

To pdf - IPETS

From IAMC-Documentation

Reference card - IPETS

Contents

- 1 Reference card - IPETS
 - 1.1 About
 - 1.2 Model scope and methods
 - 1.3 Socio economic drivers
 - 1.4 Macro economy
 - 1.5 Energy
 - 1.6 Land-use
 - 1.7 Other resources
 - 1.8 Emissions and climate

The reference card is a clearly defined description of model features. The numerous options have been organized into a limited amount of default and model specific (non default) options. In addition some features are described by a short clarifying text.

Legend:

- ☐ not implemented
- ☒ **implemented**
- ☒ **implemented (not default option)**

About

Name and version IPETS 2.0

Institution and users National Center for Atmospheric Research (NCAR), USA,
<https://www2.cgd.ucar.edu/sections/tss/iam/iam-modeling>.

Documentation IPETS documentation is limited and consists of a reference card

Model scope and methods

Objective The iPETS model is developed to analyze greenhouse gas mitigation and climate change impacts with a special emphasis on the implications of demographic heterogeneity.

Concept Computable General Equilibrium

Solution method The economic problem is formulated as a three-level nested problem. The solution of these three sub-problems yield the dynamic capital path (investment/consumption trade-off in each simulation year), and factor and output prices which clear all factor and goods markets.

Anticipation Forward looking

Temporal dimension Base year:2004, time steps:annual, horizon: 2100

Spatial dimension Number of regions:9

- | | |
|-------------------------------|-----------------------------------|
| 1. China | 6. Other Industrialized Countries |
| 2. EU27+ | 7. sub-Saharan Africa |
| 3. India | 8. Transition Countries |
| 4. Latin America | 9. USA |
| 5. Other Developing Countries | |

Policy implementation Climate policy through (global or regional) carbon tax or emission target (annual level or temporal budget)

Socio economic drivers

- | | | |
|--------------------------|----------------------------------------------------------------|----------------------------------------------------------------------|
| Exogenous drivers | <input checked="" type="checkbox"/> Exogenous GDP | <input checked="" type="checkbox"/> Energy Technical progress |
| | <input type="checkbox"/> Total Factor Productivity | <input type="checkbox"/> Materials Technical progress |
| | <input checked="" type="checkbox"/> Labour Productivity | <input type="checkbox"/> GDP per capita |
| | <input type="checkbox"/> Capital Technical progress | |

Note: Exogenous GDP paths are targeted for baseline scenarios by modifying labor productivity. In mitigation and impacts analyses GDP is endogenously determined.

- | | | |
|--------------------|--------------------------------------------------------------|----------------------------------------------------|
| Development | <input checked="" type="checkbox"/> GDP per capita | <input type="checkbox"/> Education level |
| | <input type="checkbox"/> Income distribution in a region | <input type="checkbox"/> Labour participation rate |
| | <input checked="" type="checkbox"/> Urbanisation rate | |

Macro economy

- | | | |
|-------------------------|-------------------------------------------------------------|-------------------------------------------------------|
| Economic sectors | <input checked="" type="checkbox"/> Agriculture | <input type="checkbox"/> Transport |
| | <input checked="" type="checkbox"/> Industry | <input type="checkbox"/> Services |
| | <input checked="" type="checkbox"/> Energy | |
| Cost measures | <input checked="" type="checkbox"/> GDP loss | <input type="checkbox"/> Area under MAC |
| | <input type="checkbox"/> Welfare loss | <input type="checkbox"/> Energy system costs |
| | <input checked="" type="checkbox"/> Consumption loss | |
| Trade | <input checked="" type="checkbox"/> Coal | <input type="checkbox"/> Electricity |
| | <input checked="" type="checkbox"/> Oil | <input type="checkbox"/> Bioenergy crops |
| | <input checked="" type="checkbox"/> Gas | <input checked="" type="checkbox"/> Food crops |
| | <input type="checkbox"/> Uranium | <input type="checkbox"/> Capital |

☒ Emissions permits☒ Non-energy goods

Energy

Resource use

- ☐ Coal
- ☐ Oil
- ☐ Gas

- ☐ Uranium
- ☐ Biomass

Electricity technologies

- ☒ Coal
- ☒ Gas
- ☒ Oil
- ☐ Nuclear
- ☐ Biomass

- ☐ Wind
- ☐ Solar PV
- ☐ CCS
- ☒ non-fossil

Note: generic CES function for each electricity producing sector

Conversion technologies

- ☐ CHP
- ☐ Heat pumps
- ☐ Hydrogen

- ☐ Fuel to gas
- ☐ Fuel to liquid
- ☒ Refined fuels

Note: Refined fuels can be produced from any feedstock (but initially mostly represent crude oil to fuels)

Grid and infrastructure

- ☐ Electricity
- ☐ Gas
- ☐ Heat

- ☐ CO2
- ☐ H2

Energy technology substitution

- ☐ Discrete technology choices
- ☐ Expansion and decline constraints

- ☐ System integration constraints

Energy service sectors

- ☐ Transportation
- ☐ Industry

- ☐ Residential and commercial

Land-use

Land-use

- ☒ Cropland
- ☒ Forest

- ☒ pasture

Other resources

Other resources

- ☐ Water
- ☐ Metals

- ☐ Cement

Emissions and climate

Green house gasses	<input checked="" type="checkbox"/> CO2	<input type="checkbox"/> HFCs
	<input type="checkbox"/> CH4	<input type="checkbox"/> CFCs
	<input type="checkbox"/> N2O	<input type="checkbox"/> SF6
Pollutants	<input type="checkbox"/> NOx	<input type="checkbox"/> OC
	<input type="checkbox"/> SOx	<input type="checkbox"/> Ozone
	<input type="checkbox"/> BC	
Climate indicators	<input type="checkbox"/> CO2e concentration (ppm)	<input type="checkbox"/> Temperature change (°C)
	<input type="checkbox"/> Radiative Forcing (W/m ²)	<input type="checkbox"/> Climate damages \$ or equivalent

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