LCEM(IAMC/IEEE)

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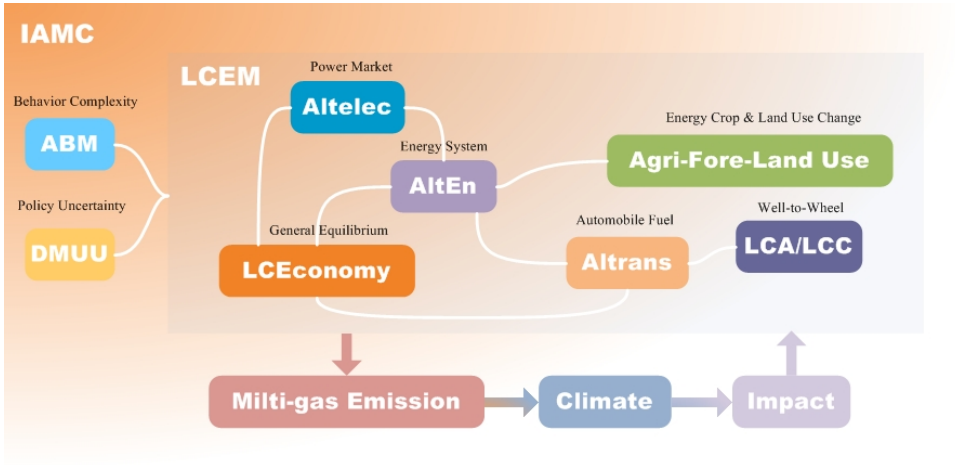
Key Design Characteristics

- ***Participating Model:***
  - LCEM (Low Carbon Energy Model) – IAMC (Integrated Assessment Model for China)
  - GCAM & MESSAGE-China Region
- ***Model Type:***
  - Macroeconomic-Energy System Hybrid Model
  - Integrated Assessment Model (IAM), using MAGICC as its atmosphere and climate model
- ***Participating Modelers:***
  - Chai Qimin, Yue, Hu Guangping, Wang Yu, Zhang Jihong, Zhou Sheng, Zhang Xiliang, He Jiankun
- ***Time Step:***
  - 5 years /10 years/ 15 years
- ***Time Frame:***
  - 2005 to 2050 / 1990 to 2100
- ***Solution Type:***
  - Optimization / Dynamic Recursive
- ***Equilibrium Type:***
  - General/ Market Equilibrium
- ***Underlying Computing Framework:***
  - GAMS, C++



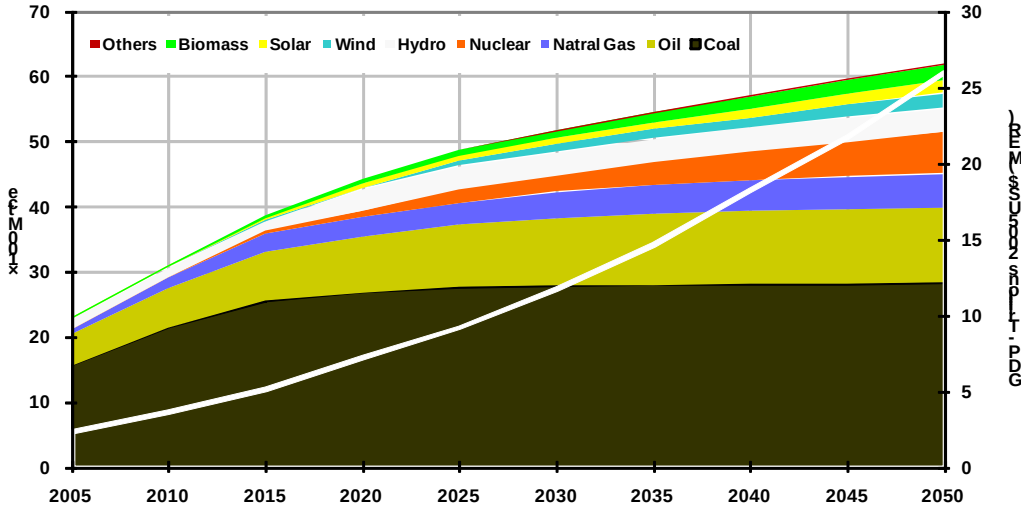
Inputs and Outputs

- Key inputs
  - Demographics:
    - Population
  - Economic:
    - GDP, urbanization rate, industrial structure
    - Labor productivity, price and income elasticities
  - Resources:
    - Depletable resources by grade (e.g. fossil fuels and uranium)
    - Renewable resources by grade (e.g. wind, solar, biomass)
  - Technology:
    - Extraction, production, transformation and use technologies
- Key outputs
  - Economic:
    - GDP, energy prices (oil, gas, coal, biofuels, etc.)
  - Energy:
    - Production, transformation, end use, import and export
  - Agri-Fore-Land Use:
    - Production, consumption, trade, and land use
  - Emissions:
    - CO_2 emissions by source, non-CO_2 emissions (CH_4, N_2O, etc.)

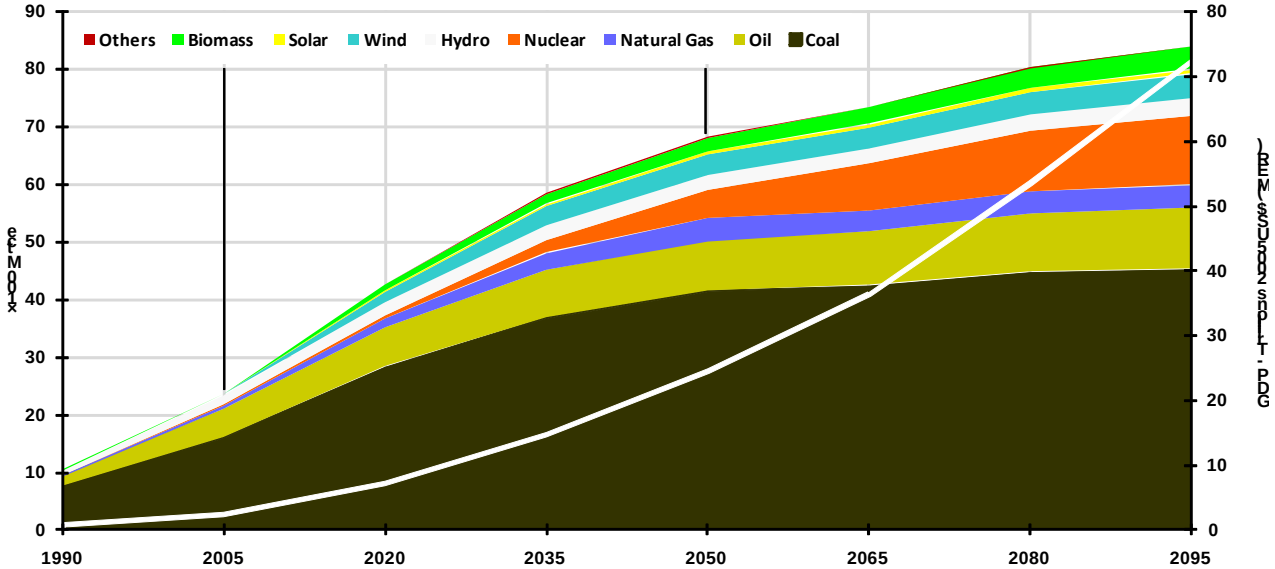
Regional Scope & Other Detail

- Regional Details:
  - Regional Scope: China
  - Number of Sub-Regions: 1 or 3
- Energy Demand & Supply Details:
  - Energy Demand Sectors:
    - Industry, Transportation, Building (Commercial, Household), Agriculture
  - Energy Supply Sectors:
    - Electricity Generation, Liquid Fuel Production, Gas Fuel Production, Hydrogen Production, Chemical Feedstock

China Baselines



LCEM
GDP, Primary Energy Consumption
2005-2050



GCAM
GDP, Primary Energy Consumption
1990-2095

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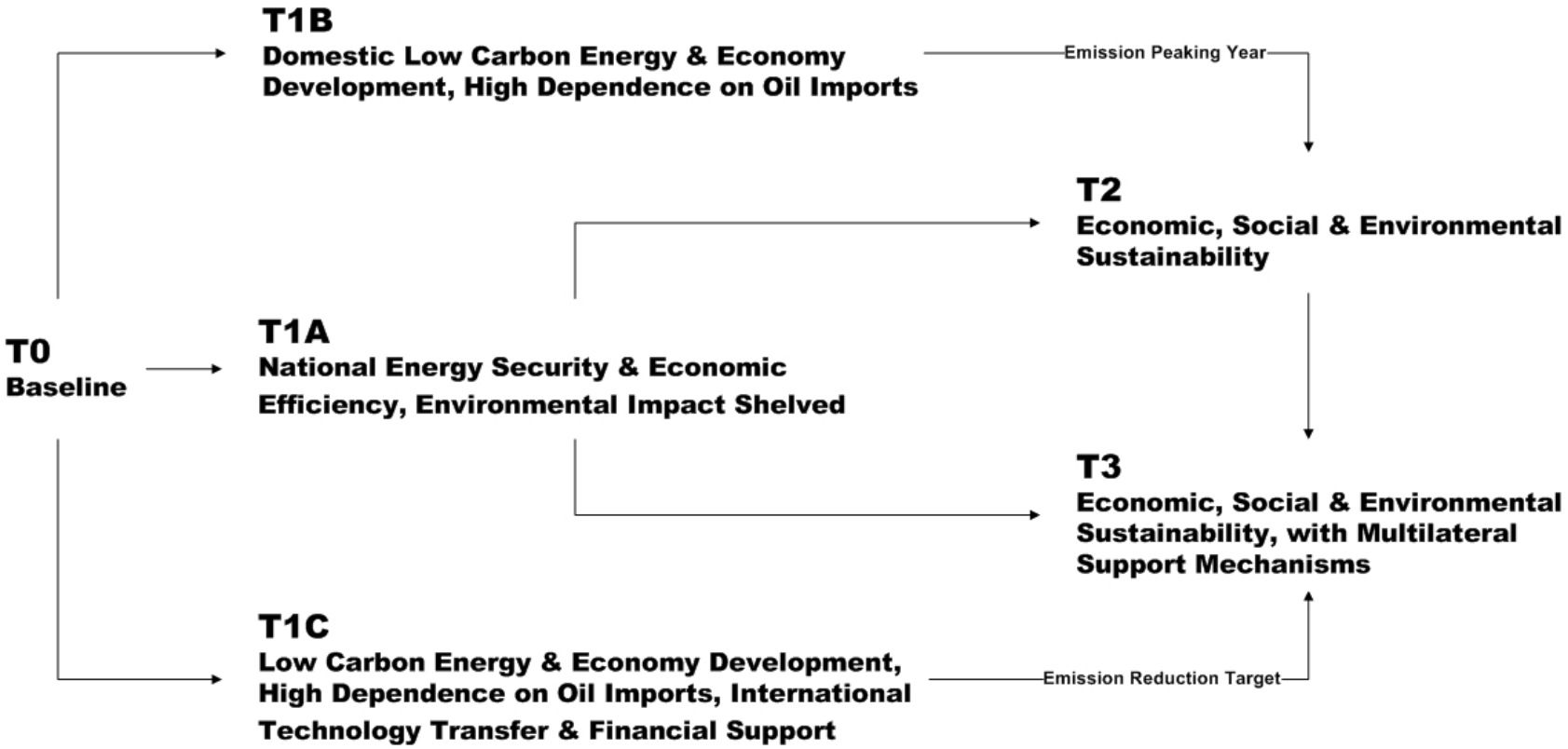
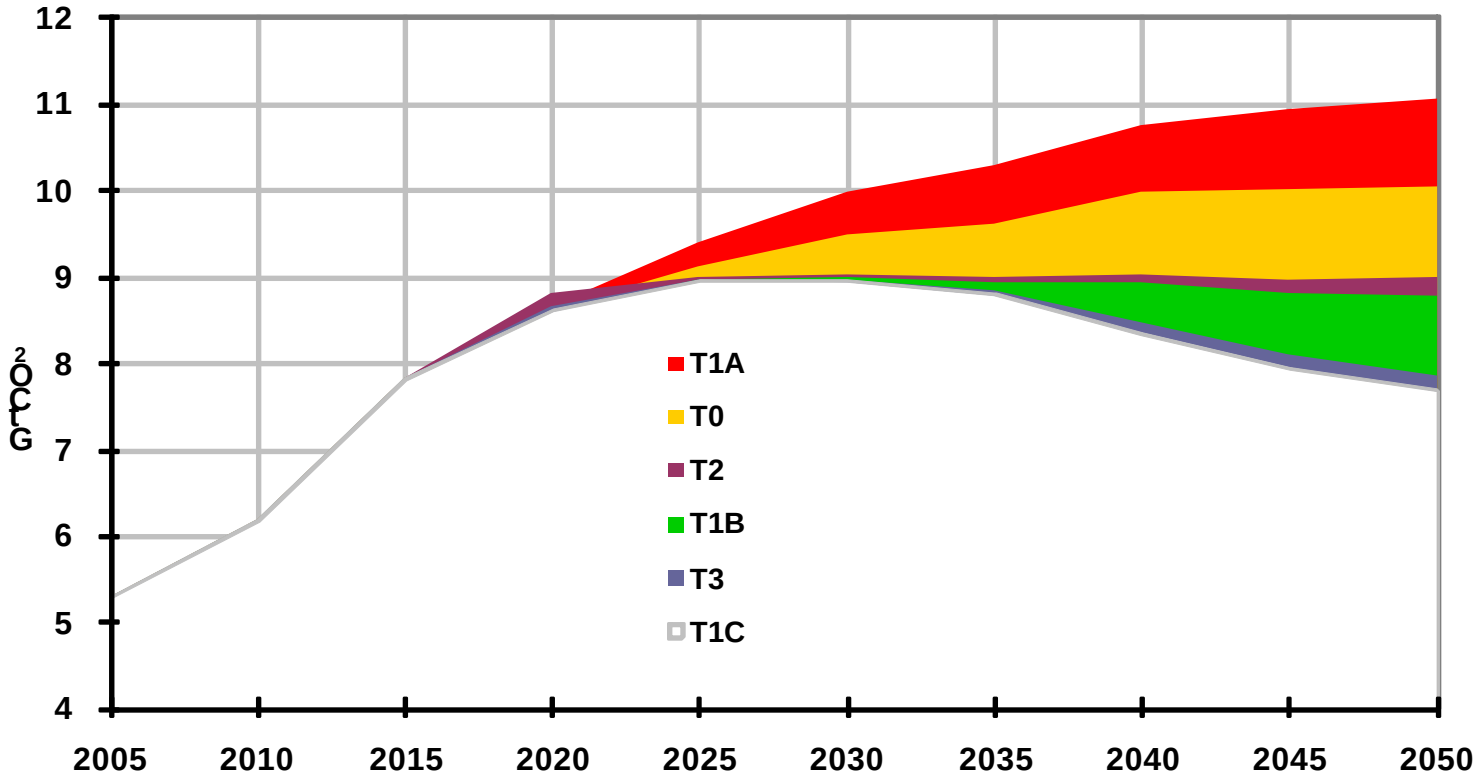
T Scenarios

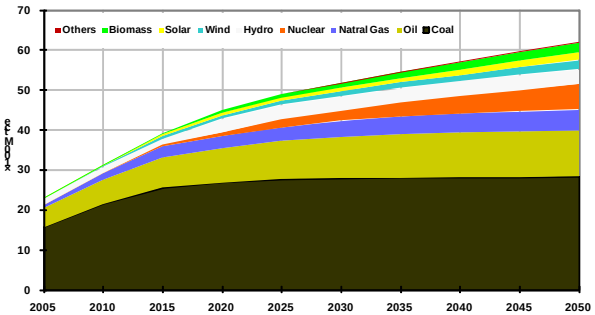

T1B
Domestic Low Carbon Energy & Economy Development, High Dependence on Oil Imports
Emission Peaking Year
T2
Economic, Social & Environmental Sustainability
T0
Baseline
T1A
National Energy Security & Economic Efficiency, Environmental Impact Shelved
T3
Economic, Social & Environmental Sustainability, with Multilateral Support Mechanisms
T1C
Low Carbon Energy & Economy Development, High Dependence on Oil Imports, International Technology Transfer & Financial Support
Emission Reduction Target

Scenarios for Emission Peaking year and Reduction Target

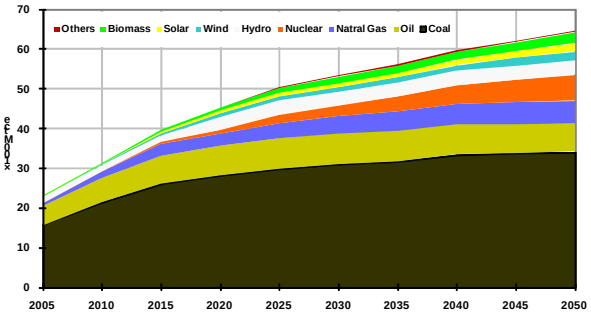


T Scenarios

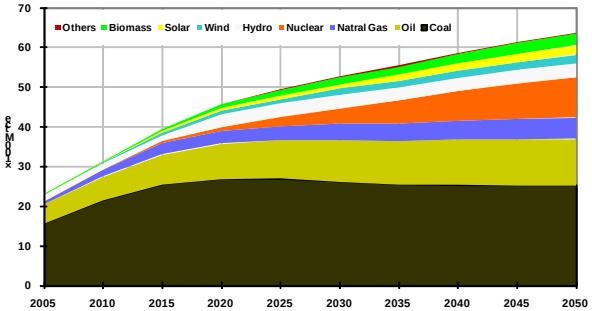
T0



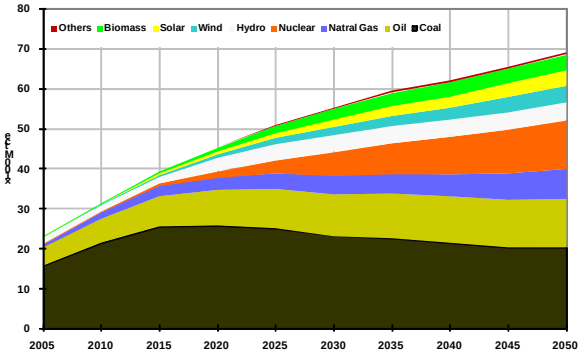
T1A



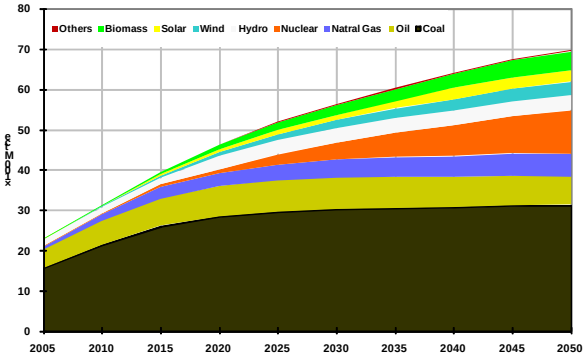
T1B



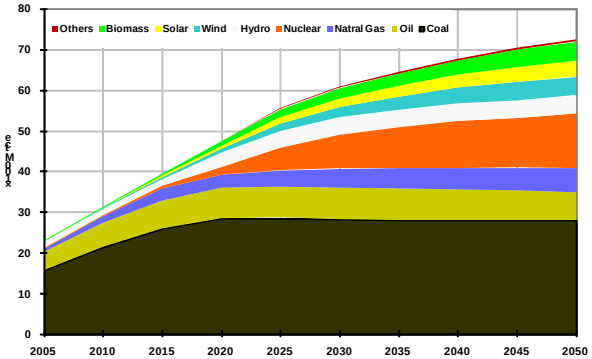
T1C



T2

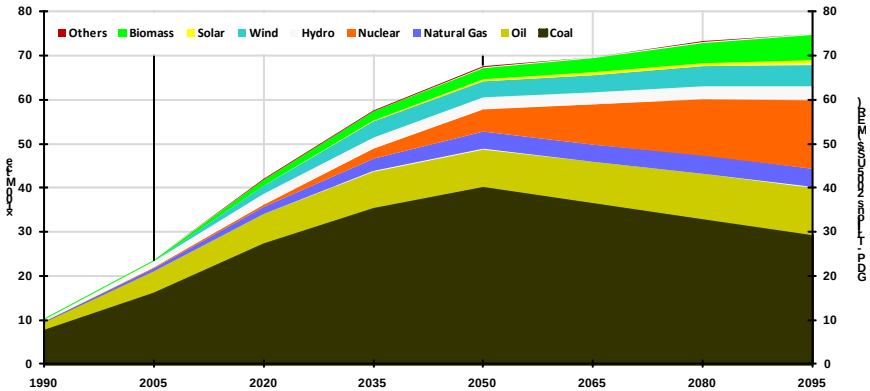


T3

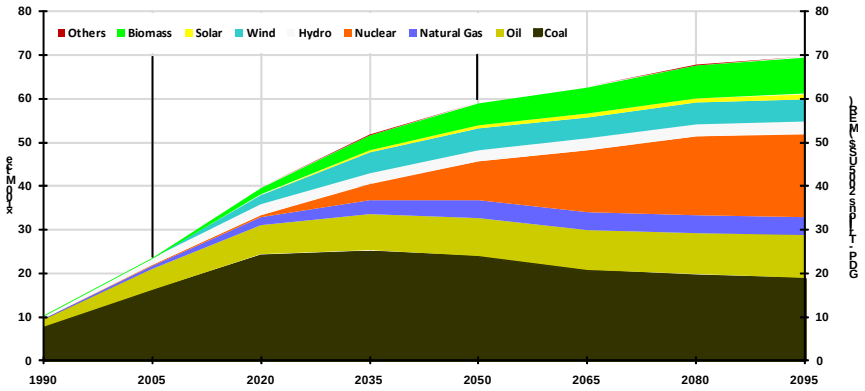


Scenarios under Full Participation

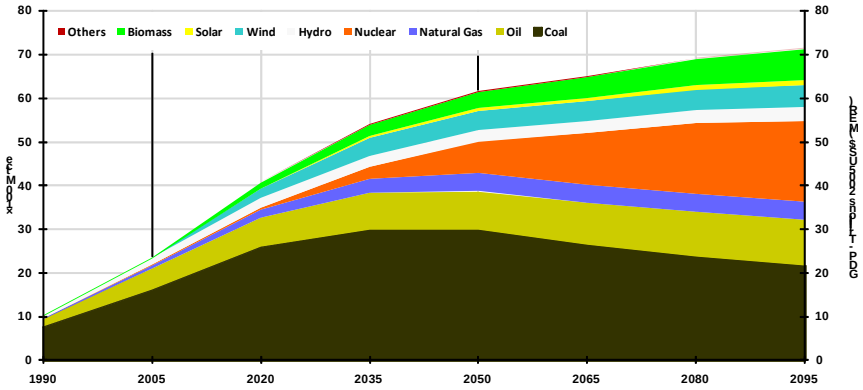
750ppm, 5.8W/m^2



550ppm, 4.4W/m^2



650ppm, 5.0W/m^2



450ppm, 3.4W/m^2