



提高政策目标以减少燃煤和燃气发电

在全球努力实现《巴黎协定》设定的气候目标过程中，逐步摆脱化石燃料具有重要意义。

在迪拜举行的 COP28 会议上，首次全球盘点确认了逐步摆脱化石燃料的目标。尽管科学依据和历史证据表明应逐步淘汰化石燃料发电厂，特别是未加减排装置的燃煤电厂，但目前看来天然气发电的发展仍有较大的不确定性。新的研究从社会、政治和制度方面识别了淘汰现有煤电和天然气发电的驱动因素，这些因素可为未来政策设计提供灵感。

初步结果显示:

- 根据 IPCC 的分析，现有进展和政策雄心无法实现 1.5 摄氏度无过冲的目标。
- 早期的煤电退出是通过转变为天然气实现的。但也有证据表明，直接转向为可再生能源也是可行的。
- 在发展中国家实现更可信和公平的淘汰路径需要发达国家采取更具雄心的行动，尤其是减少燃气发电。
- 经济政策、监管政策和电力市场改革可能加快淘汰的进程。

请在此处查看完整的政策简报（英文版）。



Expanding current scenarios

Although the scientific community is generally in consensus on the importance of reducing the use of fossil fuels, the specific path to get there depends on the scenario type. Different Integrated Assessment Models (IAMs) are used to understand these potential futures through modelling the interactions of climate, energy, and economies. IPCC Assessment Reports compare and summarise the scenarios generated by these models to assess policy insights.

IAMs present the best available science, but no model can fully represent the real world. Currently, they mostly focus on techno-economic considerations and have limited representation of social and political opportunities or roadblocks. There are, however, efforts to incorporate more realistic assumptions for more feasible outcomes.

There is an ongoing debate about a coal phase-out, which brings with it immense implications on a justice level. Current coal phase-out IAM pathways to reach Paris Agreement targets, moreover, have raised concerns, especially in the context of China and India. To consider a more feasible coal phase-out in developing countries, much more ambitious and significant decline in natural gas and oil would be required in developed countries to compensate.¹

As such, many lessons are still to be learned from historical coal phase-out. This report conducts empirical analysis on the factors linked to coal and gas power plant phase-out in the past, which could inspire more ambitious actions for the future.

Technology substitution

To phase-out higher-polluting coal while still utilising existing infrastructure, some coal power plants have been switched to operate with natural gas. This strategy is commonly adopted in the eastern United States, Europe, and eastern China (Figure 1).

Given the need to also reduce natural gas

power generation, such substitution strategies may result in stranded assets. Moreover, the underestimated climate impacts and geopolitical fuel trade uncertainties can lead to future challenges around natural gas.²

Empirical analysis shows that expanding renewable energy technologies such as solar and wind, coincides with historical coal and gas declines. For example, the rapid cost reduction of renewable energy has led to natural gas power plant shutdowns in the United States. Indeed, localised policy efforts to reach one of the targets agreed on by the First Global Stocktake – to triple the world’s renewable capacity by 2030 could provide additional incentives for a transition away from fossil fuels.

Societal considerations

The transition away from coal and gas is especially difficult for people and communities reliant on these resources for employment and economic growth.

Our empirical analysis shows that countries with a larger percentage of workforce employed in mining are less likely to phase out coal-fired power generation. Countries with natural gas production contributing to a larger portion of Gross Domestic Product (GDP) are less likely to reduce natural gas-fired power generation.

Policies aimed at more ambitious fossil fuel phase-out should incorporate compensatory packages for affected communities. Engaging with local stakeholders in this transition can also improve the political buy-in and justice implications.³

International cooperation and support are especially crucial for countries reliant on fossil fuel resources and lacking economic capacities.

Market reform

The difficulty in transitioning away from fossil fuels is closely intertwined with power market structure and design. Market reform across various mechanisms was found to be connected

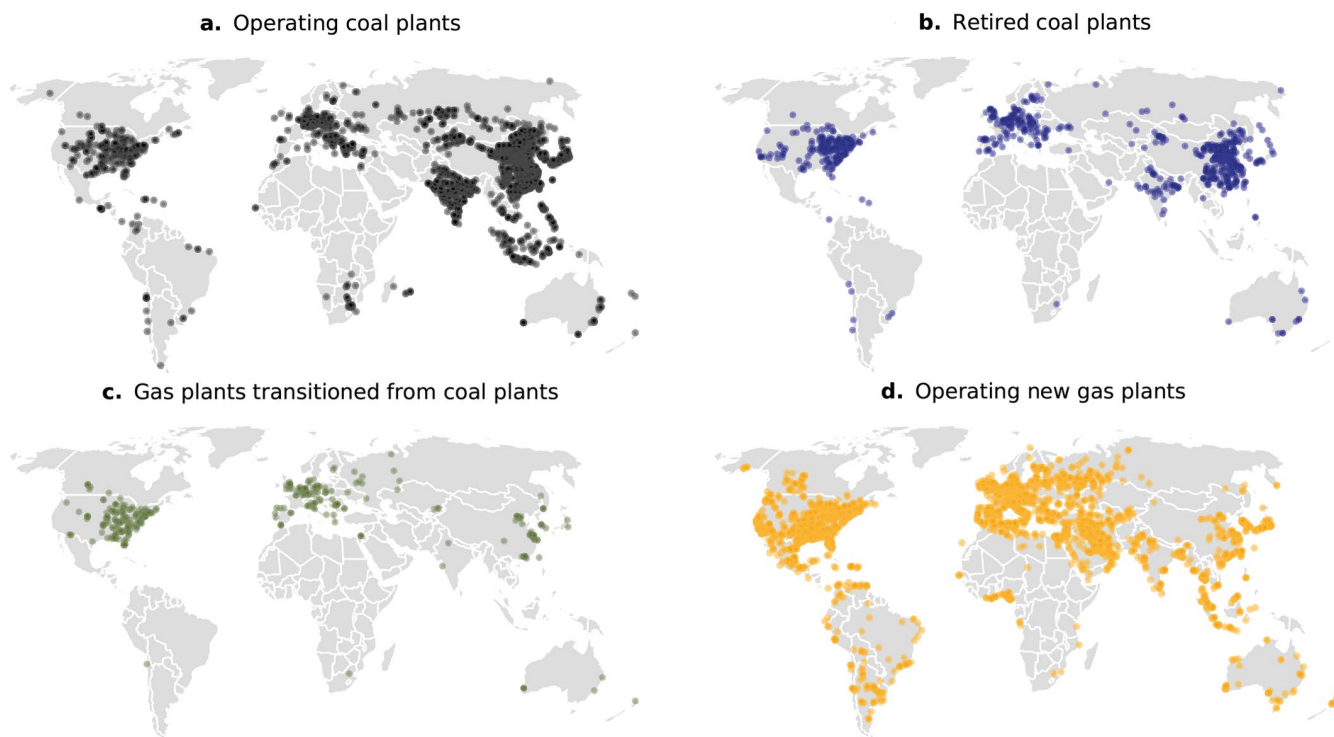


Figure 1: Operating, retired and transitioned coal power plants and operating natural gas power plants in 2022. Data source: Global Gas Plant Tracker, Global Energy Monitor, February 2023 release (version 2); Global Coal Plant Tracker, Global Energy Monitor, January 2023 release

with a more ambitious coal and gas phase-out. Notable mechanisms include the choice of electricity supplier, privatisation, and the availability of wholesale markets.

Countries that currently have reformed power markets are also those with higher GDP, where a larger portion of the population that believe human activities are the main contributor for climate change. These countries are also more likely to enact climate policies in the energy supply sectors to address economic or regulatory barriers of fossil fuel phase-out. The combined effects of economic capacity, consumer willingness, and a liberalised market could facilitate and stimulate more ambitious actions.

Overcoming lock-in

Most countries with climate progress have experienced periods of fossil fuel reliance. For those only starting the transition now, there are many policy opportunities to overcome lock-in. Special attention should be paid to natural gas-reliant countries which appeared to be more stagnant in the transition.

IAM modellers are working towards incorporating such social, political, and institutional factors to develop more politically relevant scenarios. Policymakers can utilise existing evidence to enable the transition away from fossil fuel with more ambitious domestic policies and more equitable international cooperations.

References

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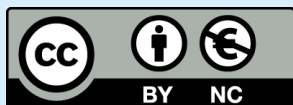
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More information about the ELEVATE project: www.elevate-climate.org

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**PBL Netherlands Environmental
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