



Comparing transformation pathways across major economies

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Abstract

This paper explores the consequences of different policy assumptions and the derivation of globally consistent, national low-carbon development pathways for the seven largest greenhouse gas (GHG)–emitting countries (EU28 as a bloc) in the world, covering approximately 70% of global CO₂ emissions, in line with their contributions to limiting global average temperature increase to well below 2 °C as compared with pre-industrial levels. We introduce the methodology for developing these pathways by initially discussing the process by which global integrated assessment model (IAM) teams interacted and derived boundary conditions in the form of carbon budgets for the different countries. Carbon budgets so derived for the 2011–2050 period were then used in eleven different national energy-economy models and IAMs for producing low-carbon pathways for the seven countries in line with a well below 2 °C world up to 2050. We present a comparative assessment of the resulting pathways and of the challenges and opportunities associated with them. Our results indicate quite different mitigation pathways for the different countries, shown by the way emission reductions are split between different sectors of their economies and technological alternatives.

Keywords Climate change mitigation · Paris agreement · Carbon budgets · National transformation pathways · National energy-economy models · Integrated assessment models

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