



Project LIMITS

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

climate change

carbon emissions

mitigation

climate neutrality

PROJECT DESCRIPTION

LIMITS was a 3-year research project, which was attended by 10 partners from Europe, China, India and to which research centers from the United States and Japan collaborated.



OBJECTIVES

The **goal of the LIMITS** project was to **identify mitigation strategies at the global level, focusing on the actions needed by the major economies to reach the goal of limiting global temperature rise to below 2°C.**

Climate change is one of the greatest challenges of our civilization. Its broad, long-lasting and uncertain nature makes it one of the most difficult problems ever addressed. **Evaluating the shift from current emission trends to a long-term objective of carbon neutrality** has been a key interest for researchers and policy makers in recent years. However, the problem of this transition has mostly been considered at a global level, without an explicit declaration of what it means to implement severe climate targets in the main countries responsible for emissions. This is the challenge behind the LIMITS project. For the first time a series of **models designed to study the interaction between the sectors of economy, energy, land use and climate** - the so-called "integrated assessment models" - has combined the forces to investigate the consequences of the implementation of post-2020 climate agreements in all major economies. The project evaluated a number of aspects concerning the implementation of these strategies, including the political, institutional and financial requirements, and the changes necessary at the level of energy infrastructure and land use. Synergies and necessary compromises with other urgent global priorities, such as energy security, air pollution and economic development were explored.

These **global models**, supported by local experts from some key emerging economies, **have predicted the consequences of climate, environmental and energy legislation for the major economies.** The research effort has greatly increased understanding of the challenges and opportunities that different countries have to face when deciding to fight climate change. This project, which compared different scenarios, with different degrees of regional ambition, of global cooperation policies and political coverage, **has provided the most complete model-based assessment of the regional implications of climate change management.**



For this purpose a **community-based research approach was implemented**. Research teams from different countries **simulated a variety of different policy outputs**, informing the scientific community and policy-makers.

PROJECT PHASES

The **LIMITS project evaluated, through the use of "integrated assessment models", a series of critical questions** particularly relevant for **climate-related political decisions**:

- *Is the achievement of strict climate policies feasible from the economic and technical points of view?*
- *What investments are needed to implement the transformations of the energy system and how can countries favor these investments?*
- *What is the role of policies in promoting mitigation, and in recognizing the diversity of regional and national interests?*
- *Can mitigation policies help countries to achieve co-benefits related to energy security and air quality?*

LIMITS had 7 main work-packages (WP).

The first 4 WPs included most of the research work carried out within the project.

In particular, **WP1** (Global mitigation pathways for limiting global temperature increase below 2°C) was designed to **establish a complete set of "2 ° C scenarios"**, which was used as a reference framework for more detailed investigations in the rest of the project.

WP2 (Implementation in major economies: Policy, institutional and financing needs) **analyzed the policy, institutional and financial requirements to implement "2°C" policies** in the main economies.

WP3 (Implementation in major economies: Changes to energy infrastructure and land use patterns) examined the **feasibility of rapid changes required in energy infrastructure and land use in the main economies**.

Finally, **WP4** (Multiple benefits of climate mitigation and implications for development) analyzed how **strict climate mitigation policies impact and influence progress** towards the main national objectives, in particular those concerning **energy security and air pollution**, as well as **economic growth and development**.

In addition to research, LIMITS aimed to disseminate project results to a wide audience. To this end, various project meetings and stakeholder meetings were organized in Italy, Austria, Germany, the Netherlands, China and Belgium.

PROJECT RESULTS

The main result of the LIMITS project was to provide an **assessment of the emission reduction strategies** at the **global level** and at that of the **main world economies**, and to **evaluate their implementation** in terms of:

- **Definition of emission reduction paths based on different hypotheses** about technology availability, policy regimes, implementation obstacles and **assessment of the regional distribution of mitigation** at the level of the main economies;
- **Evaluation of investment needs to implement these transformation paths** and of **financing mechanisms** that allow resources to be better gathered and allocated;
- **Evaluation of national and international policies** that are necessary **to ensure that the transition to a low-emission energy infrastructure is efficiently achieved**, taking into account specific obstacles of the respective economies;
- **Quantification of changes in energy infrastructure and land use** that major economies need to implement **to achieve strict climate policies**;
- Evaluation of the **interconnections of climate policies with other issues** such as **energy security, air pollution and economic development**.

The **main research insights** emerging from the LIMITS project can be summarized as follows:

- **Short-term policies can provide important impulses for long-term actions**;
- **The 2°C target requires a peak in emissions** from all the major regions of the world within **this or the next decade**;



- A limit of **2°C** would require a **significant reduction in carbon budgets** in all the major economies, halving approximately the carbon budgets currently proposed in the negotiations;
- **The potential for mitigation options differs from region to region;**
- **Regional characteristics imply different mitigation models and costs:** under the same carbon tax, developing countries would pay a higher cost;
- **Climate policies** lead to important reductions in air pollution, with **great short-term health benefits;**
- **Climate policies** would significantly **improve energy security**, but not *vice versa*;
- **The effects of climate policies on energy security vary from region to region.**

The project has led to a significant number of publications in peer reviewed literature and in prestigious journals. Many of the papers produced as part of the LIMITS project were cited in the 5th Evaluation Report of the IPCC (Intergovernmental Panel On Climate Change).

The reports produced within the project include:

- [Report on the various mitigation requirements compatible with a global 2°C target](#)
- [Report on the feasibility and costs of the 2°C target as a function of technology and policy](#)
- [Report on global and local policies and on the implementability of climate policies](#)
- [Report that analyses the economic resources needed to achieve 2°C and to adapt to it](#)
- [Report that assesses the institutional needs for dealing with policies and financing - The economics and management of climate-related financial flows](#)
- [Report focusing on the financing mechanisms required to raise and manage economic resources needed to limit the global temperature increase to 2°C](#)
- [Report on the implications of 2°C in terms of technology transitions and key thresholds - Report on the feasibility and implications of future technology trajectories in 2°C scenarios](#)
- [Report summarizing the multiple benefits of climate mitigation in terms of air pollution, energy security and economic development](#)

The **outputs of the research activities of the LIMITS project helped to inform the current international climate negotiations** and were disseminated in a series of stakeholder meetings and conferences around the world.





Acronym

LIMITS

Number of reference

282846

Reference Programme

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Beneficiary Coordinator

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EU contribution

3.462.863,00

Call Year

2010

Start Year

2011

End Year

2014

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Region

Lombardia

Description

LOMBARDIA