

Coal exit can happen only with stronger policies, and with China cooperating, says study

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Current climate policies including efforts like the Powering Past Coal Alliance will not add up to a global coal exit, a new study shows.

Countries phasing coal out of the electricity sector need to broaden their policy strategy, or else they risk pushing the excess coal supply into other industries at home, like steel production. The scientists find that China has an opportunity to dominate the renewable energy technology market if it begins phasing down coal immediately. Otherwise, it could dangerously delay the renewable energy breakthrough worldwide.

"It's really a make-or-break moment," says Stephen Bi from the Potsdam-Institute for Climate Impact Research (PIK) and Potsdam University, lead author of the study published in *Nature Climate Change*. "Our computer simulation of climate economics and policy making indicates that current policies lead the world to less than a 5% likelihood of phasing out coal by mid-century. This would leave minimal chances of reaching net-zero emissions by 2050 and limiting disastrous climate risks."

"The most shocking result was that even though most countries decide to stop burning coal for electricity during the simulation, this has almost zero impact on total future coal use," says Bi. "We then dug deeper into this perplexing result to identify what policymakers can do to actually achieve the coal exit."

Carbon pricing and coal mining phase-out would be effective policies

Investigating the Powering Past Coal Alliance, launched at the world climate summit COP23 in 2017, the scientists sought to understand whether these countries' efforts to cut coal would make it easier or harder for other countries to follow suit. That is, the coalition may grow as member states work to modernize their electricity sectors, but it may also lead to a rebound in coal use globally. The latter effect, often referred to as "leakage," can arise due to market effects: if demand

decreases in some places, so do prices, which in turn can increase demand elsewhere.

Interestingly, the scientists' computer simulation shows that the most concerning leakage effect in this case may actually arise within the alliance itself rather than through international coal markets. Although the Powering Past Coal Alliance is expected to grow, its pledge is limited to the electricity sector. This means that countries who join can actually increase their coal use in steel, cement and chemicals production, greatly hindering the potential of this initiative.

"The greatest risk to the coal exit movement may actually come from free-riding sectors in coalition members. Unregulated industries can take advantage of falling coal prices at home and use more coal than they otherwise would have," says co-author Nico Bauer, also from PIK. The scientists conclude that additional strong policies are needed to avoid this effect. "The coal exit debate has to look beyond the power sector and also include the heavy industry. Carbon pricing would be the most efficient instrument to close loopholes in domestic regulations, while restrictions on coal mining and exports would go the furthest to deter free-riding abroad," continues Bauer.

'A golden opportunity for China,' if it acts quickly

"China plays a special role since it produces and consumes more than half of all coal globally. The Chinese government must act swiftly to curtail the coal-driven COVID recovery," says Bi. "The current coal plans jeopardize China's recent promise to peak domestic emissions before 2030, and to achieve net-zero emissions by 2060. The computer simulation gives China roughly fifty-fifty odds of joining the Alliance, and it only falls on the right side of that line if it stops building coal plants by 2025."

Further, the simulation shows that the Alliance only manages to boost solar and wind energy expansion if China decides to phase-out coal. China would thus have "a golden opportunity to solidify its leading role in renewable energy market and unleash sustainable development opportunities worldwide, but this requires commitment to phasing out coal," explains Bi. "If not, then it becomes less clear how we'll achieve sufficient diffusion of renewables worldwide. China's actions today can position it to either lead or impede the global energy transition."

Robust insights due to innovative first real-world policy making computer simulation

These insights are substantially more robust than most previous analyses because the scientists used a data-driven approach for simulating real-world policy making, called Dynamic Policy Evaluation, for the first time. "Scientifically analyzing future emissions is subject to a large degree of uncertainties, not least policies. We were able to determine that coal-exit commitments often depend on certain domestic pre-conditions, which enabled us to remove some of the uncertainty on their emission impacts. Our new approach is thus the first to coherently simulate policy adoption in future scenarios which is also in line with historical evidence," says co-author Jessica Jewell from Chalmers University of Technology.

"The G20 has initiated the phase-out of international public finance for coal projects. We are now assessing how much political momentum this can potentially impart on the Powering Past Coal Alliance," says PIK Director Ottmar Edenhofer. "Things are therefore looking somewhat more promising, but we must account for negative feedbacks alongside the positive for a balanced assessment of [policy](#) diffusion in our multipolar world. What remains clear is that governments must take a much much more active approach to phasing out [coal](#) if they want to stay

true to their climate promises."

More information: Stephen Bi, Coal-exit alliance must confront freeriding sectors to propel Paris-aligned momentum, *Nature Climate Change* (2023). DOI: [10.1038/s41558-022-01570-8](https://doi.org/10.1038/s41558-022-01570-8).
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