



THE ENVISAGE MODEL

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Key design characteristics

- ***Participating model:*** ENVIRONMENTAL IMPACT AND SUSTAINABILITY APPLIED GENERAL EQUILIBRIUM (ENVISAGE) MODEL
- ***Model type:*** Integrated Assessment Model (IAM)—multi-sector global CGE model with MERGE-based climate module
- ***Participating modelers:*** Jianwu He, Ken Itakura, Denis Medvedev, Dominique van der Mensbrugghe
- ***Time frame:*** (Standard) 2004-2015, 2015-2050 ($\Delta 5$), 2050-2100 ($\Delta 10$)
- ***Solution type:*** Dynamic recursive
- ***Equilibrium type:*** Market general equilibrium
- ***Computing Framework:*** GAMS/PATH with Excel interface



Inputs and outputs

Inputs

- **Demographics:** Population and labor force (15-64) by country
- **Economic:** Substitution, price and income elasticities, savings elasticity wrt to dependency ratios, labor productivity
- **Resources:** Depletable resources for oil and gas, logistic supply functions for land and hydro
- **Technology:** Calibrated nested CES functions with AEEI, *exogenous assumptions for 'backstops'—1st and 2nd generation biofuels, coal and gas CCS in electricity*



Outputs

- **Economic:** GDP, factor and goods prices, output and trade
- **Emissions:** CO₂, CH₄, N₂O, F-gases by driver
- **Climate:** GHG concentration, radiative forcing and global mean temperature



Model dimensions and other details

Model dimensions

- **Regional scope:** Global with GTAP-based ‘variable geometry’ — 
Asia model includes CHN, IDN, MYS, PHL, THA, XEA, BGD, IND, PAK, XSA, RUS, XEC, JPN, KOR, RHA
- **Sectoral scope:** GTAP-based with supplemental electricity data (coal, oil & gas, hydro, nuclear, other) 

Other details

- **Rigidities:** Putty/semi-putty technology (vintage capital)
- **Consumption:** CDE/(E)LES/AIDADS
- **Damages:** Currently limited to agriculture (Cline estimates—average of with- and without carbon fertilization)

