GRAPE (IAE)

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Asia Modeling Meeting

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Key Design Characteristics

- ***Participating Model:*** **GRAPE (Global Relationship Assessment to Protect the Environment)**
- ***Model Type:*** **Integrated Assessment Model (IAM), using ISAM as its climate model**
- ***Participating Modelers:*** **Atsushi Kurosawa**
- ***Time Step:*** **10 years**
- ***Time Frame:*** **2000 to 2150**
- ***Solution Type:*** **Intertemporal Optimization**
- ***Equilibrium Type:*** **General Equilibrium with Macroeconomic Production Function**
- ***Underlying Computing Framework:*** **GAMS**

Inputs and Outputs

- **Key inputs**
  - ***Demographics: Population by region***
  - ***Economic: Reference GDP and energy demand, other parameters in CES production function (e.g. elasticities, TFPs)***
  - ***Resources: Depletable resource by grade (e.g. fossil fuel and uranium); renewable resource by grade (e.g. biomass, hydropower) or price down over time(e.g. wind, solar)***
  - ***Technology: Energy conversion (e.g. generation, hydrogen, synfuel) and CCS, enduse products (vehicle, CHPs, FCs)***
- **Key outputs**
  - ***Economic: GDP, investment, consumption***
  - ***Energy: Production, conversion, enduse and trade***
  - ***Agriculture: Production, landuse, food demand***
  - ***Emissions: CO2, nonCO2(CH4, N2O, F-gases), other agents***
  - ***Climate: GHG conc., radiative forc., temperature, etc.***

Regional Scope & Other Detail

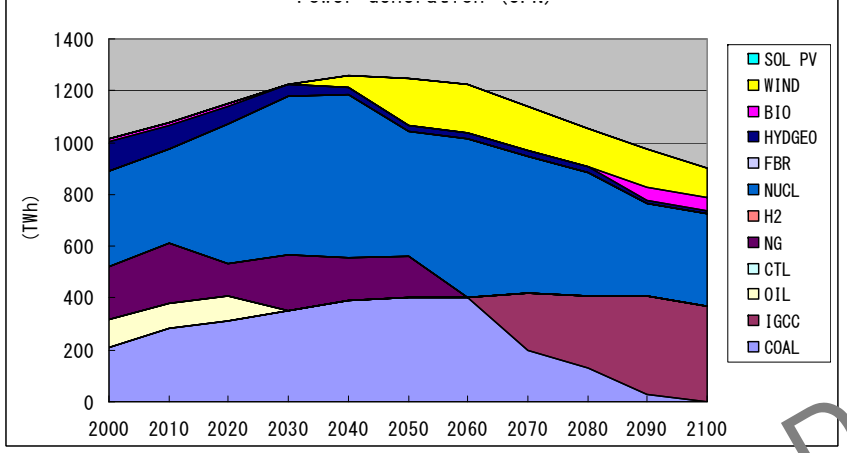
- **Regional Details:**
  - ***Regional Scope: Global***
  - ***Number of Sub-Regions: 15***
  - ***Asian Regions: Japan, China, India, Southeast Asia***

- **Other Details:**
  - **Energy Demand Sectors : Transportation, Electricity, Stationary**
  - **Climate and CO2 feedbacks to Terrestrial Biosphere**

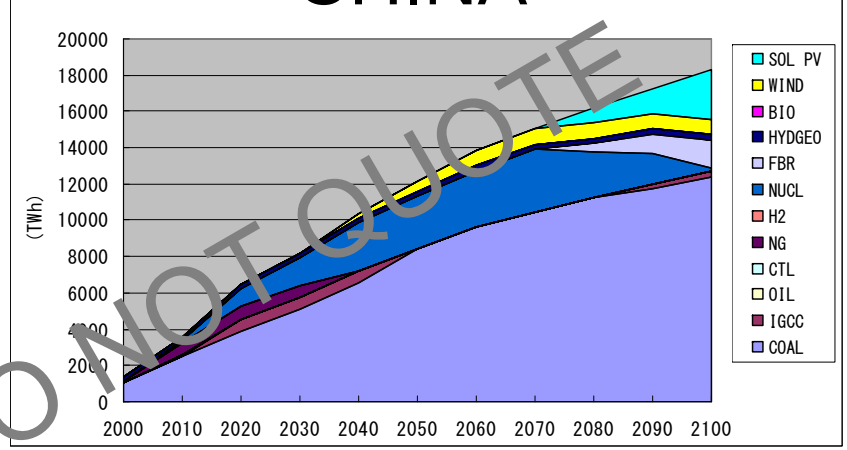
Asian Baselines

Power Generations

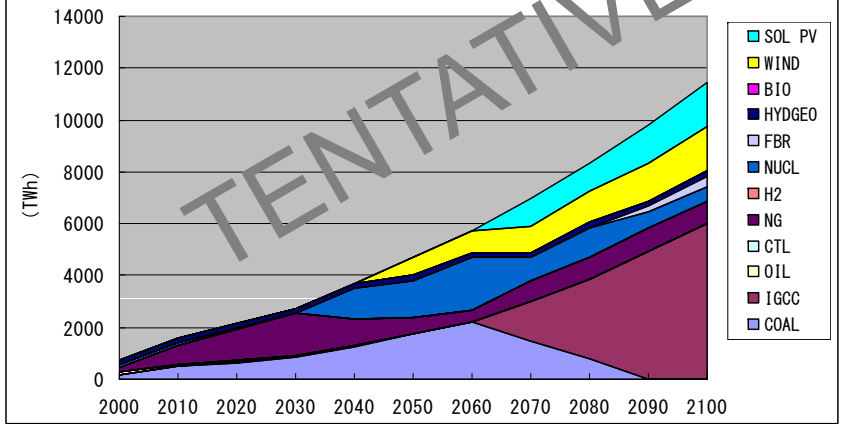
JAPAN



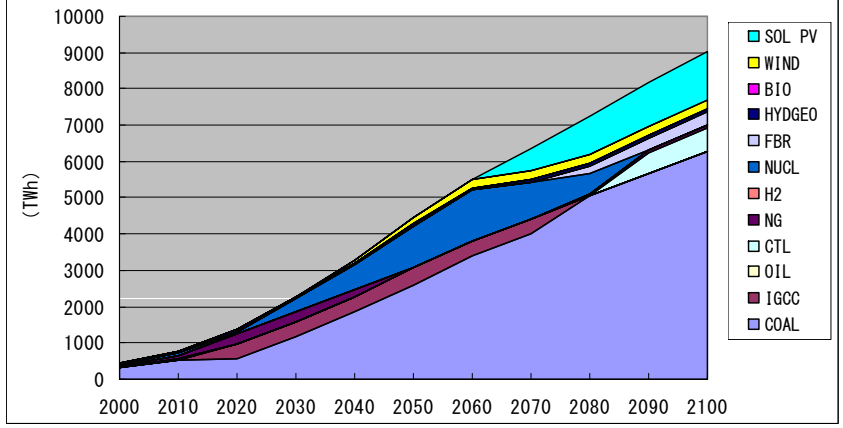
CHINA



Southeast ASIA

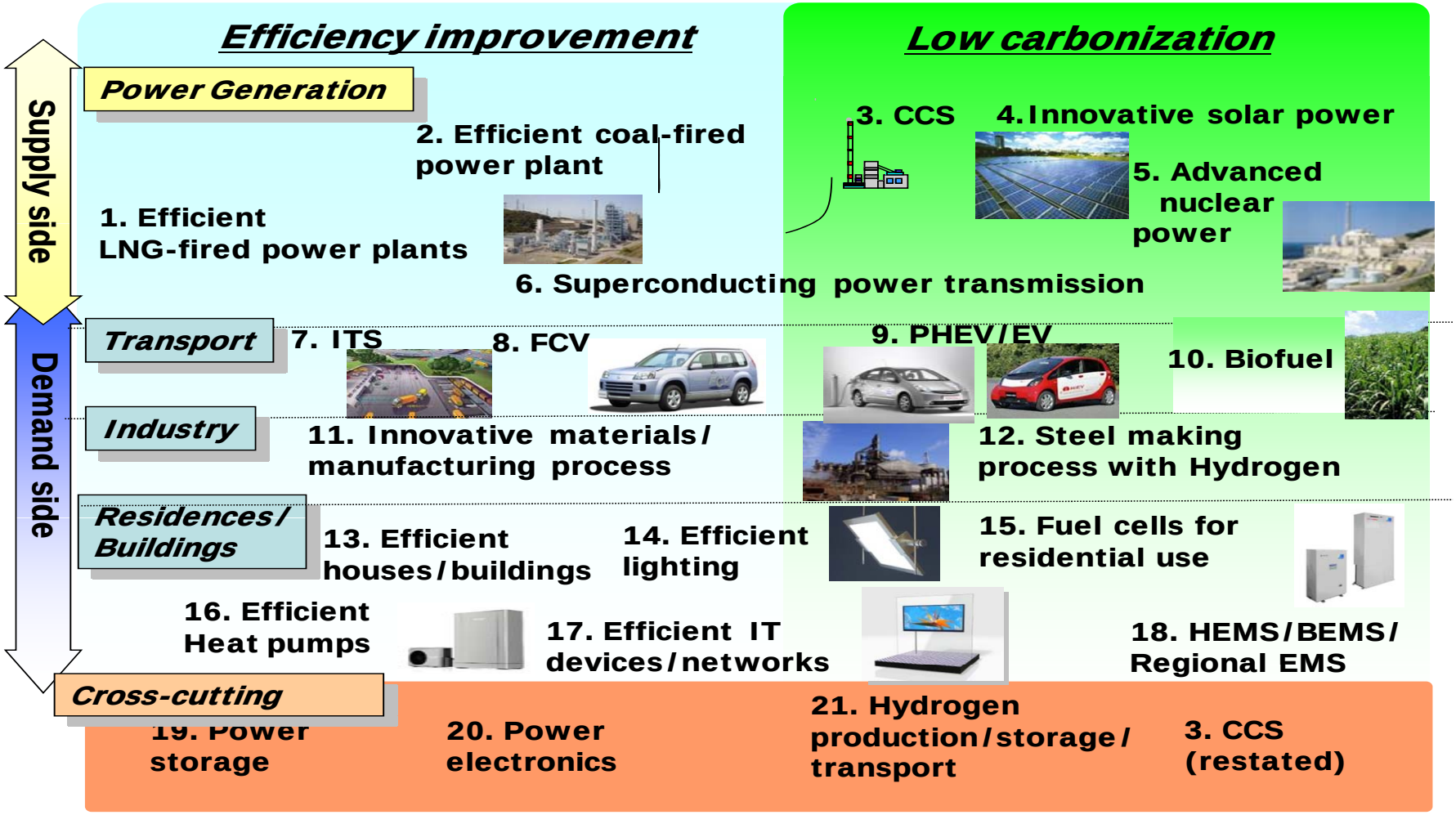


INDIA



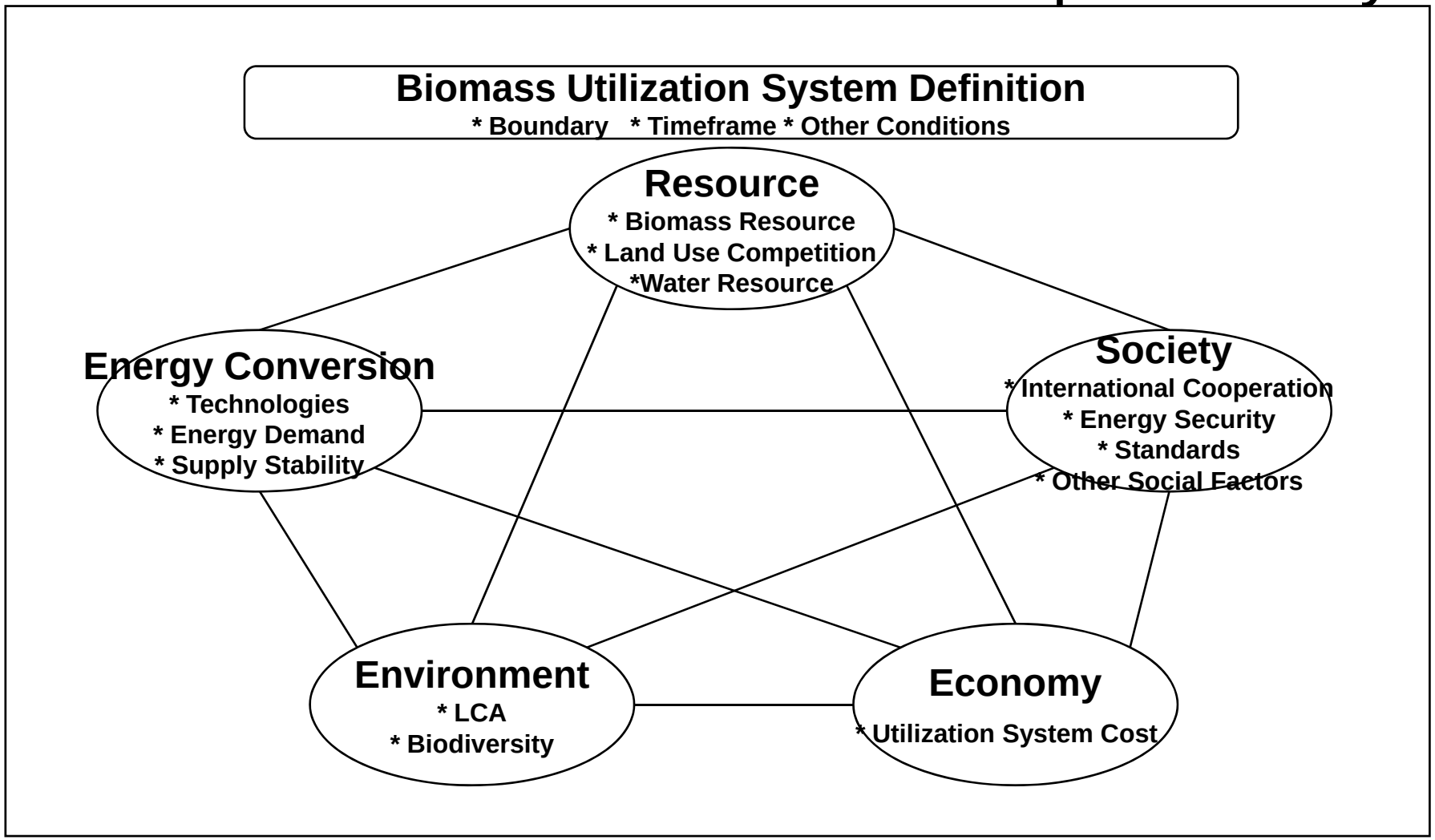
Previous Work on Asia

Energy Innovation Analysis
"Cool Earth - Innovative Energy Technology Program"
21 key innovative energy technologies.



Previous Work on Asia

Sustainable Biofuel Use – Conceptual Study



Source: ERIA Project Report, 2007

Previous Work on Asia

Synfuel Analysis – CTL and Biofuel