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# China's clean energy trends could cut emissions by 30% in 2035 if sustained

A scorecard for China's new climate targets

## Key findings

- In a period of global volatility, China could reaffirm its leadership in multilateralism and help drive global climate action by setting a strong but achievable target of reducing emissions by at least 30% by 2035.
- If current rates of clean energy deployment continue, and growth in power demand eases as expected, China may already be witnessing a structural decline in emissions.
- Continuing and extending current trends and policy targets would enable China to achieve the emissions reduction from 2023 to 2035 required to align the country's emissions pathway with the Paris Agreement.
- Emissions from electricity must drop by at least 30% with an expected capacity of 5,000 GW of renewables by 2035; emissions from industry should decrease by more than 25%, mostly driven by emission reductions from the steel sector; emissions from the transport sector will reach 2020 levels if uptake of electric vehicles (EVs) continues to increase; emissions from the building sector have significant potential to drop by 40%.
- Beyond CO<sub>2</sub> emissions, a target for emission reductions of more than 35% from greenhouse gases other than CO<sub>2</sub> will be critical, as they make up one sixth of China's total climate footprint.
- While there are currently no indications of what targets policymakers in Beijing are considering, they would benefit from capitalising on recent positive developments and establishing clear policies for China's decarbonisation pathway to ensure China's credibility as a responsible major power.

## China's path to 2035

By February 2025, China must publish its new climate targets for 2035, otherwise known as its nationally determined contributions (NDCs), as required under the Paris Agreement. These targets could determine whether or not the world can achieve the goals of the Paris Agreement. They also come at a time when Beijing is setting the tone for its overall national policy planning with the 15th Five-Year Plan.

As China remains the largest emitter in the world, the ambition in its climate agenda is decisive for keeping the international community on track for a 1.5C or 2C pathway. The country is responsible for 30% of global greenhouse gas (GHG) emissions and 90% of the growth in CO<sub>2</sub> emissions since the signing of the Paris Agreement in 2015.

This is the first time that China will set actual emission reduction targets after it pledged to peak emissions before 2030 and will determine China's trajectory towards carbon neutrality in 2060. The credibility of China's carbon neutrality goal requires substantive emission reductions towards the goal over the next decade.

This scorecard lays out the emission reductions and policy milestones needed in China by 2035 to keep the Paris Agreement and the 1.5-degree target alive globally and to put China on track to credibly meet its carbon neutrality commitment.

Comparing these milestones to actual trends in China's energy sector provides some reason for optimism. If current rates of clean energy deployment continue, and growth in power demand remains constrained, we may already be witnessing a structural decline in China's emissions.

## Why China's NDC targets are crucial for the country and the world

Driven by industrial activities, China's emissions surged between 2021 and 2023. In recent months, though, emissions started to stabilise. Coupled with the clean energy boom, this calls for cautious optimism that the emissions peak is within reach.

Clean energy industries have played a key role in China's economic recovery from the Covid-19 pandemic. Strong targets for clean energy growth and a cleaner energy sector

would support the country's drive for high-quality growth and 'new quality productive forces', as well as improve environmental quality. In a pivotal shift, clean energy has become a [key economic driver](#), contributing a record CNY 11.4tn (USD 1.6tn) to China's economy in 2023, accounting for all of the investment growth and 40% of GDP growth, thereby compensating for the downturn in real estate.

Strong climate targets would also help allay the concerns of trading partners about excessive and underpriced exports of clean technology, threatening manufacturers in other countries, making it clear that the clean energy manufacturing expansion is underpinned by strong domestic demand. In contrast, unambitious targets that postpone emissions reductions would risk undercutting the vast investments made in clean energy manufacturing in the past few years.

Since China is highly likely to [miss](#) its 2025 climate targets, the credibility of the country's long-term goals requires demonstrable progress towards the carbon neutrality target during the following years.

In a volatile period for international climate politics, ambitious targets from China could be a crucial signal to demonstrate commitment to climate multilateralism. China has provided leadership before — its CO<sub>2</sub> peaking target in 2014 paved the way for the Paris Agreement, and its carbon neutrality announcement in 2020 helped unlock long-term ambition from numerous other countries — and the geopolitical benefit of positive climate signals can help the country again on the global stage.

## Benchmarking China's climate targets

Analysis of a large range of 1.5-degree aligned emission pathways shows the minimum emissions reductions required overall and in different sectors. We have suggested policy targets and commitments that could be included in the NDC and would put China on track to realise the outlined emission reductions in each sector.

China can achieve at least 30% CO<sub>2</sub> emission reductions overall by 2035 compared to 2023. An absolute emission reduction target set by the central government would be critical to achieving this reduction, which is needed to align with the Paris Agreement.

Reducing emissions of other greenhouse gases besides CO<sub>2</sub> will also be critical over the coming decade, as they make up a sixth of China's total climate footprint. By including a

target on the reduction of non-CO<sub>2</sub> emissions in its NDC or a separate policy document, China could achieve a reduction of at least 35% of these gases by 2035.

Clean power generation growth has been the main driver in bringing down domestic emissions over the past months. In fact, clean electricity is now growing fast enough to meet the expected incremental increase in power demand for the first time. Continuing the current rate of solar and wind expansion would enable China to install an impressive 3,500 gigawatts (GW) of renewables by 2030 and 5,000 GW by 2035. This could increase the share of non-fossil energy in total energy consumption to above 40% and the share of non-fossil power generation to at least 65% by 2035. As a result, China could cut 30% of emissions from the electricity sector in a Paris-aligned pathway.

Industrial decarbonisation will be another critical cornerstone to achieving ambitious emission reductions by 2035. Industrial emissions will have to decline by at least 25% by 2035, driven in particular by more than 45% emission cuts from the steel sector and more than 20% from the cement sector. The recently announced expansion of the emission trading scheme (ETS) to include steel, cement, and aluminium sectors is a welcome development. However, to make the ETS an effective instrument, it will need to expand to further industrial sectors such as the chemicals sector and introduce an annually declining cap on emissions.

The rapid increase in new sales of electric vehicles (EVs) is also a central opportunity for China to reduce emissions. Bringing transport emissions down to 2020 levels by 2035 would put the sector on track for the Paris Agreement goals. This would require EV sales to increase to 60% of all vehicle sales, which is not far off from the more than 50% of EVs and plug-in hybrid sales recently seen in China. In addition, rail freight should increase to 25% with an additional target set for rail passengers.

The building sector has one of the largest potentials for emission cuts, where emissions could decline by 40% by 2035 due to strong policies to eliminate household coal use. This will require: new buildings to meet low-carbon standards; 25% of existing buildings to be retrofitted; and the share of heat pumps and other renewable heating to reach 40% by 2035.

**Table 1. Benchmarking China's climate targets for 2035**

Sector	Paris-aligned CO2 emission reduction in 2035 compared to 2023	Policy steps
CO2 emissions	Peak immediately; reduce 10% by 2030 and at least 30% from the peak by 2035	Set an absolute emission reduction target from 2020 or 2025 level for 2035; set an absolute emission reduction target for 2030 or reaffirm and strengthen existing 2030 commitments (carbon intensity, non-fossil energy).
Non-CO2 greenhouse gas (GHG) emissions	At least 35%; include in 2060 carbon neutrality target	Include non-CO2 GHGs in 2035 emission reduction commitment or set a separate absolute target.
Electricity	At least 30%	Share of non-fossil energy in total energy consumption above 40% by 2035; share of non-fossil power generation at least 65% by 2035. Triple renewable energy capacity from 2022 to 2030 and continue the same rate of additions in 2031-35. This would mean 5,000 GW of renewable capacity, including hydropower, and 4,500 GW of solar and wind capacity in 2035.  Set an annually declining cap on emissions. Stop approvals of new unabated coal plants and set capacity reduction targets for coal power to reach 950 GW.
Industry	At least 25%	Include a broader set of industrial sectors, especially the chemical and coal-to-chemicals industries, in the ETS and shift from the intensity-based approach to an annually declining cap on emissions.
Industry, of which: - Steel	At least 45%	Increase the share of non-coal-based steelmaking (electric arc furnace (EAF) and hydrogen-based) to above 30%.
Industry, of which: - Cement	At least 20%	Include cement process emissions in the total CO2 reduction target.

Transportation	Return emissions to 2020 levels by 2035	Raise the share of EVs out of new vehicle sales to 60% and the share of rail to 25% in freight tonnage by 2035. Additionally, set a target for the share of rail in passenger transport kilometres.
Buildings	At least 40%	All new buildings meet low-carbon standards and 25% of existing buildings are retrofitted. Increase the share of heat pumps and other renewable heating methods to 40% by 2035, up from the current 20% ( <a href="#">IEA</a> ).
Forest coverage/ natural sinks	Increase the forest sink by at least 20% from 2020 to 2035 ( <a href="#">ICCS</a> )	Increase land cover of afforestation and reforestation by at least 15% by 2035, compared to 2025.

The benchmarks are derived from the climate transition pathways compiled for CREA's [China Climate Transition Outlook](#), including pathways proposed by Chinese researchers in the literature and the pathways incorporated in the [IPCC AR6 report](#).

## Comparison of benchmarks to current trends

Current trends in energy and industrial sectors' CO<sub>2</sub> emissions are promising. China can achieve very meaningful emission reductions by 2035 if the current rate of clean energy additions is maintained and energy demand growth returns to pre-Covid trends. The [slowdown](#) in new coal power permits and the [halting](#) of new steel plant permits, together with the general [decline](#) in emission-intensive industries related to the real estate sector, further indicate a potential turning point and opportunity for China to shift towards a greener economic model.

We assess that continuing and extending current trends and policy targets would enable China to achieve the minimum 30% emissions reduction from 2023 to 2035 required to align the country's emissions pathway with the Paris Agreement. Continuing these trends, however, requires overcoming significant obstacles, including [grid bottlenecks](#) and opposition from vested interests. Setting targets that ensure the continuation or acceleration of clean energy deployment, electrification, the shift to clean steelmaking, and other key trends is essential to provide a basis for the transition.

In other areas, such as non-CO2 greenhouse gas emissions and building energy efficiency, current trends are not aligned with the Paris Agreement and stronger targets and policies are needed.

**Table 2. Comparing benchmarks to current trends**

Sector	Current trends
CO2 emissions	Started falling in March but not fast or consistently enough. No targets set that would ensure a falling trend.
Non-CO2 greenhouse gas emissions (GHG)	Fossil fuel methane emissions <a href="#">keep</a> increasing. Alarming <a href="#">increases</a> in perfluorocarbons.
Electricity	Emissions fell in the second quarter of 2024. Solar and wind additions are growing and on track to triple total renewable capacity.
Steel	Steel output has stabilised and is expected to start falling. As China's steel demand peaks and much more scrap steel becomes available, there is great potential to replace coal-based primary steelmaking with much less emissions-intensive steel production from scrap. The China Iron and Steel Industry Association <a href="#">projects</a> that by 2035, the share of electric arc steelmaking could exceed 30%. Combined with the fall in output projected by 2035, this would enable a 40% reduction in CO2 emissions from the sector by 2035.  However, the shift to electric arc steelmaking using scrap is currently lagging behind targets and requires stronger policies.
Cement	Cement output and emissions fell 15% from 2020 to 2023. The China Building Materials Federation <a href="#">projects</a> that demand will fall further, by more than 10% by 2030. Extending this trend suggests that cement output and thereby emissions could fall by 20% from 2025 to 2035, or by almost 30% compared with 2020.
Other industries	Electrification has been happening faster than in climate transition pathways, enabling rapid emission reductions if growth in clean electricity generation is maintained. As a result, industrial

	<p>electrification increased rapidly from 2015 to 2020 and increased again in 2023.</p> <p>Coal use in the coal-to-chemicals industry is increasing rapidly.</p>
Transportation	Oil consumption has begun to fall; the share of electric vehicles is increasing rapidly and ahead of 1.5-degree pathways.
Buildings	Coal consumption in buildings has been falling rapidly, significantly faster than in most transition pathways. However, much of the coal use has been replaced by fossil gas, representing a lock-in in CO <sub>2</sub> -emitting heating. Progress on building energy efficiency is weak, resulting in rapid increases in electricity and fossil gas consumption.



## Methodology

The benchmarks are derived from the climate transition pathways compiled for CREA’s [China Climate Transition Outlook](#), including pathways proposed by Chinese researchers in the literature and the pathways incorporated in [IPCC AR6](#). The pathway database is filtered to exclude those scenarios that assume modest rates of electrification, identified as those in which emissions outside of the power sector fall more slowly than total emissions. These pathways don’t correspond with China’s current policy approach or trends over the past decade. The pathways for steel and cement are based on industry projections, as the model pathways don’t incorporate the recent changes in the outlook for the demand for construction materials.

As most pathways achieve an overall emission reduction of much more than 30% by 2035, the sectoral emission reductions in each pathway are normalised to an economy-wide emission reduction of 30% from 2023 levels by 2035. This captures the relative magnitude of emission reductions from different sectors in the pathways optimised according to different models and assessments.

The China Climate Transition Outlook survey of transition pathways covers the following public studies: [IPCC](#), Climate Action Tracker ([CAT](#)), International Energy Agency ([IEA](#)), Institute of Climate Change and Sustainable Development, Tsinghua University ([ICCS](#)), [School of Environment & Natural Resources](#), Renmin University, [Network for Greening the Financial System \(NGFS\)](#), [Energy Foundation China & University of Maryland](#), [Lawrence Berkeley National Laboratory](#).

**Table 3. Compilation of emission reductions by 2035 in different 1.5 and 2-degree pathways**

Sector	Product	Institute	Scenario	Reduction from peak to 2035 [min, max]
All	Kyoto gases (CO <sub>2</sub> , methane, nitrous oxide, HFCs, PFCs,	<a href="#">IPCC</a>	1.5C scenarios included in IPCC Sixth Assessment Report	-66% [-83%, -30%]

	sulphur hexafluoride)			
All	Kyoto gases	Climate Action Tracker ( <a href="#">CAT</a> )	1.5C	-54%
All	Kyoto gases		2C	-33%
Energy	CO2	International Energy Agency ( <a href="#">IEA</a> )	Announced Pledges Scenario	-26%
All	CO2	Institute of Climate Change and Sustainable Development, Tsinghua University ( <a href="#">ICCSU</a> )	1.5C	-35%
All	CO2		2C	-20%
All	CO2	<a href="#">School of Environment &amp; Natural Resources, Renmin University</a>	1.5C	-31%
All	CO2		2C	-23%
All	Kyoto gases	<a href="#">Network for Greening the Financial System (NGFS)</a>	1.5C	-73% [-74%, -61%]
All	Kyoto gases		2C	-38% [-63%, -26%]
All	Kyoto gases	<a href="#">Energy Foundation China &amp; University of Maryland</a>	Updated Nationally Determined Contribution to Carbon Neutrality	-35% [-67%, -21%]