UCI SUSTAINABLE SYSTEMS ANALYSIS

RESEARCH BRIEF

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KEY POINTS FOR DECISION-MAKING

- **In published scenarios that meet international climate goals, gas- and coal-fired power plants shut down much earlier than they have historically.** Gas- and coal-fired power plants have historically operated for nearly 40 years. But such a long lifetime is incompatible with future trajectories of power sector emissions.

- **Average lifetimes of coal-fired power plants are especially short.** In scenarios that limit global warming to 1.5°C, the average lifetime of coal-fired plants is just 9 years. Allowing warming of up to 2°C increases the lifetime to 16 years--still far shorter than plants have operated historically.

- **Continued investment in fossil power plants increases the need for and costs of early plant retirements.** Building more fossil power plants increases the magnitude of assets that will be stranded by climate goals. Which policy mechanisms force early retirements may ultimately determine who will bear the economic losses.

Coal-fired power plant under construction in China

Fossil power plants retire decades early in scenarios that meet global climate goals

International goals to limit the increase in global mean temperatures to no more than 2°C warmer than the preindustrial era entail drastic changes in global energy systems, including large and rapid reductions in CO_2 emissions from the elctric power sector.

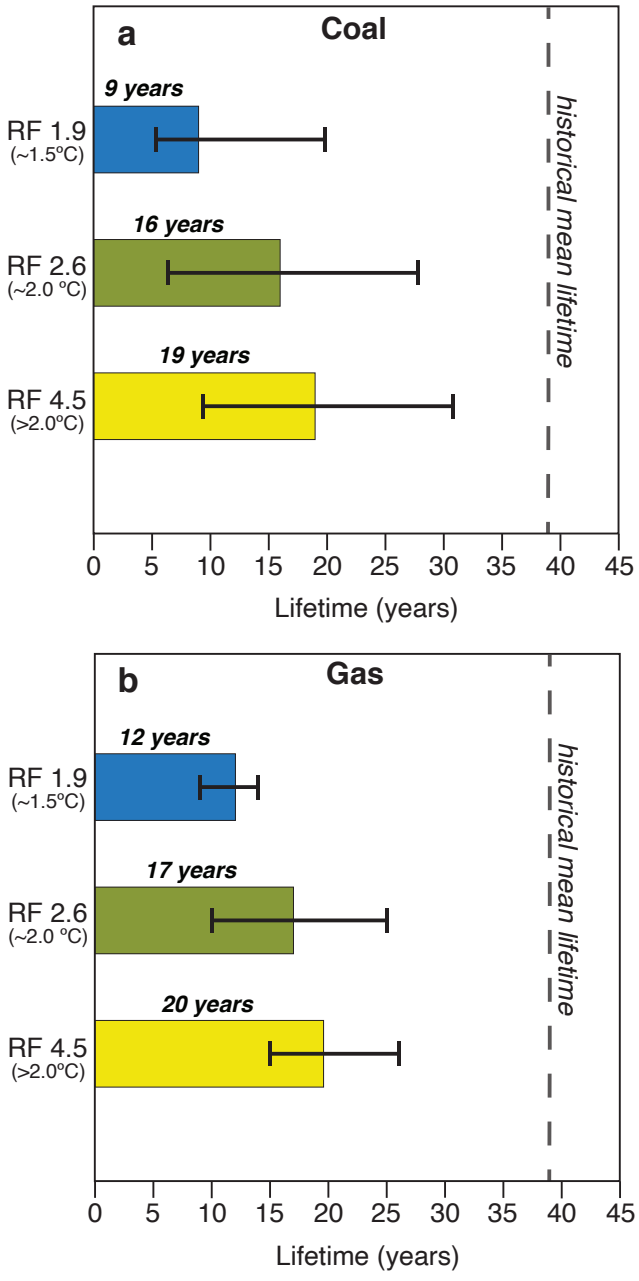
We analyzed scenarios generated by integrated assessment models to infer changes in the operating and/or retirement schedules of historically long lived fossil fired-power plants.

In scenarios consistent with international goals, we find that coal and gas-fired power plants retire one to three decades earlier than historically has been the case.

Although it is well understood that fossil infrastructure will need to be swiftly decommissioned to avoid the most extreme consequences of climate change, the extent to which climate mitigation scenarios rely on the premature retirement of existing plants and the curtailment of future construction is not widely known.

Summary

The continued deployment of new gas- and coal-fired power plants, unless their utilization is severely curtailed, is at odds with international climate goals. Thus, further investments in coal- and gas-fired power plants come with the risk of either stranding assets or failing to avoid ever more dangerous levels of climate change.



Maximum power plant lifetime across all scenarios of different warming levels. Bars show the maximum lifetime among analyzed scenarios with different levels of radiative forcing when operated as they have historically. Error bars show the effect of different capacity factor assumptions. In scenarios that meet global climate targets (blue and green bars), coal- and gas-fired power plants retire much earlier than they have historically (dashed line).

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Coal-fired power plant at sunset

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