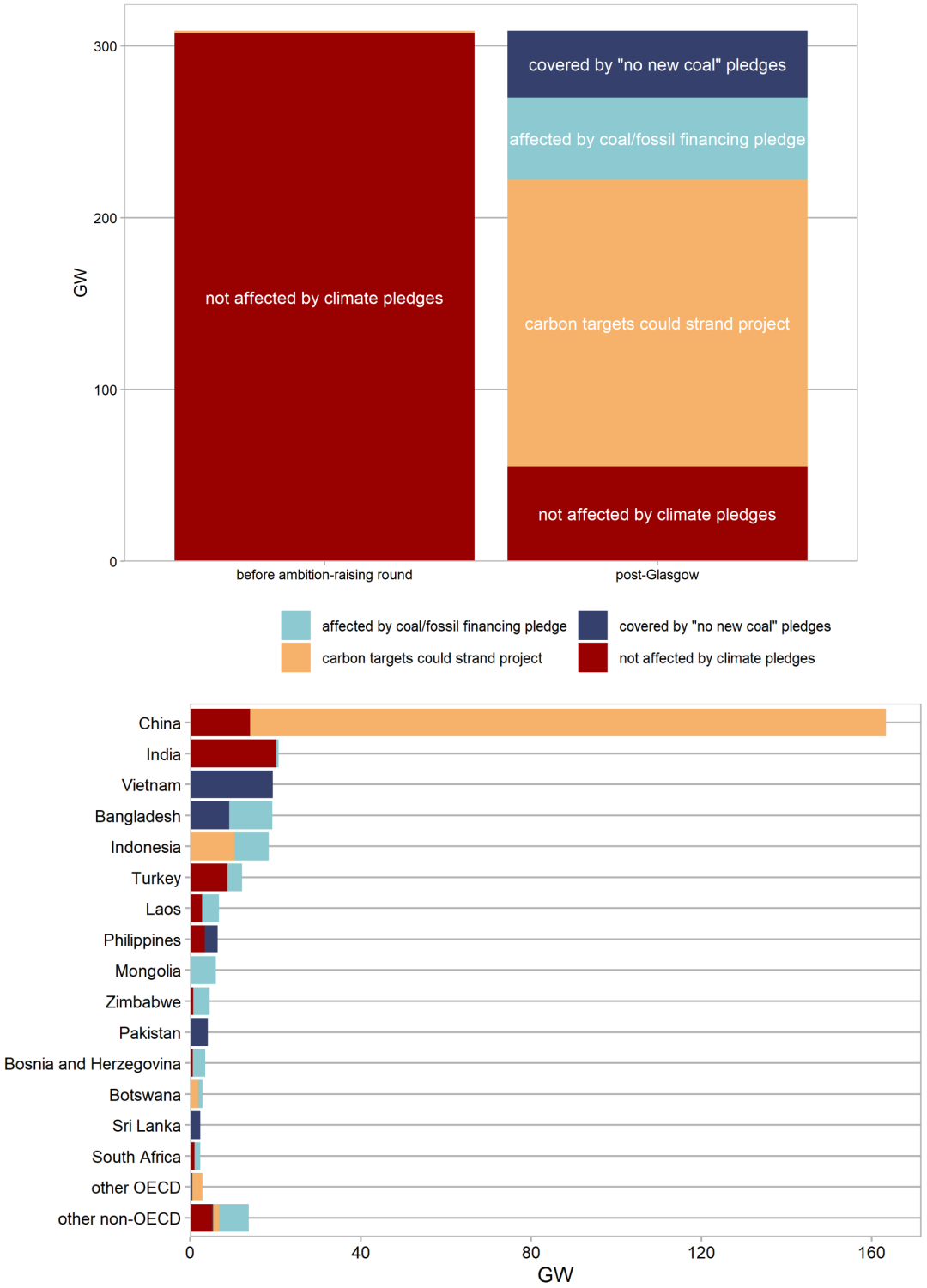
Out of a total of 300 GW of planned coal-fired capacity around the world, almost 40 GW is directly affected by "no new coal" pledges. This includes partial cancellations and moratoria of new coal in Bangladesh, Philippines and Pakistan, as well as full "no new coal" pledges in Vietnam, Sri Lanka and Kenya, among others. Another 48 GW is likely to be cancelled because of "no new coal financing" pledges, and 12 GW is covered by both types of pledges. The impact of the financing pledges is likely to be the largest in Bangladesh, Indonesia, Mongolia, Zimbabwe and Bosnia-Herzegovina, all countries that had planned to lean heavily on international financing to develop coal power plants.

In total, two-thirds of proposed coal-fired power plants outside of China are likely to be cancelled as a result of pledges made in the run-up to Glasgow and at the conference itself.

China did not join the coal declarations at Glasgow and has made it clear that it still intends to add new coal-fired power plants at least until 2025. However, new projects are highly questionable in light of the target of peaking coal use around 2025, and the reductions in coal-fired power generation required to make progress towards carbon neutrality by 2060.

India, the country with the second highest pipeline for planned coal, announced a 2070 carbon neutrality target at Glasgow. The long timeframe could leave space for more coal power plants to be added and operated for a conventionally assumed lifetime of 30-40 years. However, the country's target for 500 GW of renewable power capacity by 2030 (up from 100 GW currently) effectively limits the demand for new coal-fired capacity, and could already be sufficient to cover incremental electricity demand without increasing generation from coal between 2021 and 2030.

Figure 2: *State of New Coal Power Projects after Glasgow*



To align with Paris goals, all new coal power projects need to be cancelled.

Includes only new projects not yet under construction.

Existing Coal in the OECD

Impact of Pledges on Existing Coal Plants in the OECD

- 95% covered by either phase-out plan or carbon neutrality target by 2050; 410 GW (80%) now has a close-by date.
- Only 180 GW (35%) scheduled for Paris-compliant closure by 2030

Of the 500 GW of coal-fired capacity in OECD countries, 180 GW is now committed for a phase-out by 2030, in line with the timeline required to meet Paris Agreement goals. However, another 230 GW is covered by inadequate phase-out decisions, aiming for a post-2030 retirement. An additional 52 GW is covered by carbon neutrality targets, but has yet to be assigned a corresponding coal phase-out plan. Only 19 GW is not covered by either kind of pledge. The most notable countries lacking a phase-out plan are Japan, Australia and Turkey, while South Korea, Poland and Germany — among the largest coal users — have inadequate phase-out targets. Germany is however expected to agree on a phase-out by 2030 soon.

The U.S. 2035 clean power target means an effective phase-out of unabated coal by 2035 at the very latest, more plausibly by 2030. However, since there is no explicit phase-out decision, we've classified those U.S. coal power plants that don't have a retirement date as "retirement agreed but needs to be sped up".

With Germany's expected 2030 phase-out decision and assuming the U.S. 2035 Clean Power Plan will mean an effective coal phase out by 2030, the number of coal power plants in the OECD with a Paris-aligned phase-out date would increase from 250 plants (180 GW) to 460 plants (360 GW).

Existing Coal in Developing Countries

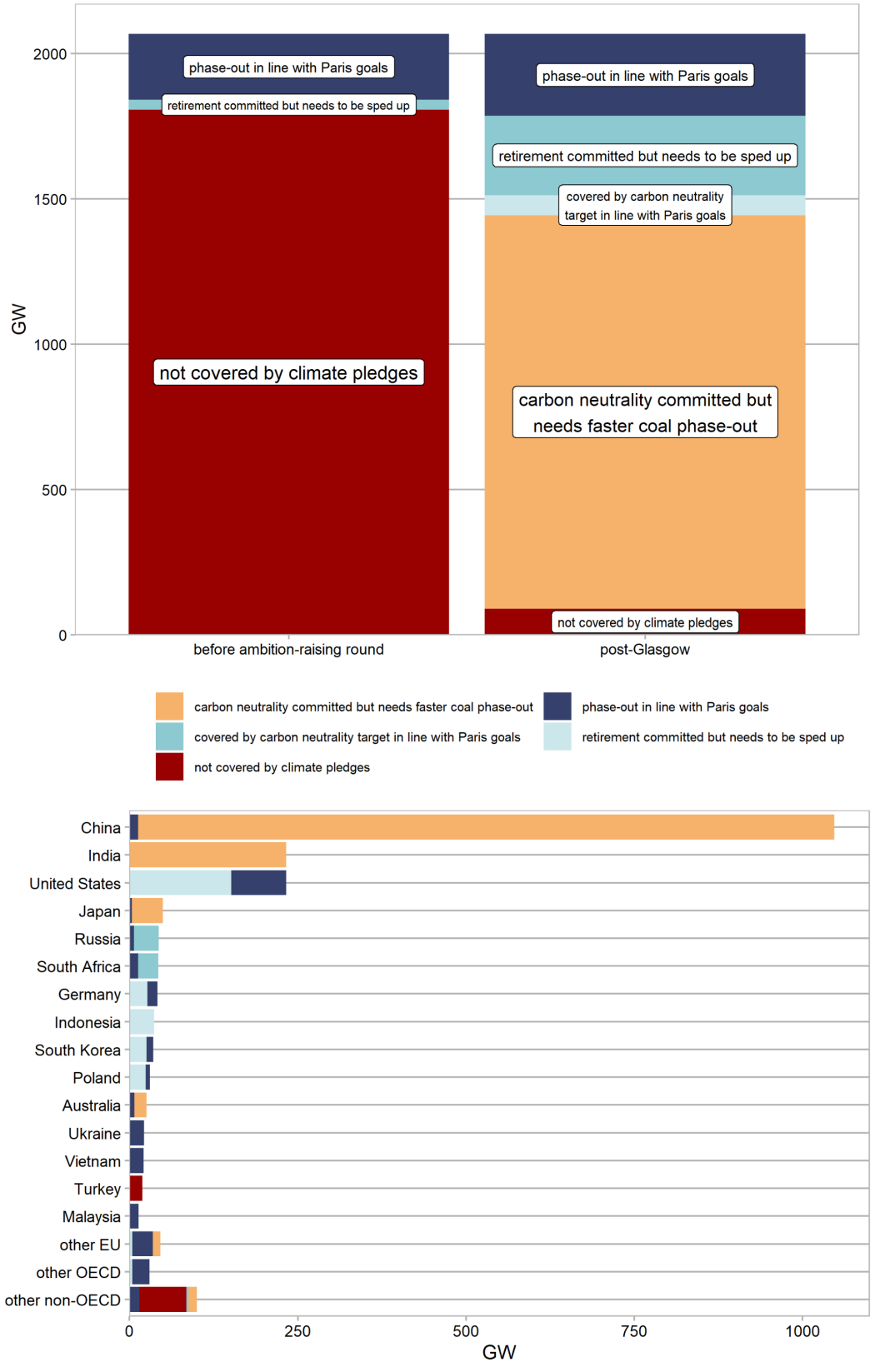
Impact of Coal Pledges on Existing Coal Plants in the OECD

- 130 GW is now scheduled for Paris-compliant closure or carbon neutrality by 2050.
- 95% of the total operating fleet in 2021 is covered by either phase-out plan or carbon neutrality target.

Outside of the OECD, only 80 GW of the 1600 GW of operating coal-fired capacity is *not* covered by any coal phase-out or carbon neutrality target. Approximately 130 GW is covered by phase-out targets and/or carbon neutrality targets by 2050, in line with the timeline required to meet Paris Agreement goals. This includes most notably Vietnam, Ukraine, Indonesia, South Africa's Eskom, Malaysia and Russia.

The two largest coal consumers, China and India, have pledged carbon neutrality targets, but have refrained from any pledges on their domestic coal power sectors. In China, the carbon neutrality pledge leaves space for existing coal power plants to operate for several decades, but reaching carbon neutrality by 2060 means an almost complete phase-out of coal power plants not equipped with carbon capture.

Figure 3: *State of the Global Operating Coal Power Fleet after Glasgow*



India's non-fossil electricity targets will "phase down" coal before 2030

In India, the 2070 carbon neutrality target date leaves ample space for existing coal power plants to run until their conventionally assumed operating lives, implying no early retirement. However, the target of reaching renewable power generating capacity of 500 GW by 2030, up from 100 GW currently, will likely provide all of India's additional electricity demand without increasing power generation from coal.

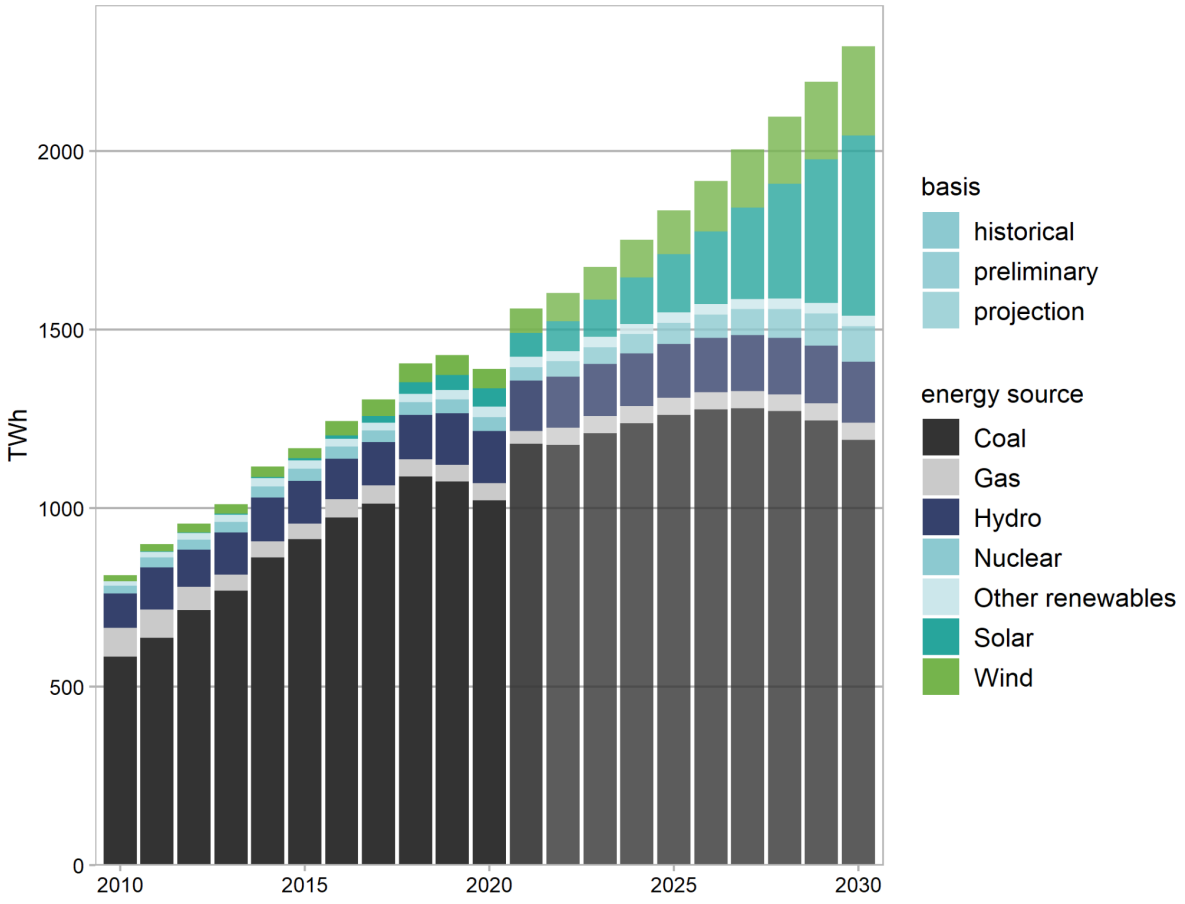
We base this assessment on the non-fossil capacity projections in India's report on optimal generation capacity mix for 2029-30, which gave a breakdown for how the earlier 450 GW renewable energy target would be met by 2030. The Survey projected the addition of 240 GW of solar, 100 GW of wind, 10 GW of hydropower and 12 GW of nuclear by 2030, compared with levels at the end of March 2021. We then assume that the additional 50 GW is delivered from wind and solar power[1]. We also factor in no improvement in the capacity factors of the different technologies, although this is likely with the improvement in solar cell efficiency as well as in wind turbine sizes and design, and no new gas-fired power plants. These capacity additions will more than triple India's zero-carbon power generation, adding 770 terawatt-hours per year of clean electricity. Assuming that electricity demand growth returns to pre-COVID-19 trend, growing on average 4.6% per year from fiscal year 2019-20 to 2029-30, demand will increase by around 780 TWh.

As a result, coal-fired generation will likely increase in the next few years, and then peak and decline as the additions of clean energy capacity accelerate towards the target. This means that there is no case for adding new coal-fired power capacity in India, and realizing the 500 GW target will already start the phase-down of coal in the country.

[1] Realized capacity factors of wind and solar are so close to each other that the specific combination of the two technologies has no effect on the results.

Power generation in India by year

under the 500 GW renewables target



Methods

"Early retirement" is considered a committed retirement after less than 40 years of operation.

It's assumed that reaching carbon neutrality means effectively phasing out unabated coal by the target year; essentially all energy systems modeling suggests a faster timeline for this in all countries, but many government plans in contrast leave a token role for unabated coal in the power grid, to be offset with negative emissions — a highly uneconomic proposition necessitated by optics.

Coal power plant capacity and status from Global Energy Monitor Global Coal Plant Tracker.

Coal plants affected by finance pledges from CREA's Chinese overseas coal project database and GEM Global Coal Public Finance Tracker.