Centre for Research on Energy and Clean Air

China's Path to Carbon Neutrality

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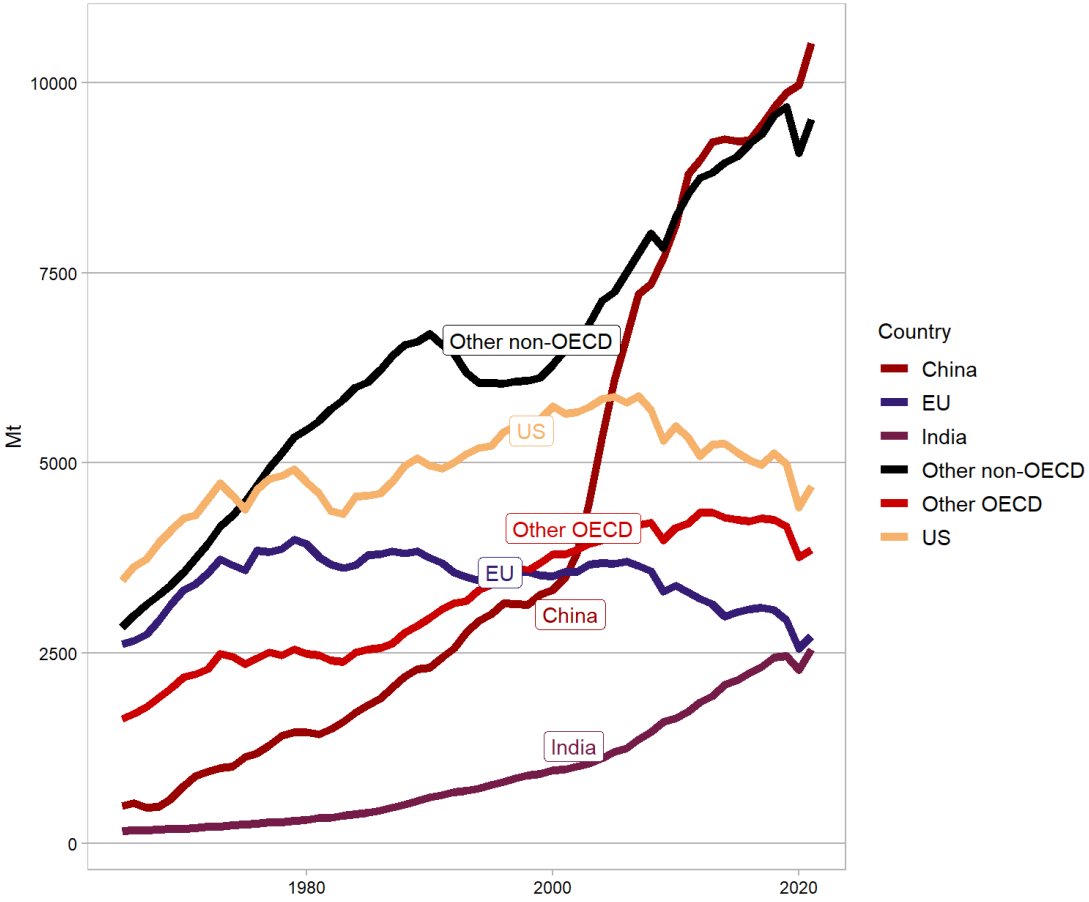
Energy CO2 emissions by region

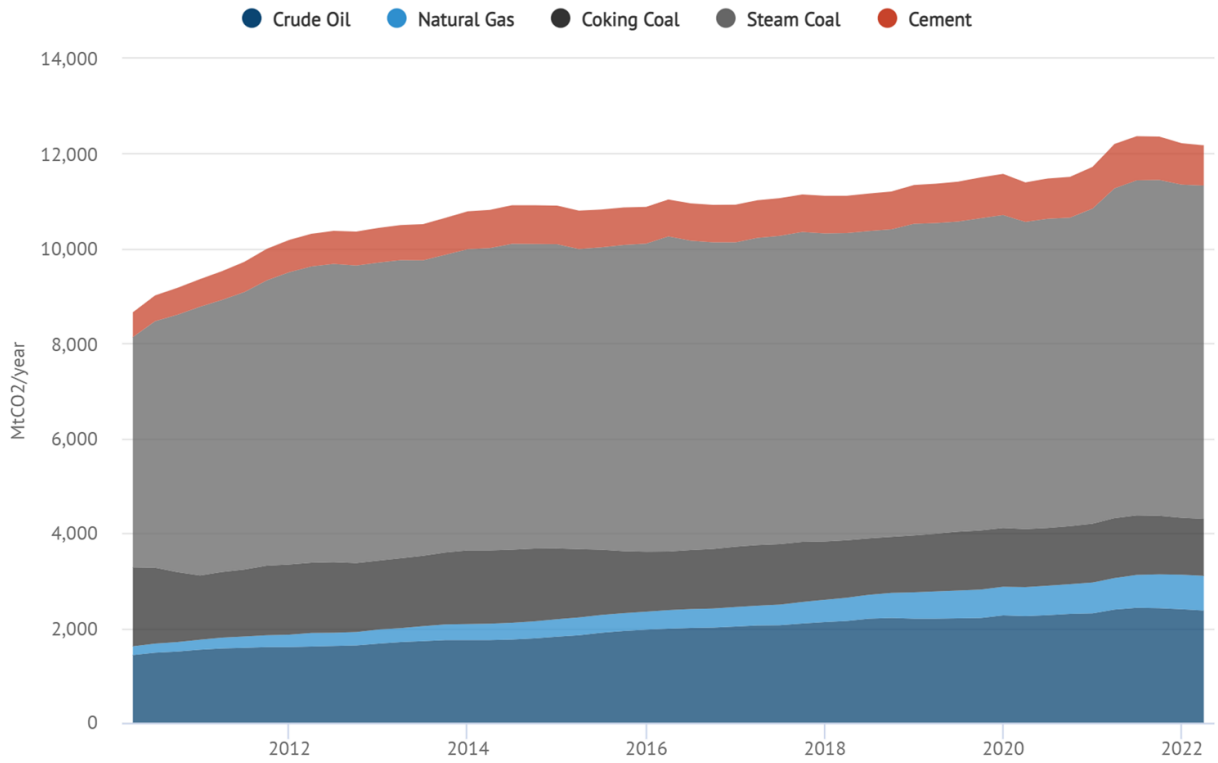


Ups and downs of China's emissions

- 2003-07: WTO accession boom
- 2008-12: Infrastructure stimulus
- 2013-16: CO2 peaking announcement, economic "New Normal", war on air pollution, clampdown on new coal power plants...
- 2017-19: "Old Normal strikes back": coal, oil, steel consumption rebound
- 2020: Resumption of new coal power permits, industry&construction driven recovery, fossil fuels dominate energy sector investment plans...

COVID surge and slowdown

Annualised CO2 emissions from fossil fuels and cement, millions of tonnes of CO2



“We aim to have CO2 emissions peak before 2030 and achieve carbon neutrality before 2060.“

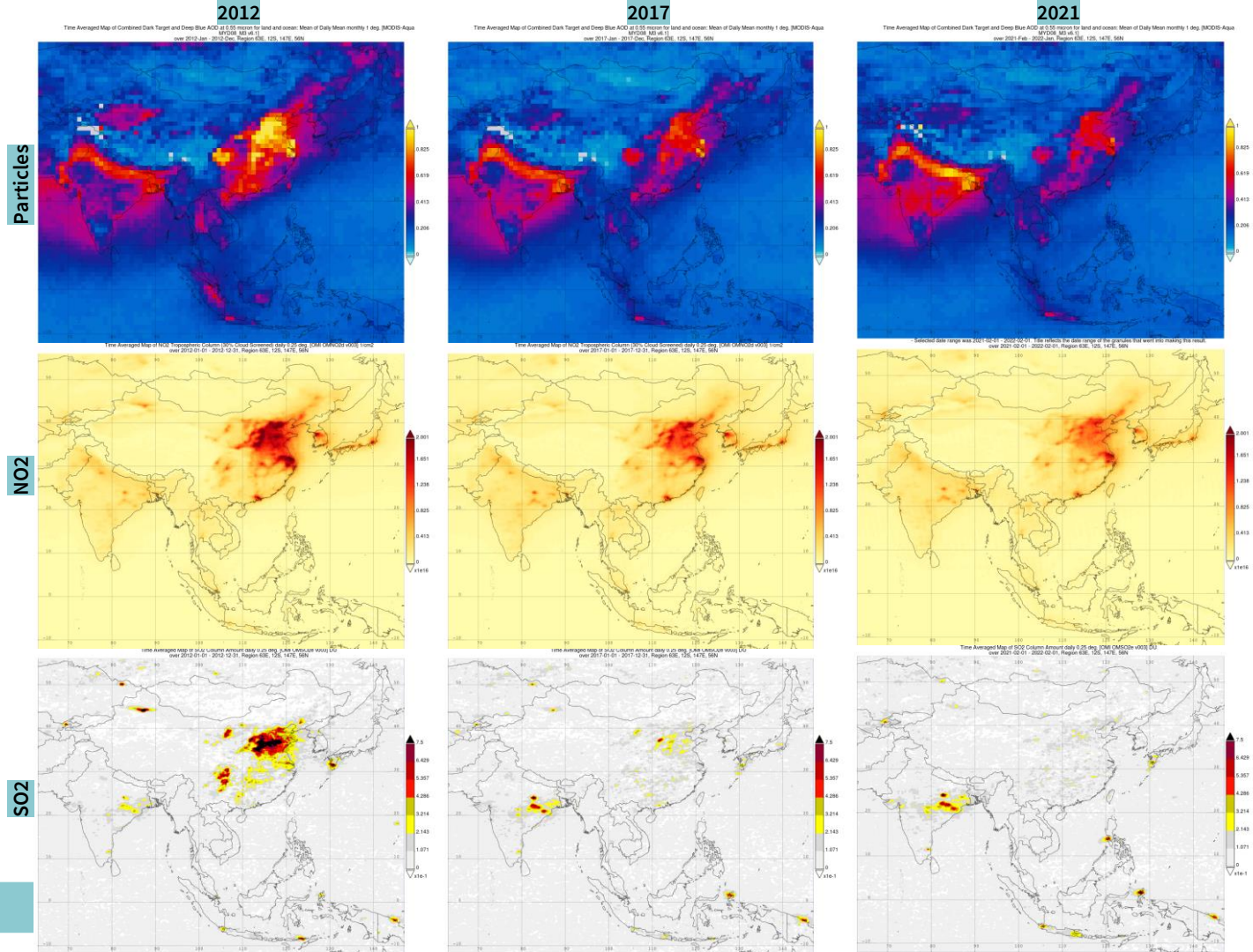
- **Key things to note about the announcement:**
  - proactive
  - unilateral
  - surprising even to most domestic observers and stakeholders
  - terse - just one sentence: work on implementation plans only started after the announcement

China has strong reasons to act on climate

- National security, food and water security
- Air pollution from fossil fuels
- Energy security
- Industrial policy: technological and market leadership in key technologies
- Economic policy: shifting to high value-added industries and services
- Opportunity to promote foreign policy goals: establish China as an important contributor to solving global challenges

Air pollution as a driver

- Coal use ~plateaued in 2013
- New emission standards for power plants & industry
- New environmental law
- Massively strengthened monitoring and enforcement



Implementation: Tsinghua take

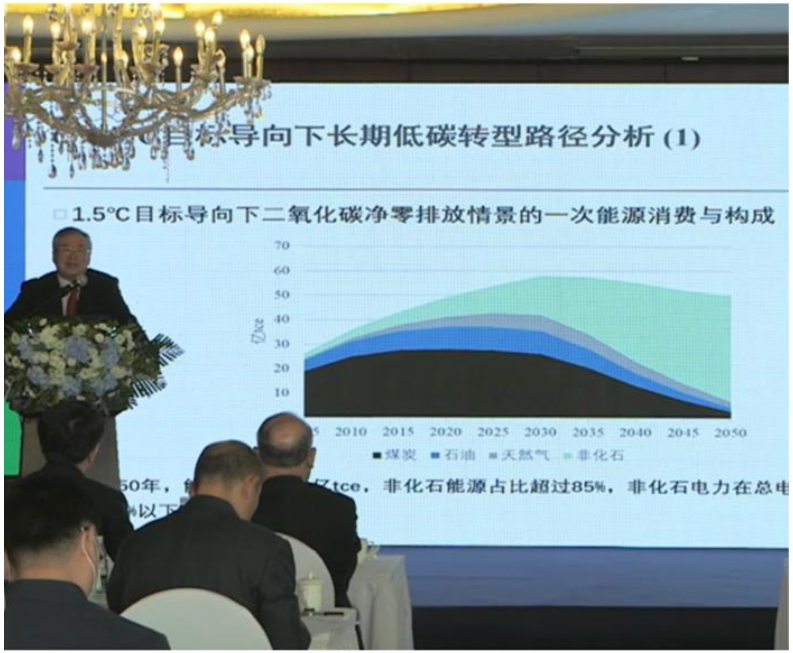
Zero carbon power sector by 2050; negative emissions thereafter

“Electrify everything”: transport, heating, industry

Peak energy demand in early 2030s - economic transformation

Investment: $17,000 bln in electricity; $3,000 bln in carbon capture / negative emissions technology

Expecting a “National carbon peaking and neutrality action plan” similar to the air, water and soil action plans (published 2013-2015), with key cities moving first

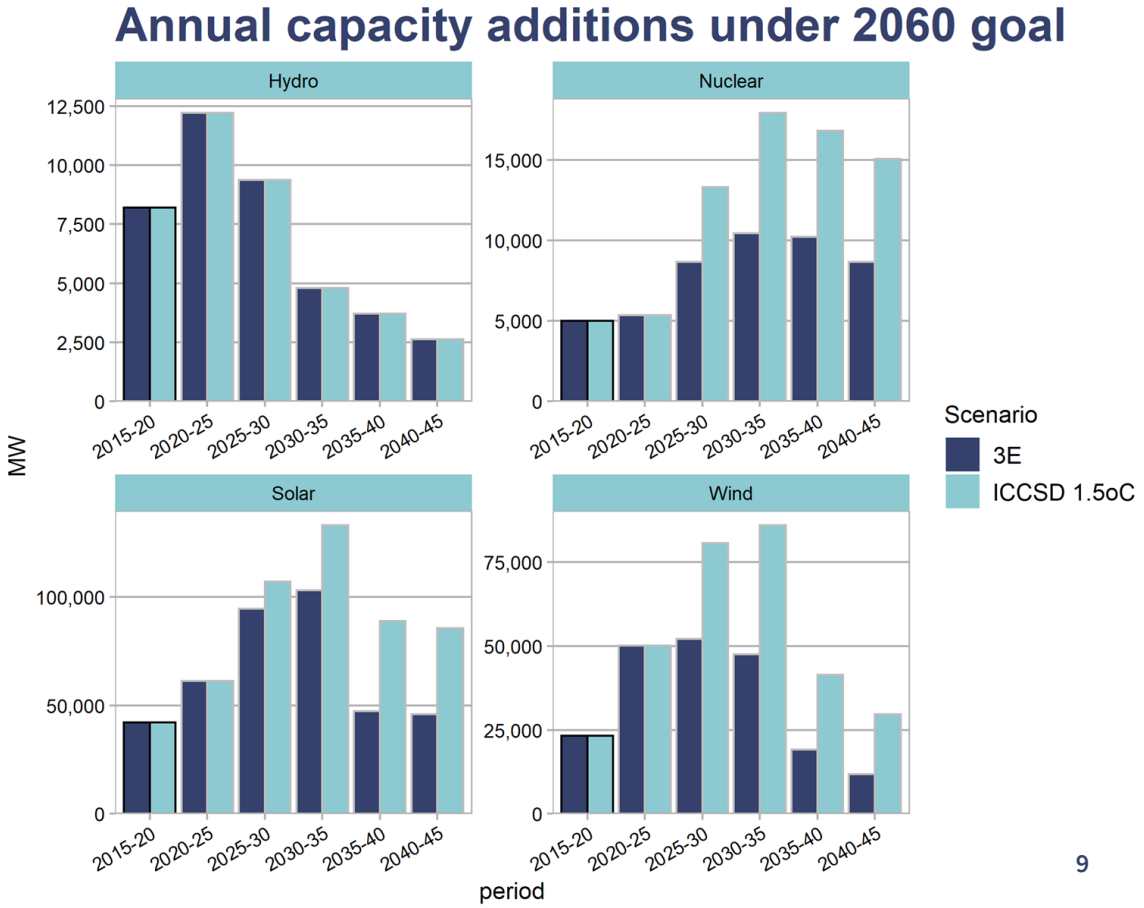


Implications for power sector investment

Wind, solar and nuclear capacity will need to increase 10-fold or more

Annual installations need to increase 2-3 fold

Limited potential to scale up hydro



https://www.carbonbrief.org/influential-academics-reveal-how-china-can-achieve-its-carbon-neutrality-goal

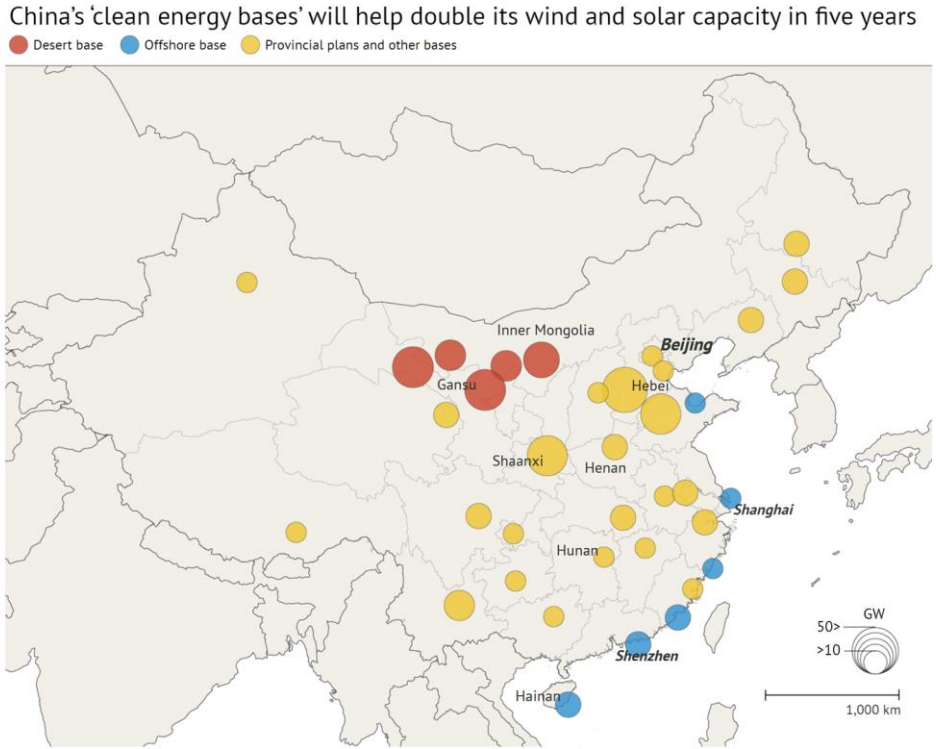
1+N policy framework

- Focus on a broad range of enabling policies: Power sector reforms, green finance,
- Build a system of controlling annual CO2 emissions and emissions intensity
- Sectoral CO2 peaking plans
- Province CO2 peaking plans

1+N policy framework

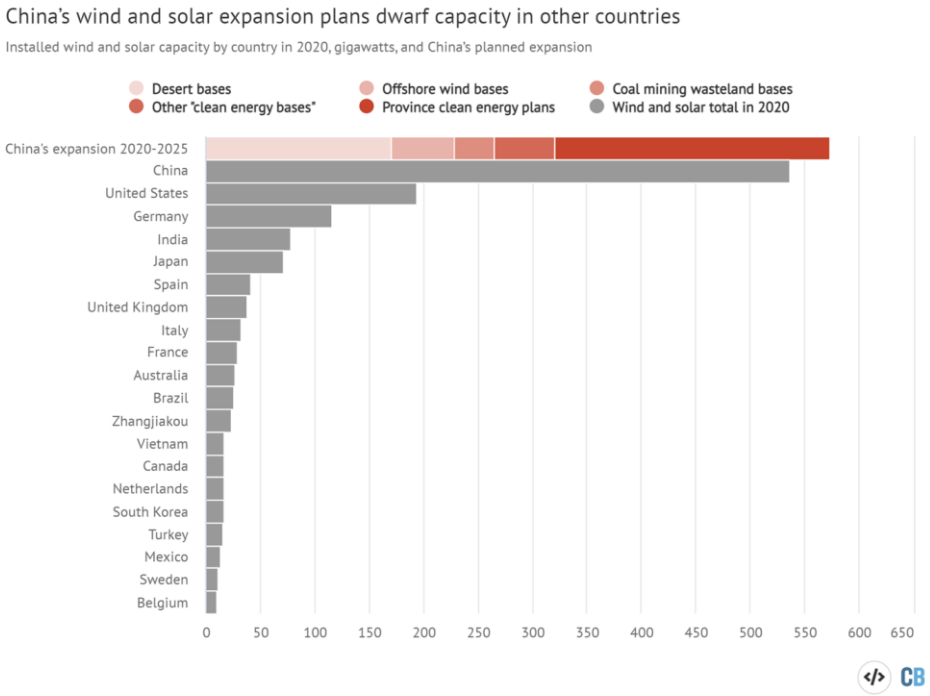
- **For the next 10-20 years, China's commitments lack specificity and ambition**
  - The "CO2 peaking action plan" is an ambitious regulatory and policy programme with a high political priority but few quantitative goals
  - Makes it hard to assess whether the country is on track to the long-term goal
  - From a climate perspective, China's emissions need to peak urgently to enable global emissions to peak and decline

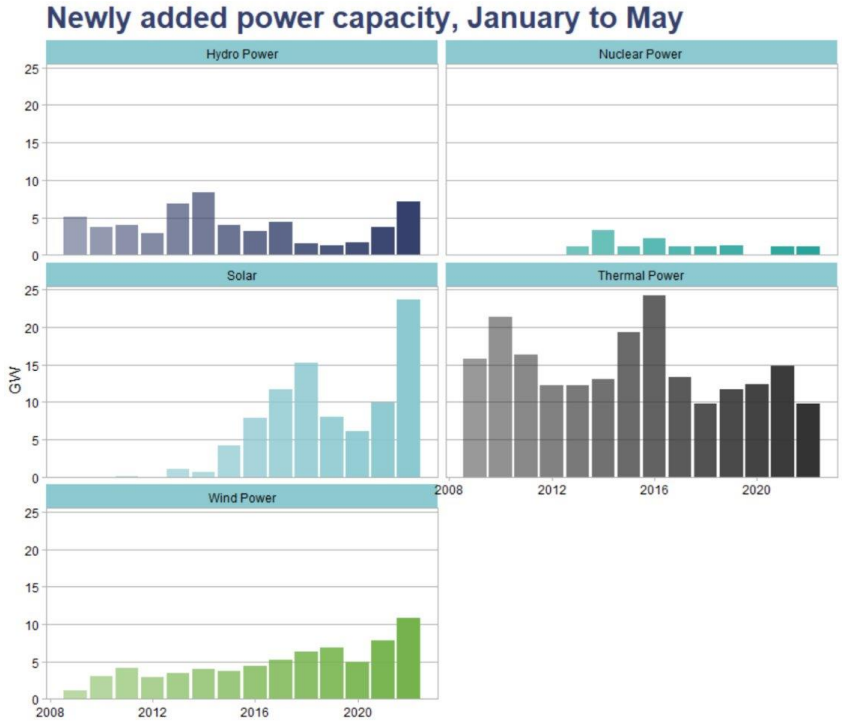
“Clean energy bases”



Clean energy bases and provincial clean energy installation plans with targeted installed wind and solar capacity by 2025 indicated by the size of the circles. The desert bases (red circles) in western Inner Mongolia and Gansu, offshore wind bases across the coast (blue) and provinces’ own clean energy expansion (yellow) will all provide electricity to the demand centres in the east. Source: Authors’ compilation of targets from policy documents. Map by Tom Prater for Carbon Brief.

Accelerating clean energy investment

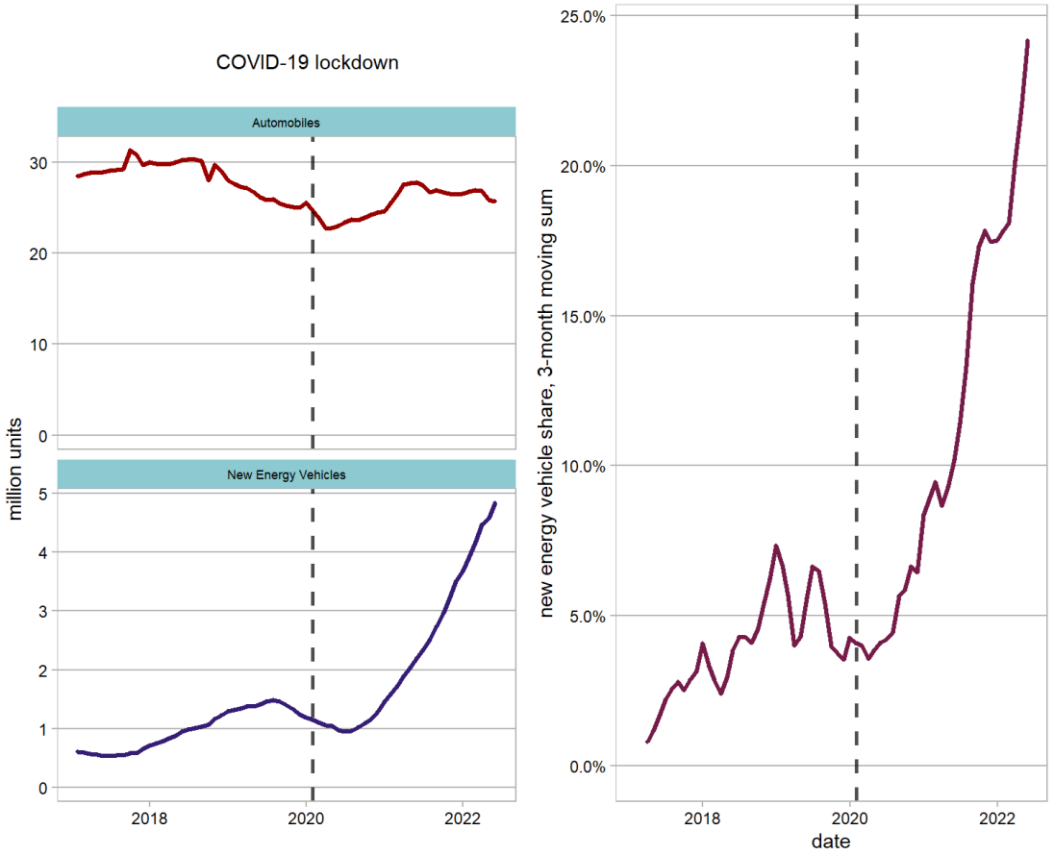




Total installed wind and solar capacity by country at the end of 2020, in comparison with China's planned expansion from 2020 to 2025. Source: Capacity by country for wind and solar; China's planned expansion based on authors' compilation of central and provincial government targets. Chart by Joe Goodman for Carbon Brief using Highcharts.

Vehicle production

12-month moving sum



Conflicting interests

- Many coal-dependent provinces and state firms see the time before emissions peak as a window to build more fossil capacity
- Investments in coal mining, coal power and coal-based steelmaking have continued or even accelerated in 2021–22
- Getting the “losers” of the transition to redirect investments and diversify is key to a successful transition

China wants to be carbon neutral by 2060, but can its provinces manage it?

- Ensuring carbon emissions peak before 2030, as is promised, may prove difficult for some provinces, not least where the economy relies on coal
- Some provincial-level authorities have taken steps towards the government’s goals, while others’ actions have been slow or vague

Echo Xie
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Thank you!

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