

GEMINI-E3 EU

(General Equilibrium Model of International - National Interactions between Economy, Energy and the Environment)

MODEL OVERVIEW

GEMINI-E3 EU is a recursive dynamic, multi-country and multi-sector computable general equilibrium (CGE) model that simulates the economy as an interconnected system of markets, ensuring simultaneous equilibrium across production, consumption, trade, and factor allocation. It integrates detailed representations of energy systems, emissions (GHGs and air pollutants), and climate policies within a consistent macroeconomic framework, enabling economy-wide assessment of mitigation pathways and policy impacts. The model further enhances analytical depth through refined regional (EU-focused) and sectoral disaggregation, alongside modules for technology, household heterogeneity, and labour dynamics.

ACCESS

GEMINI-E3-EU:

<https://gemini-e3-eu.readthedocs.io/en/latest/>

GitHub:

<https://github.com/Perdana-Sigit/GEMINI-E3EU>

Zenodo:

<https://doi.org/10.5281/zenodo.20410710>

LICENSE

GNU Lesser General Public License
Version 2.1 (LGPL-2.1 license)

OTHER INFORMATION

Time horizon: 2017 - 2050

Access to the GTAP 11 database is needed

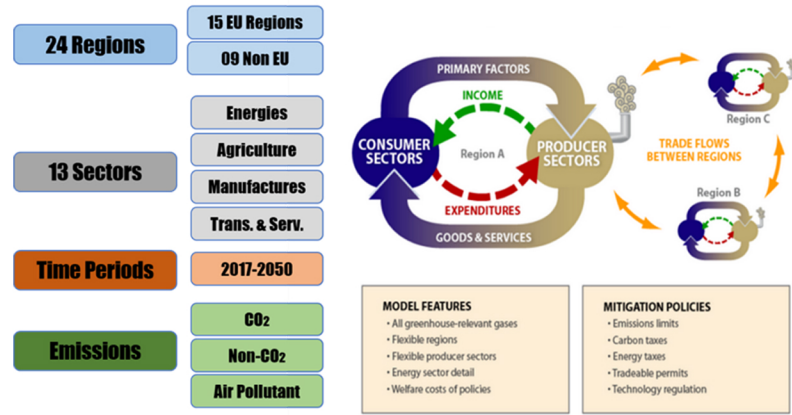
CONTACT DETAILS

Marc Vielle (EPFL)

marc.vielle@epfl.ch

Sigit Perdana (EPFL)

sigit.perdana@epfl.ch



GEMINI-E3 EU model structure

SUPPORTED ANALYSES

- Assess the impacts of climate and energy policies on economic activity, emissions, and competitiveness across EU Member States and economic sectors.
- Explore alternative decarbonisation pathways and the role of emerging low-carbon technologies in achieving climate targets.
- Analyse the distributional impacts of climate policies across heterogeneous households and labour markets.
- Evaluate how different combinations of climate policy instruments influence the transition towards a low-carbon economy.

WHAT'S NEW

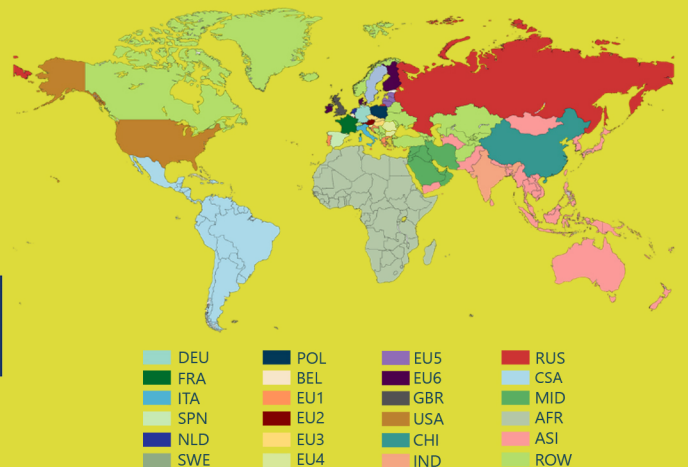
- Enhanced regional and sectoral disaggregation across EU Member States to support more detailed policy assessment.
- Updated model database based on GTAP-Power 11, including expanded coverage of greenhouse gases and air pollutants.
- Explicit representation of emerging low-carbon technologies (e.g., hydrogen, biofuels, heat pumps, and CCS), enabling assessment of technology-driven decarbonisation pathways.
- Enhanced representation of heterogeneous households and labour market dynamics to improve distributional policy analysis.

SDG COVERAGE



REGION MAP

The updated model features an expanded regional and sectoral breakdown, with a particular emphasis on the European Union (EU), based on 14 EU-focused model regions. Selected individual EU member states are distinctly modelled, alongside key global economies such as the United States, China, and India.



SECTORS

