



LIMITS

**Low climate Impact scenarios and the Implications of required
Tight emission control Strategies**

Project description

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FEEM

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The research leading to these results has received funding from the European Community's Seventh Framework Programme FP7/2007-2013 under grant agreement n° 282846 (LIMITS)

1. The context

2°C DICHOTOMY

- *Signpost of science*
- *Active debate among economists on whether it is optimal in CBA*
- *Always mentioned in international climate agreements*
- *But apparently inconsistent with short term action*
- *Confusion on whether GHG concentrations (or temperature) can be overshoot*
- *and with which probability one wants to attain it*

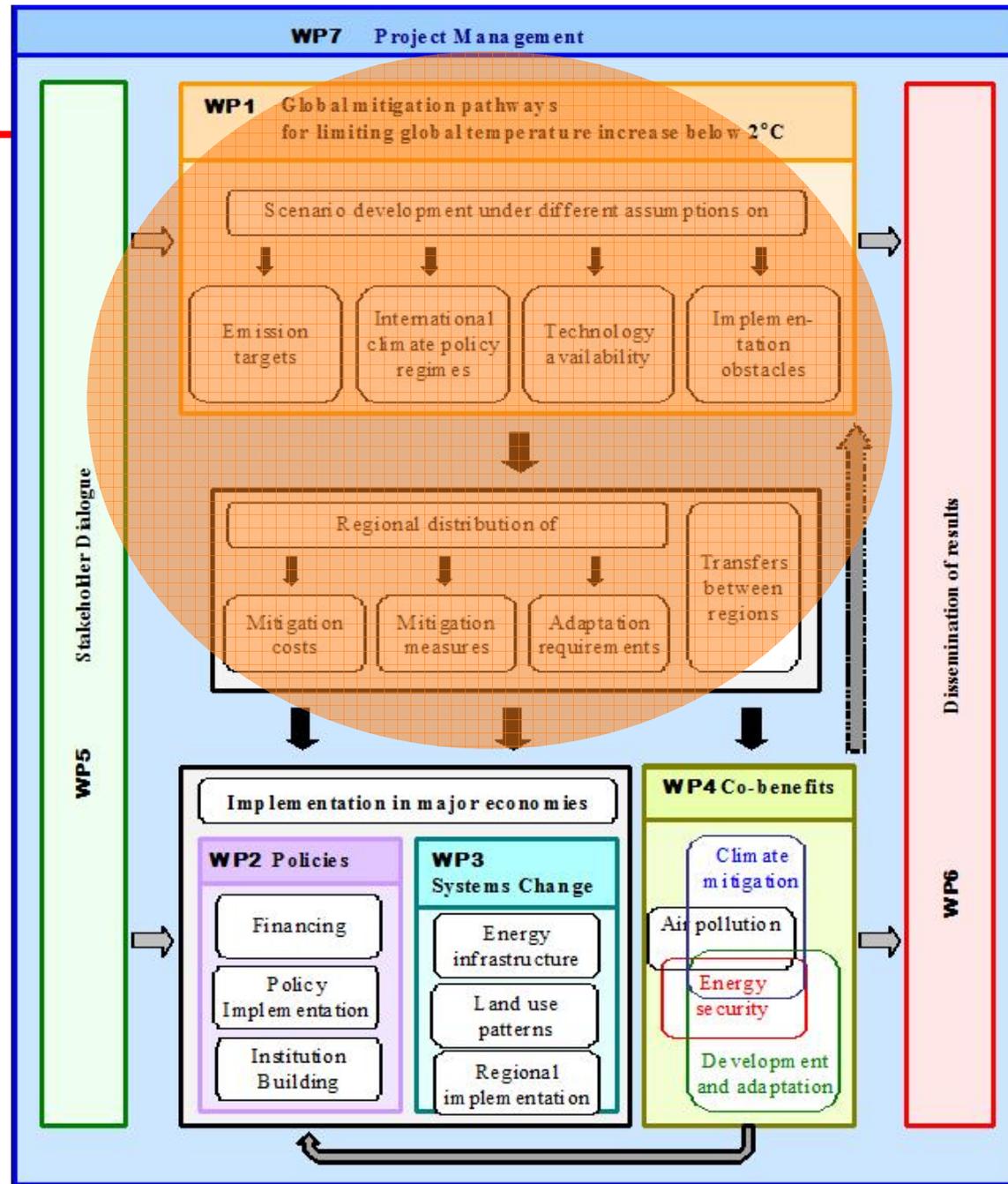
LIMITS is a **unique opportunity** to carry out an authoritative, comprehensive, and analytical assessment of what it takes to get to 2°C. Focus on integrated actions that the major economies can carry out, without neglecting the associated risks, and accounting for the diversity of national priorities and capabilities.

2. LIMITS in a nutshell

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 space 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**.

Structure

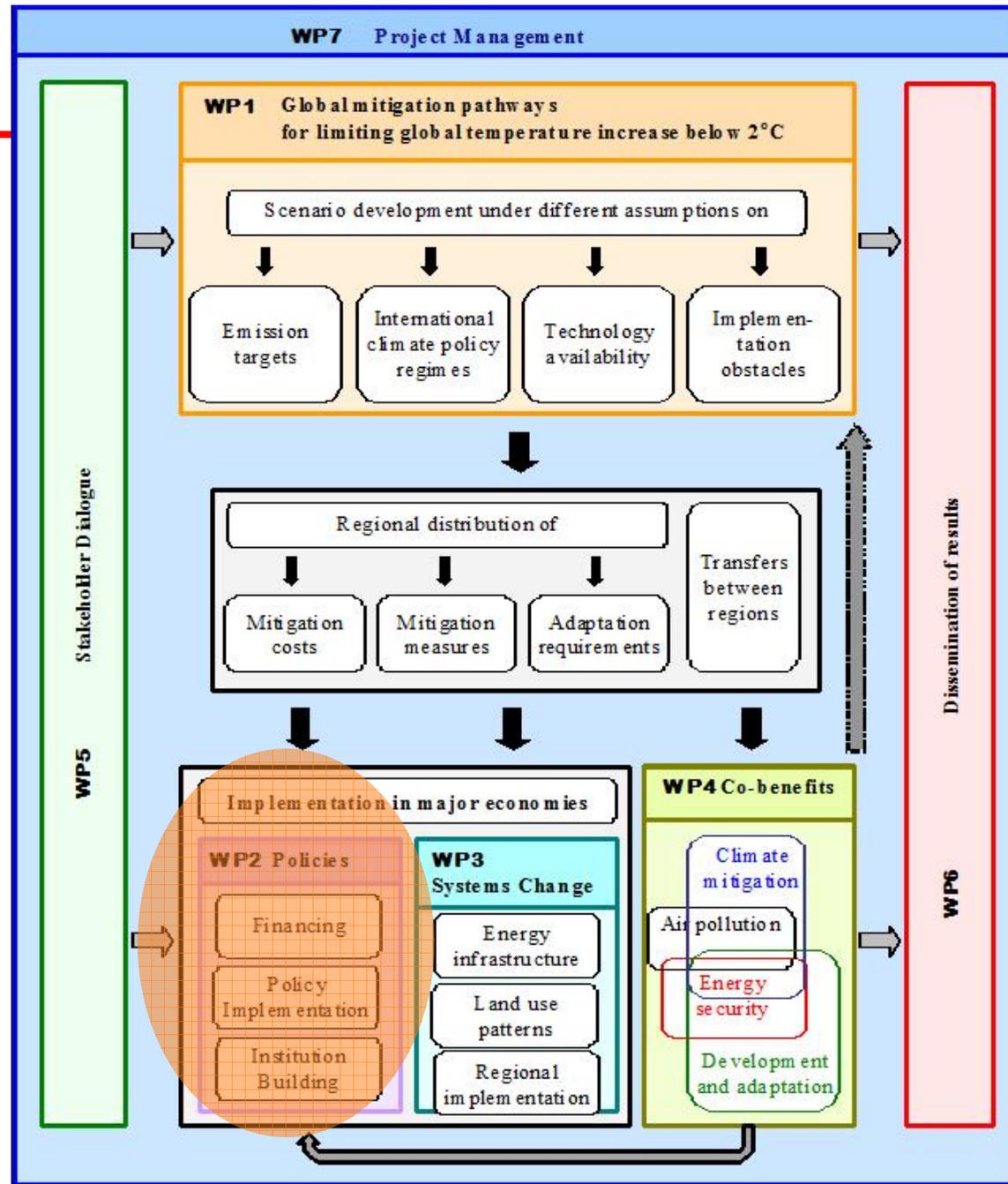


WP1: Global mitigation pathways for limiting global temperature increase below 2C (Lead: PIK)

The main questions that the WP addresses are:

- How do different interpretations of the 2C target (not to exceed during the 21st century or overshoot and obtain at the end of the 21st century? Reaching it with which probability?) translate into a range of carbon budgets for the global economy, and what does this imply for the feasibility and costs of reaching the 2C target?
- What are the key factors for reaching the 2C target (under the range of carbon budgets it implies) in terms of (i) availability of mitigation options, (ii) degree of global cooperation and (iii) sectoral and species coverage of a greenhouse gas reduction regime. What are the limiting technologies, regions, sectors and greenhouse gas species?
- How will burden sharing regimes and compensation mechanisms affect the regional distribution of mitigation efforts and costs?
- How can a useful set of global 2C scenarios be derived, taking into account the need to establish a large degree of what, where and when flexibility of emissions reductions early in the 21st century (requiring compensation and technology mechanisms)?

Structure

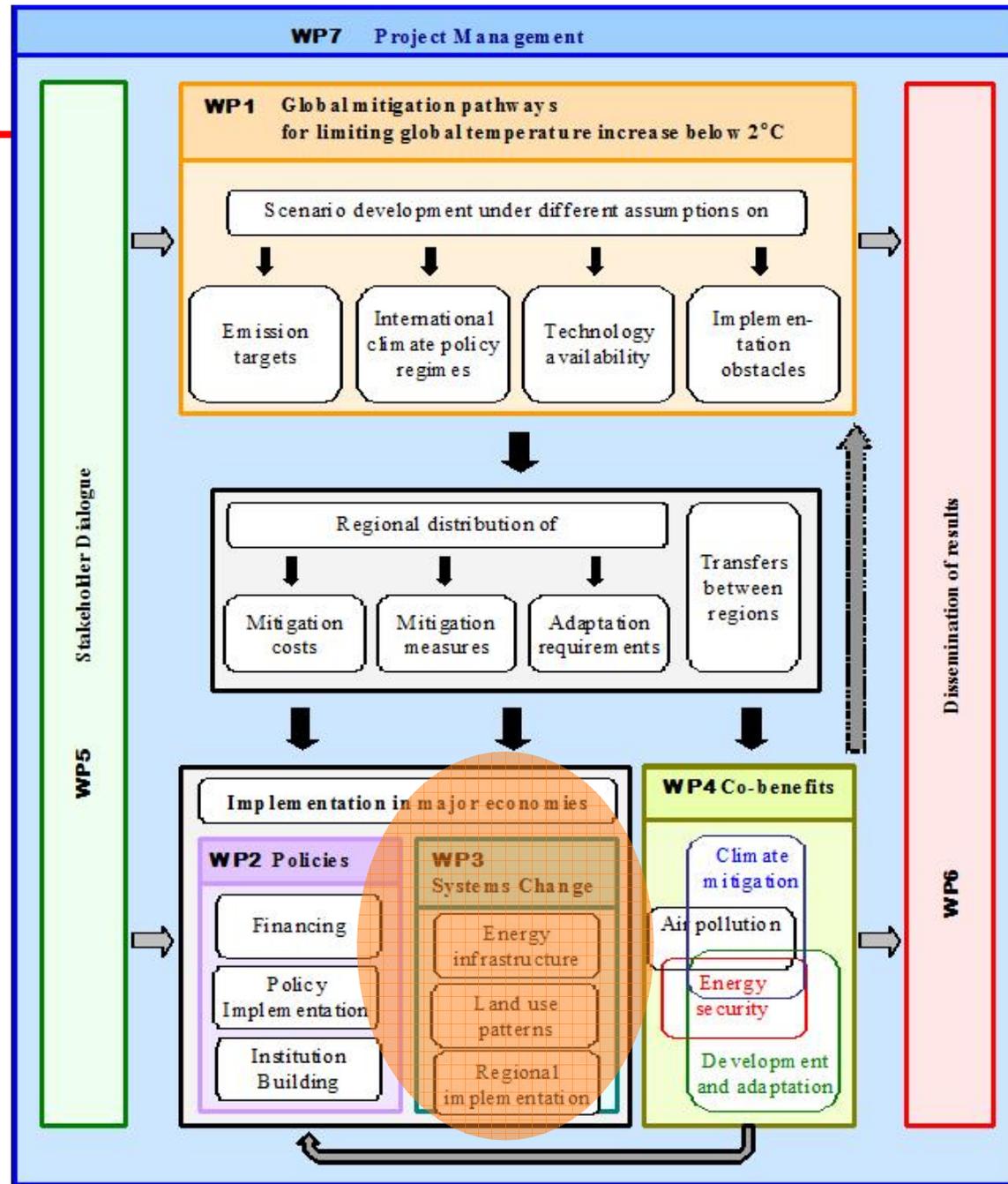


WP2: Implementation in major economies: Policy, institutional and financing needs (Lead: FEEM)

The main questions that the WP addresses are:

- Given the investment needs to achieve mitigation and adaptation compatible with 2° Celsius, how can these resources be best raised and allocated? What kind of interplay between the public and private sector is needed to ensure that the economic investments are carried out in due time and are scaled up sufficiently? Which mechanisms need to be established to hedge the risks of investing and innovating in low carbon technologies?
- What kind of national and international policies on climate and energy are needed to ensure that the transition to a low carbon energy infrastructure is attained efficiently, given specific obstacles in the respective economies? What mix of market based and regulatory policies is required to promote both low carbon investments and innovation, and how does it relate to current policies? How do these efficient policies interact with complementary policies on energy and the environment?
- What institutions and governance are needed to assist major developing countries in adopting low carbon technologies and adapting to a changing climate? How should the funds be raised and allocated?

Structure

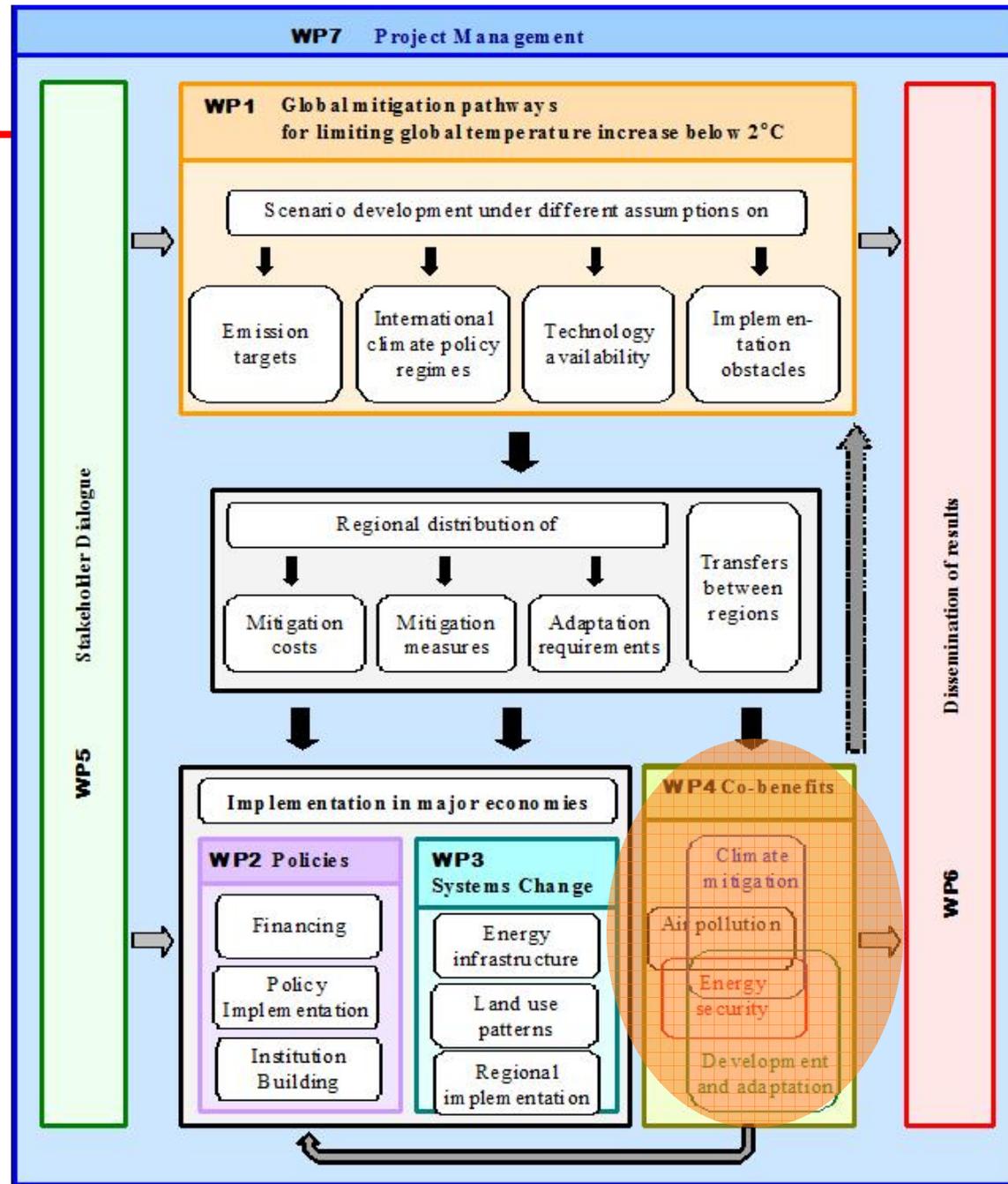


WP3: Implementation in major economies: Changes to energy infrastructure and land use patterns (Lead: UU)

The main questions that the WP addresses are:

- What changes in the energy system and land use of major economies are necessary in order to limit global mean temperature to 2C (assuming the different scenarios explored in work package 1) – and what would be the implications of these changes?
- What can locally available information on current policies and potential for greenhouse gas emission reduction in major economies tell us on the feasibility of the global scenarios?
- How can lifestyle changes contribute to achieving 2C climate targets?
- What are the land use implications of 2C scenarios under different assumptions, eg feedbacks on agricultural production, ecosystem diversity, and reduced adaptation needs because of climate mitigation policies?

Structure

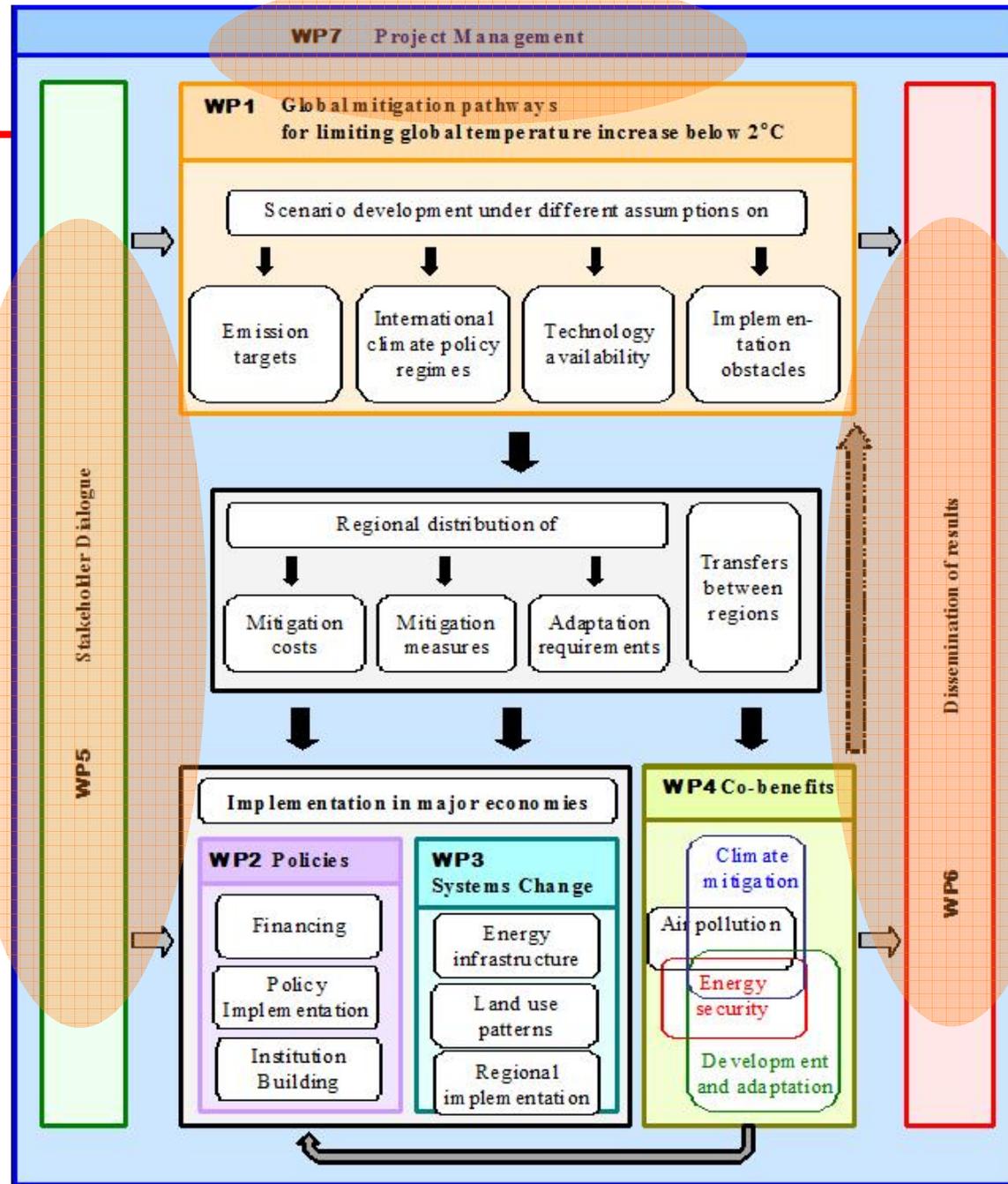


WP4: Multiple benefits of climate mitigation and implications for development (Lead: IIASA)

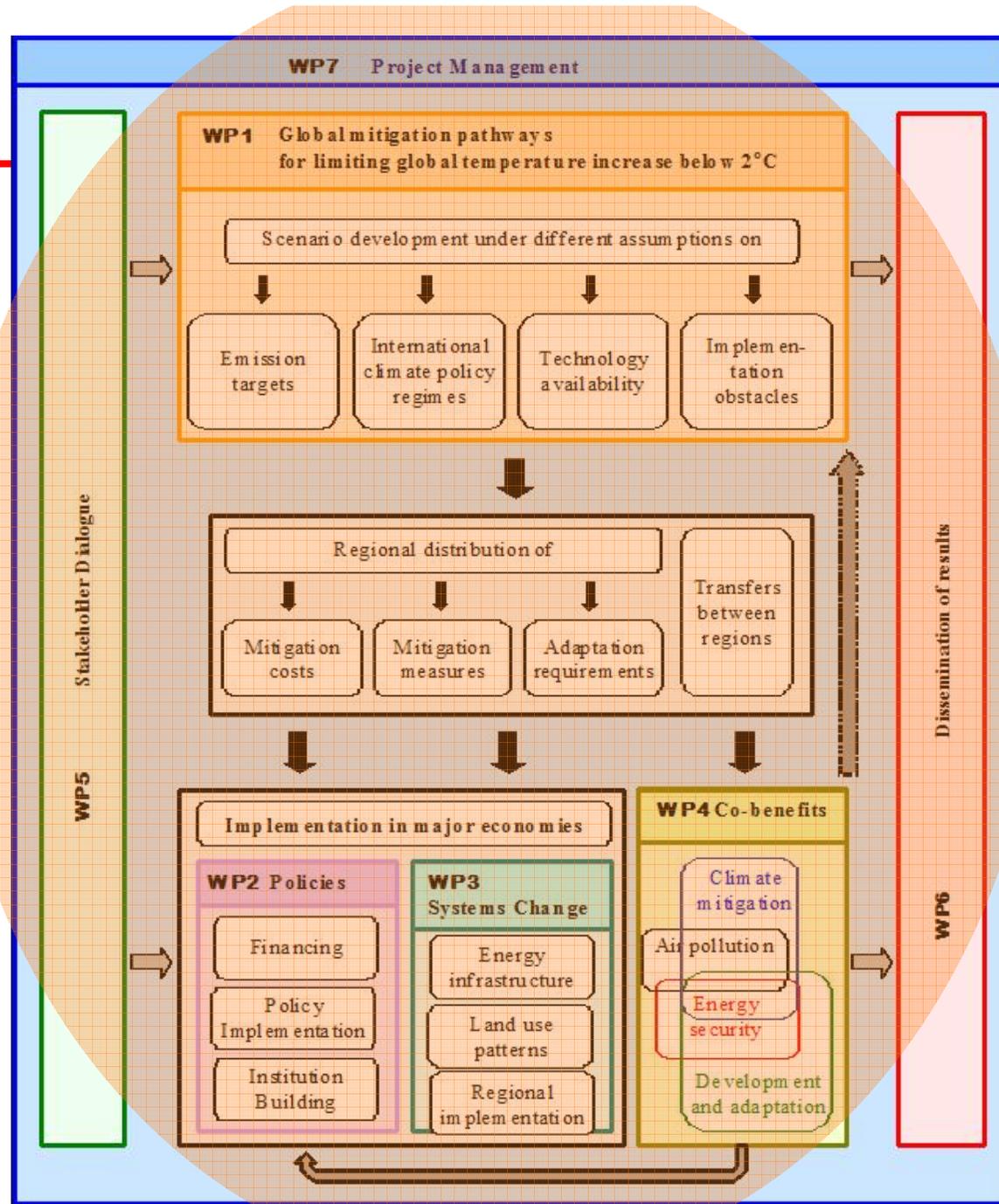
The main questions that the WP addresses are:

- Can stringent climate mitigation policies provide an entry point for other major local policy priorities, such as air pollution control, energy security, or broader development objectives?
- Which combination of climate mitigation measures, and in what economic sectors, would lead to the largest synergies for local air-pollution and energy security objectives, thus leading to “win-win” strategies in addressing local policy objectives?
- What is the regional/local benefit of climate mitigation for urban air pollution and human health, and what are the potential short-term tradeoffs for the climate given the removal of short-lived cooling agents (eg sulphur and OC)?
- What is the return of climate mitigation investments in terms of reduced pollution control costs and improved energy security? Can the benefits of climate mitigation for other priorities create sufficient incentives to mobilize the financial resources necessary for meeting the 2°C target?
- What are the implications of integrated climate-pollution-security policies for economic growth in major economies, and how big is this effect compared to meeting local policy objectives in absence of climate policies?

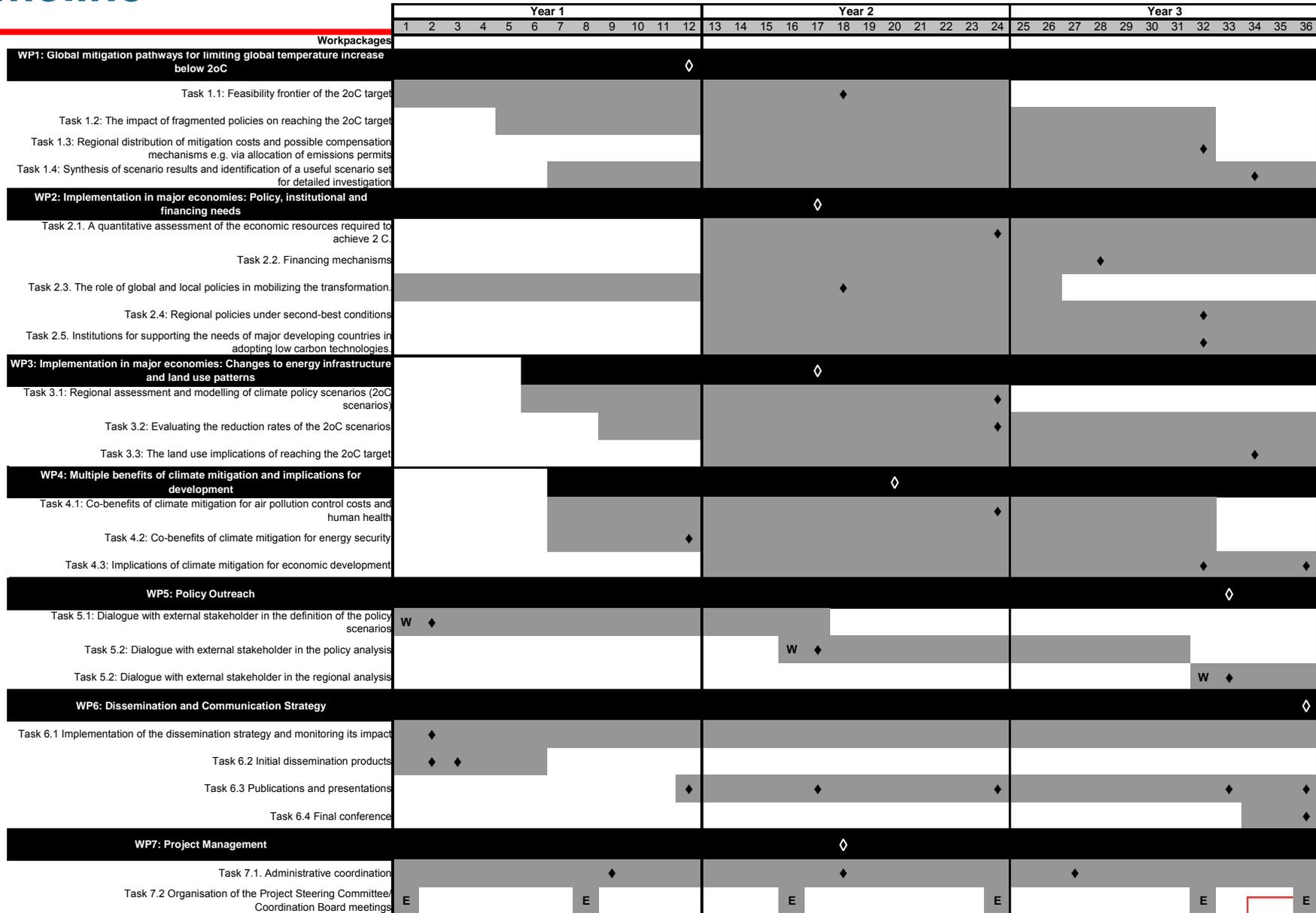
Structure



Structure



Timeline



Colourcode:
 ■ Duration of the task ◆ deliverable(s) ◇ milestone(s) E project meeting(s) W stakeholders workshop(s)
 ■ Duration of the WP

A great team!

 **Fondazione Eni Enrico Mattei (FEEM)**, Italy
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www.iiasa.ac.at

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 **Energy Research Centre of the Netherlands (ECN)**, Netherlands
www.ecn.nl

 **Joint Research Centre, Institute for Environment and Sustainability, European Commission (JRC-IES)**, Italy
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 **Central European University (CEU)**, Hungary
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 **Energy Research Institute of the National Development and Reform Commission (NDRC-ERI)**, China
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 **Indian Institute of Management (IIM)**, India
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ASSOCIATED RESEARCH ORGANISATIONS

 **Pacific Northwest National Laboratory, Joint Global Change Research Institute at the University of Maryland (PNNL)**, USA
www.pnnl.gov

 **National Institute for Environmental Studies (NIES)**, Japan
www.nies.go.jp

Focus	Tools
Economics of CC and innovation	WITCH/WITCH-AD/GLOBIOM model
Energy and system analysis	MESSAGE/GLOBIOM model
Economics and science of CC	REMIND/MagPIE/PRIDE model
Integrated science and policy	IMAGE model
Development and environ. economics	Theoretical and applied economics
Energy policy	TIAM-ECN model
Air pollution	TM5 FAST model
Energy security	Energy economics
Energy modeling	IPAC model
Economics of sust. development	GCAM-IIM and Markal India
Integrated analysis of CC	GCAM model
Integrated analysis of CC	AIM model

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