http://ampere-project.eu/web/

http://www.feem-project.net/limits/

AMPERE AND LIMITS

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At Ohyama Memorial Hall, National Institute for Environmental Studies

AMPERE: Overview

- **AMPERE = A**ssessment of Climate Change **M**itigation **P**athways and **E**valuation of the **R**obustness of Mitigation Cost **E**stimates
  - Coordinated by PIK (Project chair: Ottmar Edenhofer; Project Director: Elmar Kriegler). The SC includes Detlef van Vuuren (Universiteit Utrecht), Keywan Riahi (IIASA), Pantelis Capros (ICCS) and Valentina Bosetti (FEEM).

- **Objective:** Improve knowledge on climate change mitigation costs by better integrating climate and economic models and systematically comparing the economic components of these models.

- **Expected impact:** Better quantify the costs of climate change mitigation within an inter-comparison framework; increased consistency in cost-related information for policy making. Provide input to international assessments including the 5th IPCC report.

AMPERE: Modeling Platform

- For the first time bringing together European groups with 10 global and 6 EU27 energy-economy / integrated assessment models

  (PIK, IIASA, U Utrecht, FEEM, ICCS, CIRED, PSI, IPTS, LEPII U Grenoble, Enerdata, IPTS, IER U Stuttgart, EEG TU Wien, ERASME)

- Plus 5 groups from China (ERI), India (IIM), Japan (NIES, RITE), USA (PNNL)
- Plus 2 climate modeling groups (ClimateAnalytics, Hadley Centre)
- Brussels think tank CEPS for dissemination

AMPERE:
Research Questions and 7 Working Packages

How sensitive are mitigation scenarios and costs to model assumptions and structural differences, and why?

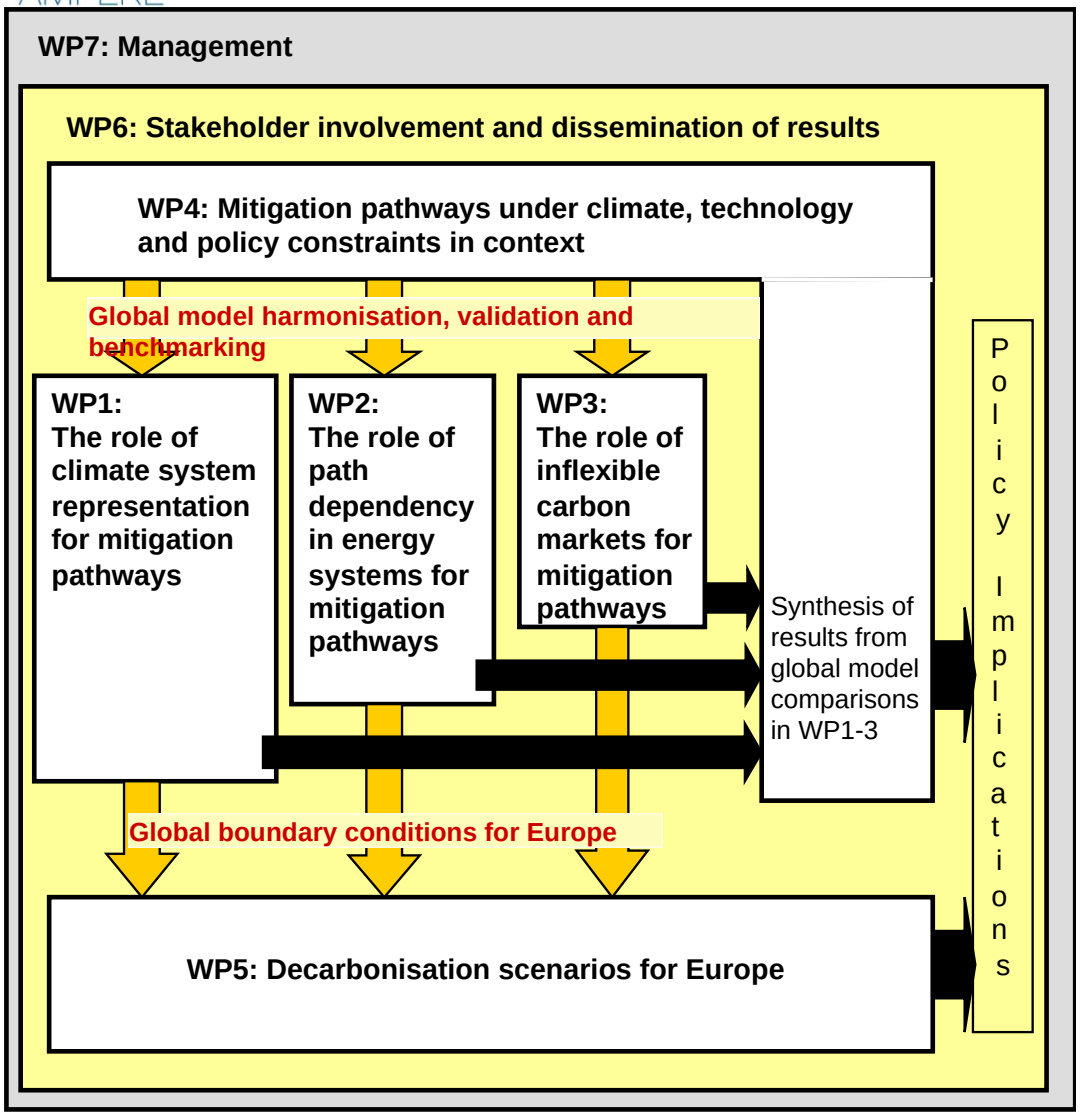
➔Model transparency, validation, diagnostics, benchmarking and comparison *(all WPs, particular WP4)*

How are mitigation scenarios and costs affected by

- Feedbacks in the climate response *(WP1)*
- Technology availability and planning horizons *(WP2)*
- Fragmented climate policy *(WP3)*

What are the implications for climate policy, particular for the EU27? *(WP5 & 6)*

AMPERE: Project Structure



WP leaders:

WP 1: UU (van Vuuren)
WP 2: IIASA (Riahi)
WP 3: PIK (Kriegler)
WP 4: PIK, IIASA, UU
WP 5: ICCS (Kapros)
WP 6: FEEM (Bosetti)
WP 7: PIK (Reuster)

LIMITS and Partners

- **LIMITS =** Low Climate Impact Scenarios and the Implications of Required Tight Emission Control Strategies
  - Coordinated by FEEM (Coordination: Massimo Tavoni)

- **Partners:** FEEM, IIASA, PIK, UU, LSE, ECN, JRC-IES, CEU, ERI, IIMA
  - **Associated Research Organizations:** PNNL, NIES
  - **Advisory Board:** Alessandro Lanza, Raymond Kopp, Bert Metz, Hans Holger Rogner

SEVENTH FRAMEWORK PROGRAMME

LIMITS: Objective

- LIMITS' main objective is to provide an assessment of the emissions reductions strategies at the level of the world and the major global economies, and to assess their implementation in terms of:
  - Defining the feasibility of low carbon scenarios and the associated emission reduction pathways according to different assumptions about technology availability, policy regimes, implementation obstacles, and level of commitment at the regional level
  - Assessing the investment requirements to implement these transformation pathways and the financing mechanisms such that these resources can be best raised and allocated. Evaluating the national and international policies which are needed to ensure that the transition to a low carbon energy infrastructure is attained efficiently, given specific obstacles in the respective economies
  - Quantifying the changes in the energy infrastructure and land use which major economies would need to implement to attain stringent climate policies, and assessing the feasibility and risks of such changes.
  - Evaluating the linkages of climate policies with other pressing social and environmental issues such as energy security, air pollution and economic development.

LIMITS: 7 Work Packages

- WP1 - Global mitigation pathways for limiting global temperature increase below 2°C
- WP2 - Implementation in major economies: Policy, institutional and financing needs
- WP3 - Implementation in major economies: Changes to energy infrastructure and land use patterns
- WP4 - Multiple benefits of climate mitigation and implications for development
- WP5 - Policy Outreach
- WP6 - Dissemination and Communication Strategy
- WP7 - Project management

AIM Model for AMPERE and LIMITS: AIM/BCM[Global]

- ***Participating Model:*** AIM/Backcasting Model [Global]
- ***Model Type:*** Global bottom-up type model
- ***Participating Modelers:*** Hiroto Shiraki, Shuichi Ashina, Toshihiko Masui and Mikiko Kainuma
- ***Time Step:*** 5 years.
- ***Time Frame:*** Yr. 2005- Yr. 2050.
- ***Solution Type:*** Intertemporal optimization
- ***Equilibrium Type:*** Partial equilibrium
- ***Underlying Computing Framework:*** GAMS (General Algebraic Modeling System) with Excel VBA support

AIM Model for AMPERE and LIMITS: Example of results from AIM/BCM[Global]

The impact of nuclear policy changes on climate change mitigation policy in Asia

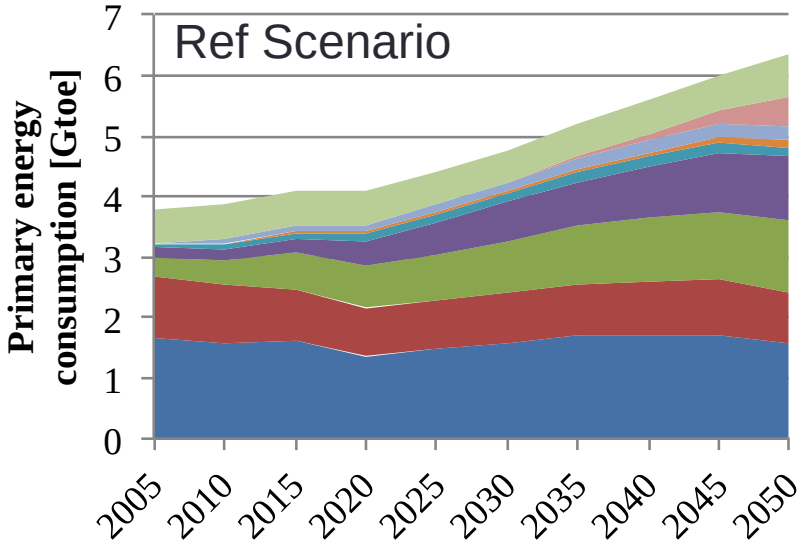
- CO_2 Emission Constraint
  - A 2050 global emission limit of 50% reduction from 2005 levels.
  - A cumulative CO_2 emission by 1137 Gt-CO_2.

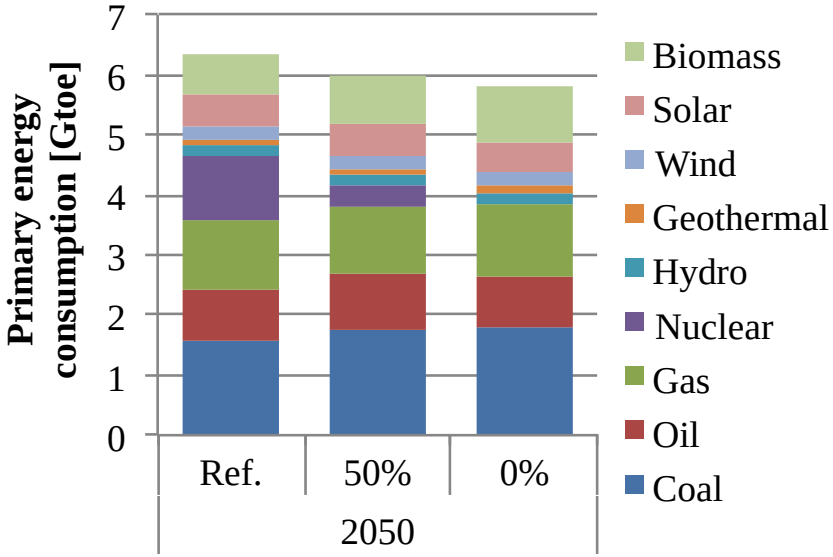
Nuclear Scenario	Installed Plants	Construction Plants in Asia	Proposed Plants in Asia	Capacity Factor
Reference (Ref.)	Available	Available	Available	Increases by 95% in 2050
50% construction (50%)	Available	Available	NOT allowed	Fixed at the level in 2005
No construction (0%)	Available	NOT allowed	NOT allowed	Fixed at the level in 2005

AIM Model for AMPERE and LIMITS: Example of results from AIM/BCM[Global]

Primary Energy Consumption by scenario

- Total primary energy consumption in 2050 is 1.68 times as much as that in 2005.
- The increases in energy consumption from nuclear, natural gas and solar are about 0.9, 0.8 and 0.5 Gtoe, respectively.
- Nuclear constraint leads to energy shifts from nuclear to biomass and coal.





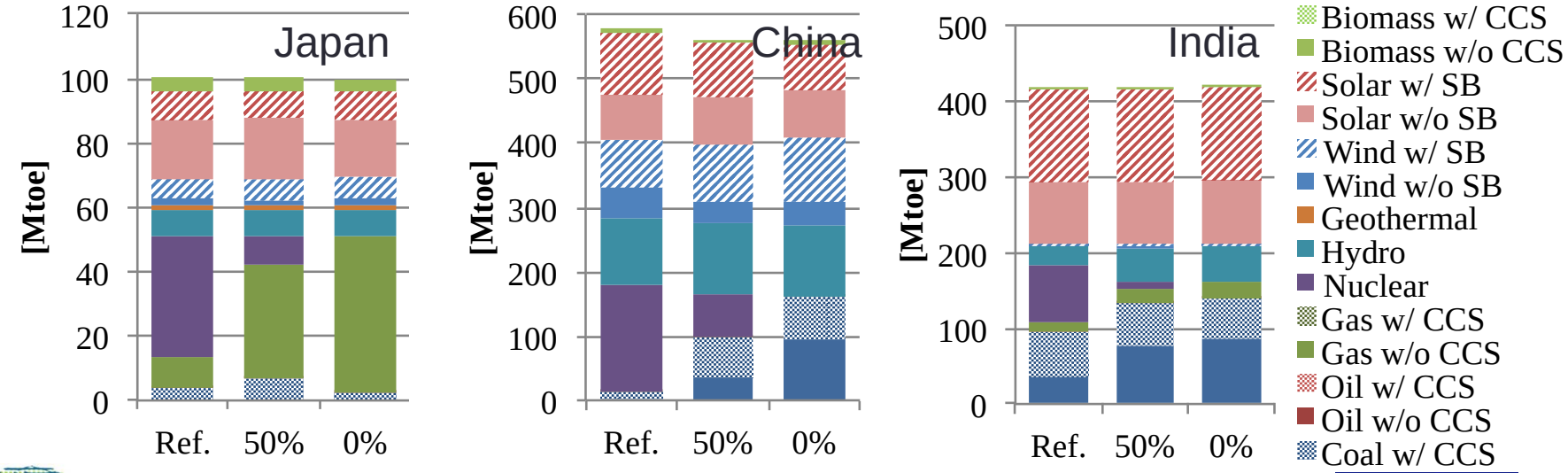
AMPERE LIMITS

SEVENTH FRAMEWORK PROGRAMME

AIM Model for AMPERE and LIMITS: Example of results from AIM/BCM[Global]

Electricity generation by scenario and by country in 2050

- Japan: Natural gas generation increases since there is no additional potential of solar and wind.
- China: Wind and coal power generation increase and electricity demand is reduced.
- India: Hydro and coal power generation increase instead of nuclear power generation.



Thank you for your attention!

Your comments and suggestions are always welcome!

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AMPERE LIMITS SEVENTH FRAMEWORK PROGRAMME