

Netherlands Environmental Assessment Agency

IMAGE (PBL)

Tom Kram Tsukuba, Japan, 17/18 September 2009



Key Design Characteristics

- Participating Model: IMAGE Framework (Integrated Model to Assess the Global Environment)
- Model Type: Integrated Assessment Model with MAGICC and grid-based landcover/land-use
- Participating Modelers: Detlef van Vuuren, Elke Stehfest, Lex Bouwman, Jasper van Vliet, Michel den Elzen, Bas van Ruijven
- Time Step: Annual
- *Time Frame:* 1970-2100 (2050)
- Solution Type: Simulation (limited foresight)
- Equilibrium Type: Market equilibrium
- Underlying Computing Framework: Fortran(C), M

Inputs and Outputs

Key inputs

- **Demographics:** population by region
- **Economic:** GDP, HH income, VA Industry/Services/Agriculture/other
- Resources: Fossil resources by grade; renewable resources by grid -> supply curves; carbon sequestration reservoirs by grade
- Technology: Explicit in energy supply and conversion; includes CCS from fossil and bio-energy; technology learning

Key outputs

- Economic: prices of energy, agricultural products
- *Energy:* primary, conversion, final consumption; production, trade
- *Agriculture:* consumption/production/trade; intensity, land-use
- Emissions: greenhouse gases (all sources), ozone precursors, BC/OC, N-compounds in water
- Climate: dT, d Precip; global and gridded (multiple GCM patterns); SLR

Regional Scope & Other Detail

Regional Details:

- Regional Scope: Global
- *Number of Sub-Regions:* 24/26 (45 in Europe version)
- Asian Regions: China, India, Indonesia, Korea, Japan, Other South-East Asia (Stans? ME?)

Other Details:

- Energy demand sectors: industry, services, households, transport, other
- Energy supply: Coal, Oil, Nat.gas, Nuclear, Solar, Wind, Hydro, Traditional biomass, Modern biomass
- Energy sectors: Fossil production, fossil conversion, electricity generation, hydrogen production, biomass production, bio-energy conversion
- Other: Agriculture (7 crops, 4 animal products), forestry (4 categories), carbon plantations, water, nutrients,

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GDP and Energy Intensity



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IMAGE@AMM, Tom Kram, 17-18/9/2009

Total Primary Energy, India



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IMAGE@AMM, Tom Kram, 17-18/9/2009

Agri.land area & Total GHG Emissions



Residential Energy Model for India

- Urban/rural divide
- Income distribution (2 * 5 quintiles)
- Monetary indicators & intensities weak: technical bottom-up
- Rural electrification



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