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Integrated impact assessment of decarbonisation pathways for the EU: insights from the REEEM Project

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The European Commission's 2050 strategy aims at carrying out a transition to a low carbon, secure and competitive EU society by 2050. The energy sector is a core part of this transition, since it accounts for.... The Commission has identified a number of actions to facilitate such transition, consisting of indicative and mandatory policy targets for the EU and the individual Member States. These targets move beyond some of the incremental policies to date to real structural change of the energy system.
Science-based evidence and experience show there is a bi-directional link between the transformation of the energy system and the whole ecosystem around it. On one hand, a structural change of the energy system is expected to carry impacts on the EU economy, environment and society. On the other hand, the political, economic, social, technological, environmental and global setting may impact the velocity and effectiveness of such change.
The Horizon 2020 REEEM research project aims to gain a comprehensive understanding of the system-wide implications of energy strategies in support of the transition to a competitive low-carbon EU energy society. The research questions revolve around: 1) quantifying the impacts of the energy strategies on the EU economy, environment and society, 2) quantifying the feedback mechanisms from the economy, environment and society to the energy strategies and 3) identify potential corrections or additions to the current strategies.
The quantification exercise involves modelling a number of energy transition pathways. It is carried out through a large ecosystem of sectorial models, new in its kind, including top-down macroeconomic models (NEWAGE), bottom-up energy system models (e.g. TIMES PanuEU, OSeMOSYS PanEU, national applications of MESSAGE), bottom-up, survey-based behavioural models, models simulating the health impacts of energy-related emissions (EMC2, Ecosense, EVA) and others. The models are soft-linked, to provide a comprehensive, yet integrated picture of the impacts of the energy transition.
The results presented here come from the first application of part of this integrated modelling framework. They provide insights at both the European and the national scale. On the European scale, they argue the influence of the global climate ambitions on the GDP and job growth in the EU, with indirect effects also on the transition of the energy system. On the national scale, they unveil conflicts potentially arising from the use of resources by different sectors. Conclusions are also drawn on the challenges faced by the modellers when employing such a large and diverse modelling framework and on potential solutions.

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