Activities of Integrated Assessment Modeling Consortium (IAMC)

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WMO

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

UNEP

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Annexes: 2

National Institute for Environmental Studies
Att.: M. Kainuma
JAPAN

Geneva, 12 September 2006

Dear Sir/Madam,

I am writing to you to explore your interest in participating in developing new scenarios that would be useful for the preparation of future IPCC assessment reports and to request information regarding your activities in scenario development.

Background
IPCC has expressed at its 24th Session in September 2005[1] the need for new emission scenarios, to be available well before completion of a possible AR5.

This decision was taken based on recommendations from an IPCC Workshop convened in June 2005 in Laxenburg with emission scenario developers, climate modelers, and representatives of user groups (climate modelers, climate impact and adaptation analysts, mitigation analysts, experts from government, NGOs and business community) to discuss what would be needed, and what role IPCC should play in the development of new (emission) scenarios[2].

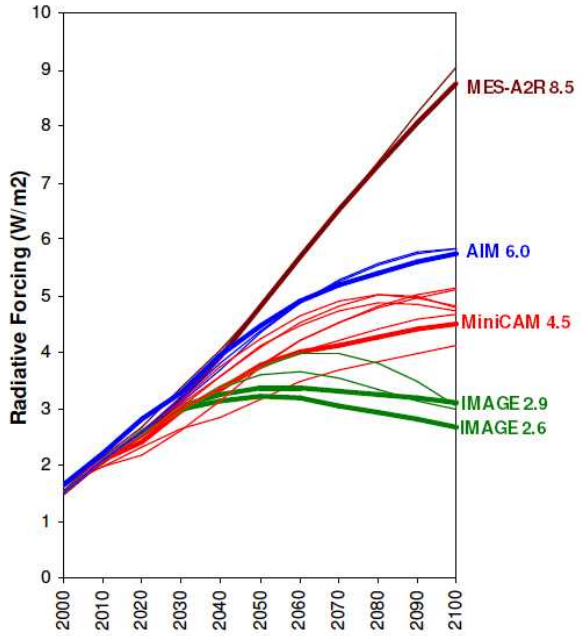
Building on these outcomes, the IPCC at its 24th Session established an IPCC Task Group on New Emission Scenarios (TGNES) mandated to prepare proposals and a plan of work for consideration and decision by the IPCC at its 25th Session in April 2006. TGNES consulted developers and users of scenarios in an IPCC meeting in Seville (March 2006) and prepared a set of unanimous recommendations for the IPCC Plenary. Some of the key conclusions are given in Annex I[3].

Based on the recommendations of the TGNES, disbanded as planned at the end of the 25th Session, the

An Integrated Assessment Modeling Consortium (IAMC): To help coordinate developing new scenarios across the IAM teams and between them and other communities involved in global change research.

IIASA	emf	NIES
International Institute for Applied Systems Analysis (IIASA)	Energy Modeling Forum (EMF) Stanford University	National Institute for Environmental Studies (NIES)

- **Australian Bureau of Agricultural and Resource Economics (ABARE)**
  - *Hom Pant*
- **Business Council for Sustainable Development – Argentina**
  - *Virginia Vilariño*
- **CEA-LERNA, University of Social Sciences**
  - *Marc Vielle*
- **Centre for International Climate and Energy Research (CICERO), University of Oslo**
  - *H.Asbjorn Aaheim*
- **Argonne National Laboratory**
  - *Donald Hanson*
- **Centre International de Recherche sur l'Environnement et le Developpement, EHESS - U.A. CNRS 940 (CIRED)**
  - *Jean-Charles Hourcade*
- **CRA International**
  - *Brian Fischer*
- **Dept. of Energy, Transport, Environment, DIW Berlin**
  - *Claudia Kemfert*
- **Electric Power Research Institute (EPRI)**
  - *Richard Richels*
- **Energy Research Institute, National Development and Reform Commission (NDRC)**
  - *Kejun Jiang*
- **Freelance Professional Economist**
  - *Thomas Rutherford*
- **Hamburg University and Economic and Social Research Institute (ESRI)**
  - *Richard Tol*
- **Indian Institute of Management**
  - *Priyadarshi Shukla*
- **Institut d'Economie et de Politique de l'Energie, IEPE-CNRS**
  - *Patrick Criqui*
- **International Institute for Applied Systems Analysis (IIASA)**
  - *Nebojsa Nakicenovic, Keywan Riahi*
- **IPCC and San Marcos University**
  - *Eduardo Calvo*
- **National Institute for Environment Studies (NIES)**
  - Mikiko Kainuma, Toshihiko Masui, Junichi Fujino
- **Ohio State University**
  - Brent Sohngen
- **Pacific Northwest National Laboratory, Joint Global Change Research Institute at the University of Maryland**
  - *Jae Edmonds, Hugh Pitcher, Ronald Sands, Steve Smith*
- **Programa de Planejamento Energético - PPE/COPPE/UFRJ**
  - *Emilio Lèbre La Rovere*

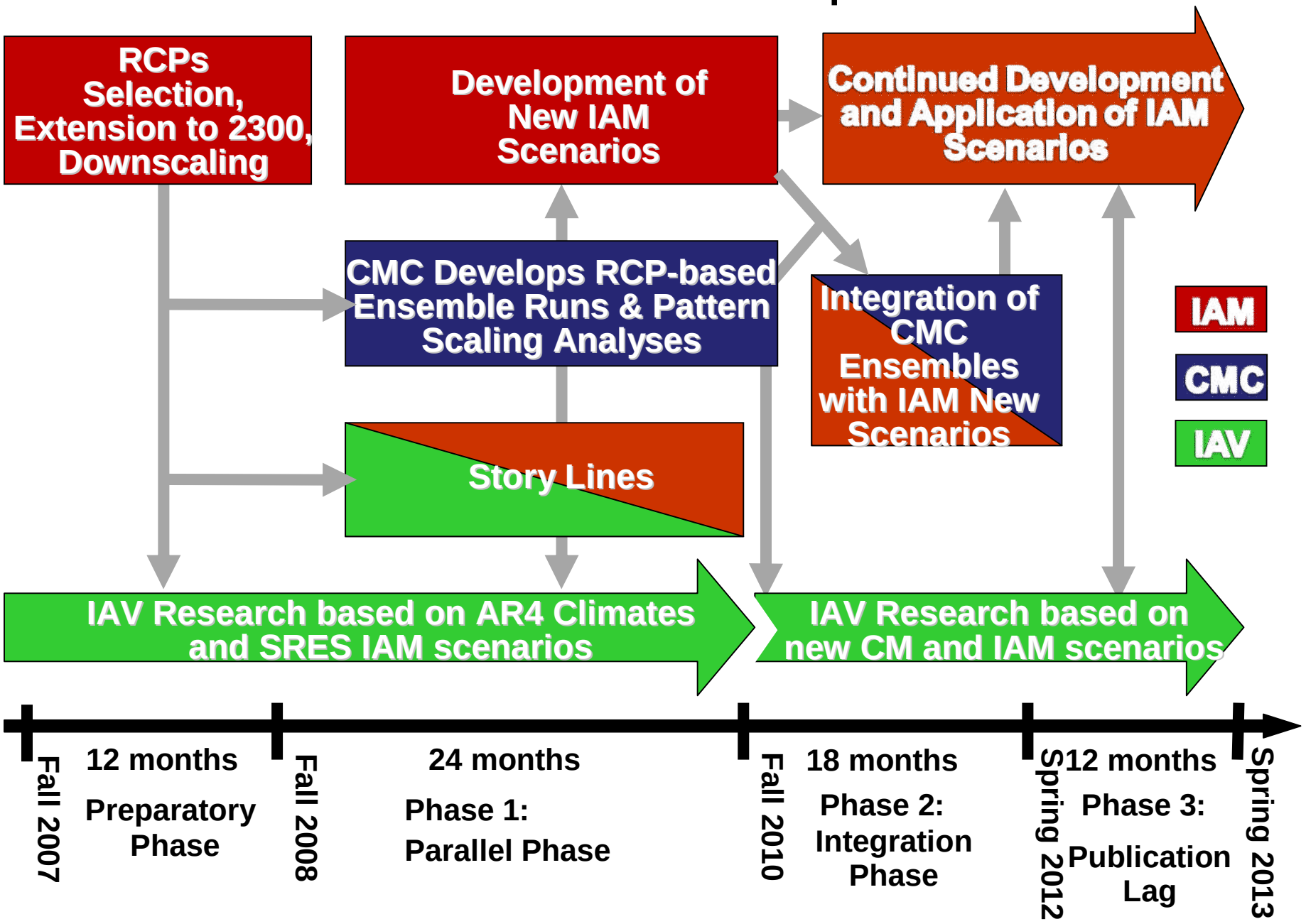


Radiative forcing compared to pre-industrial for the RCP candidates.

Three Major Scientific Communities to develop and use scenarios

1. Climate Modeling Community (**CMC**)—need scenarios to provide a coherent, internally consistent, time-paths for Earth System Models
2. Impacts, Adaptation and Vulnerability (**IAV**) modeling community—need scenarios to provide a coherent, internally consistent, time-paths to assess the consequences of potential climate changes and to set the context for adaptive strategies.
3. Emissions mitigation community including Integrated Assessment Modeling (**IAM**)—to provide a coherent, internally consistent, time -paths to assess the costs of emissions mitigation

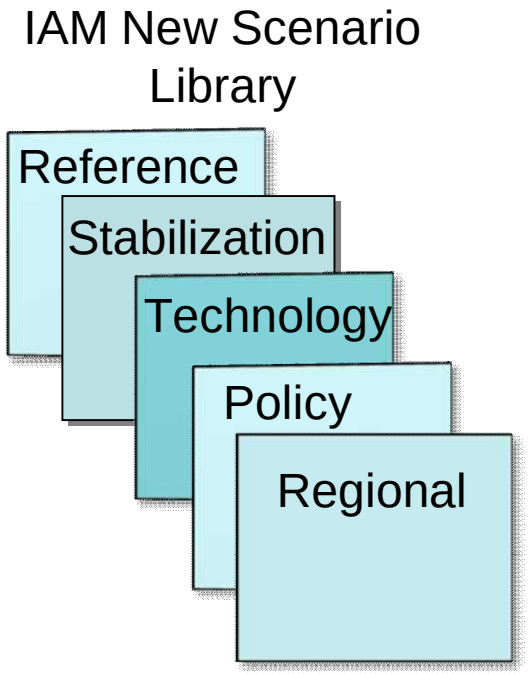
New Scenario Development



Phase 1

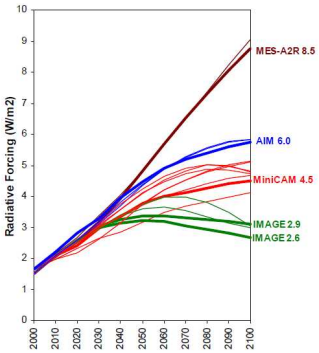
Develop groups of new scenario pathways exploring a broader range of dimensions associated with anthropogenic climate forcing

- alternative socio-economic backgrounds,
- alternative technology availability regimes,
- alternative realization of Earth system science research,
- alternative stabilization scenario pathways including traditional, not-to-exceed scenario pathways, and
- alternative representations of regionally heterogeneous mitigation policies and measures, as well as regional societies, economies and policies.



New IAM Scenario Pathways

What policies, technologies, or other factors are required to meet a target?



Socio-economic pathways

GHG emissions & concentrations

RCPs Selection, Extension to 2300, Downscaling

- Socio-economic backgrounds
- Technology dynamics
- Stabilization scenario pathways
- Regional scenarios incl. policy & measures
- Carbon cycle & climate

- CO_2, CH_4, N_2O, CFCs, HFC's, PFC's, SF_6
- CO, NO_x, NH_4, VOCs
- tropospheric O_3
- SO_2, BC, OC
- Land use and land cover

8.5 W/m2

6 W/m2

4.5W/ m2

<3 W/m2

CMC

RCP-Based Ensemble Runs

IAV

Mitigation & Adaptation

Time Scale of Scenarios

- Near-term (~ 2030)
  - Explore near-term opportunities/constraints on mitigation (given technological and institutional inertia), transitions
  - Increase focus on adaptation
- Medium-term (2050)
  - Explore mitigation options including structural changes and investment in infrastructure
- Long-term (2100, with extension to 2300)
  - Explore implications of different stabilization levels (climate, impacts, and socio-economic/energy) –"thresholds," and discontinuities
  - Analysis of "overshoots" for low stabilization levels
  - Assess feedbacks (carbon cycle)

Likely IAM Community Interests in New Scenarios

- Policy Insights
- Identify Important New Research Directions
- Model Comparisons
- Understand Uncertainties
- Make Projections of Future Conditions
- Linkage with CMC & IAV communities
  - Improvement of simple climate model/carbon cycle mechanism
  - Evolution of impact functions
  - Insights of policies among mitigation & adaptation

A Fundamental Difference in Perspective: Scientific Discovery Versus Policy Analysis

- Scientific Discovery
  - Focused on understanding how things work
  - In part to use as a basis for projecting the future
- Policy Analysis
  - Focused on figuring out what to do
  - Impacts of what we do incremental to some baseline
- Difference is Largest in Situations Characterized by:
  - Great complexity
  - Large and pervasive uncertainties
- In IPCC
  - WG I closest to Scientific Discovery perspective
  - WGIII Closest to policy analysis perspective
  - WG II somewhere in between
- In Reality the Perspectives Are Somewhat Related

Scenario Development Process

- Scenarios are being organized by modeling community
  - The IAM community has organized itself via a Consortium.
  - The ESM community has organized itself via the WCRP/IGBP
- IPCC to have catalytic role
- Needs support to increase DC/EIT participation

Increasing Participation of Developing and EIT Countries

- IAMC has participation of key modeling groups from developing countries (DC)
- Funding mechanisms to support DC modelers has to be evolved
- IAMC will foster collaborative efforts among DC modelers and with global modelers for development of new regional storylines and scenarios

Proposed Functions of the IAMC

- Become a professional society with a governing board
- Convene regular meetings (annual)
- Take stock of work--recent advances and on-going activities
- Identify research priorities
- Interface with other research communities
- Provide a public data warehouse
- Develop professional standards

Increasing Participation of Developing and EIT Countries

- An IPCC priority
- Two major needs identified:
  - Improve DC/EIT representation in global models, and availability of data and models addressing needs of these regions
  - Augment capacity (experts and infrastructure) to conduct modeling and analysis of all aspects of climate change scenario development and application

Richard Moss, 2007

Recommendation to Increase DC/EIT Participation

- Proposal for a linked network of centers and fellowships for data and model development in countries with high, middle, and low capacity
- Scientific peer groups and exchanges
- Trust fund
- Online network/clearinghouse to match needs and capabilities across developing, EIT, and developed countries

Richard Moss, 2007

IAM Consortium Activities

- Preparing socio-economic and technology characteristics
- Down-scaling of land use and land cover change
- Simple climate model and inclusion of carbon feedbacks
- Coordination of base year and other scenario assumptions
- Open processes including a scenario database