

Imaclim-R: an innovative hybrid model to foster the dialog on sustainable pathways, energy policies and climate stabilization

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Abstract

The computation of long term economic pathways and the assessment of sustainable development policies require models able to embark information and expectations from economists, engineers, earth scientists and stakeholders. 'Hybrid' modelling is aimed at fulfilling this need but has to overcome well-known difficulties linked to differences in models' variables, languages, aggregation levels or due to lock-ins in pre-existing models.

This paper presents the 'Imaclim-R' architecture designed to foster the dialog with stakeholders and within scientists on future economy-energy-environment trajectories. It is based on an iterative articulation of a static input-output model and dynamic bottom-up models. It allows (i) incorporating physical knowledge about the dynamics of production frontiers, (ii) representing both disequilibria on the short run and a steady growth on the long run, (iii) setting a hard link with bottom-up models. The architecture is now used at a global scale to compute long run GHG emission scenarios and to assess climate policies. It is used either as an autonomous tool or in dialog with other models to improve consistency of long run projections. The paper reports recent numerical experiments that open new perspectives for the assessment of climate and energy policies.

Keywords: hybrid modelling, climate change, energy, scenario