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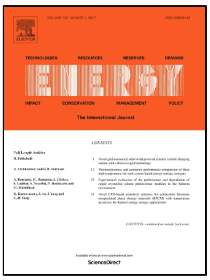

Why do climate change scenarios return to coal?

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Why do climate change scenarios return to coal?

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Abstract

The following article conducts a meta-analysis to systematically investigate why Representative Concentration Pathways (RCPs) in the Fifth IPCC Assessment are illustrated with energy system reference cases dominated by coal. These scenarios of 21st-century climate change span many decades, requiring a consideration of potential developments in future society, technology, and energy systems. To understand possibilities for energy resources in this context, the research community draws from Rogner (1997) which proposes a theory of learning-by-extracting (LBE). The LBE hypothesis conceptualizes total geologic occurrences of oil, gas, and coal with a learning model of productivity that has yet to be empirically assessed.

This paper finds climate change scenarios anticipate a transition toward coal because of systematic errors in fossil production outlooks based on total geologic assessments like the LBE model. Such blind spots have distorted uncertainty ranges for long-run primary energy since the 1970s and continue to influence the levels of future climate change selected for the SSP-RCP scenario framework. Accounting for this bias indicates RCP8.5 and other 'business-as-usual scenarios' consistent with high CO_2 forcing from vast future coal combustion are exceptionally unlikely. Therefore, SSP5-RCP8.5 should not be a priority for future scientific research or a benchmark for policy studies.

Keywords: energy resources; technological change; coal; Representative Concentration Pathways; Shared Socioeconomic Pathways; climate change scenarios

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