



Impacts and costs of climate change under different scenarios: results from selected EU FP7 projects

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The 7th Framework Programme for Research and Technological Development (2007-2013): What it is

- *Multiannual, regional programme for funding research in Europe and promote S&T international cooperation*
- *Managed by the European Union*
- *Contributions: 27 EU Member States + 14 Associated Countries**
- *FP7 Budget: > € 50 000 m over 7 years*
- *Structured around 4 Specific Programmes:*
 - **1. Cooperation – transnational collaborative research**
 - **2. Capacities – capacity building for research**
 - **3. People – individual fellowships**
 - **4. Ideas – frontier research**

* 14 Associated Countries: Albania, Bosnia & Herzegovina, Croatia, Faroe Islands, Former Yugoslav Republic of Macedonia, Moldova, Iceland, Israel, Liechtenstein, Montenegro, Norway, Serbia, Switzerland, Turkey



ClimateCost *Full Cost of Climate Change (2008-11)*

Co-ordinator: Stockholm Environment Institute EU Contribution: € 3.5m

- Using selected climate change and socio-economic scenarios - A1B (baseline), E1 (mitigation), RCP8.5 (high-end) – the project has worked on:
 - Quantification of **physical impacts** and **economic costs** for key sectors (Energy, Health, River Floods, Sea Level Rise, ancillary Air Quality benefits);
 - **Costs and benefits of adaptation**, and the residual costs of climate change;
 - Analysis of different **policy scenarios**

<http://www.climatecost.cc/>



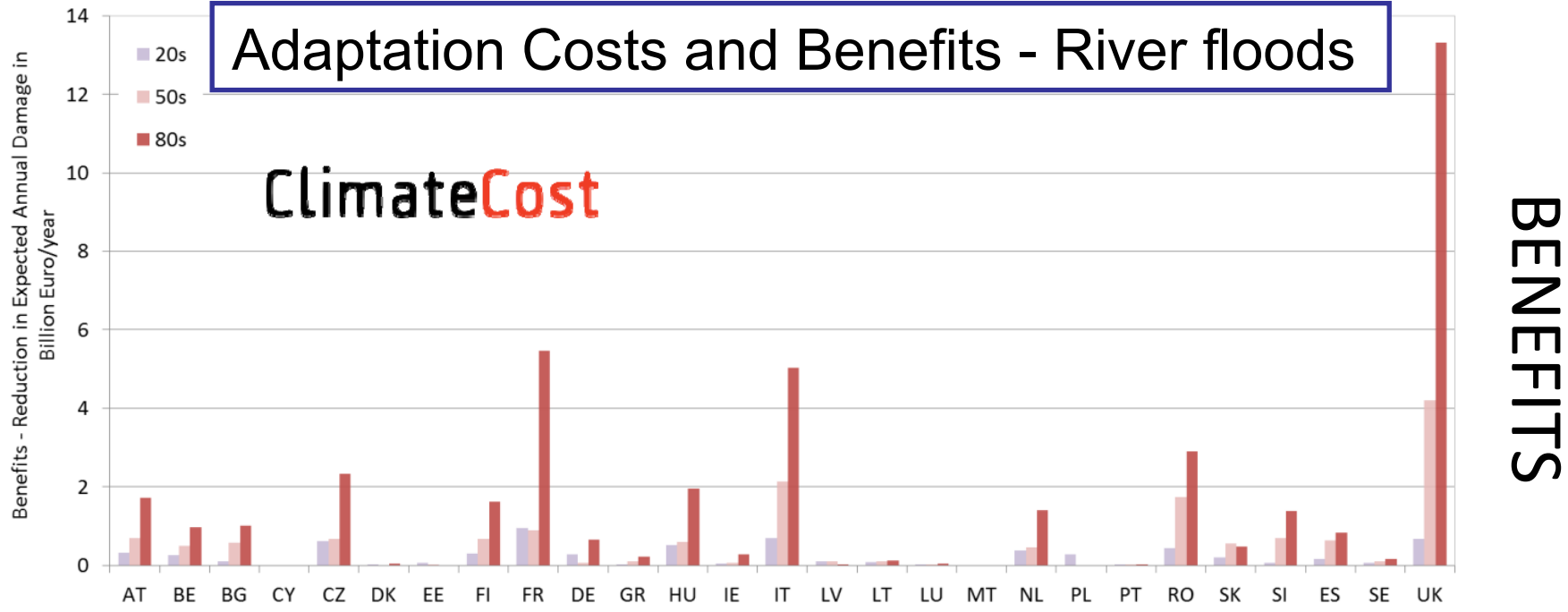
Some results: River Floods in EU27

- **290,000** – projected number of people affected by flooding annually by the 2050s under an A1B scenario (baseline)
- **46bn €** - expected annual damage costs from flooding in the 2050s (A1B)
- **3bn €** - estimated annual costs of adaptation for the 2050s to maintain protection level (A1B)

Climate**Cost**

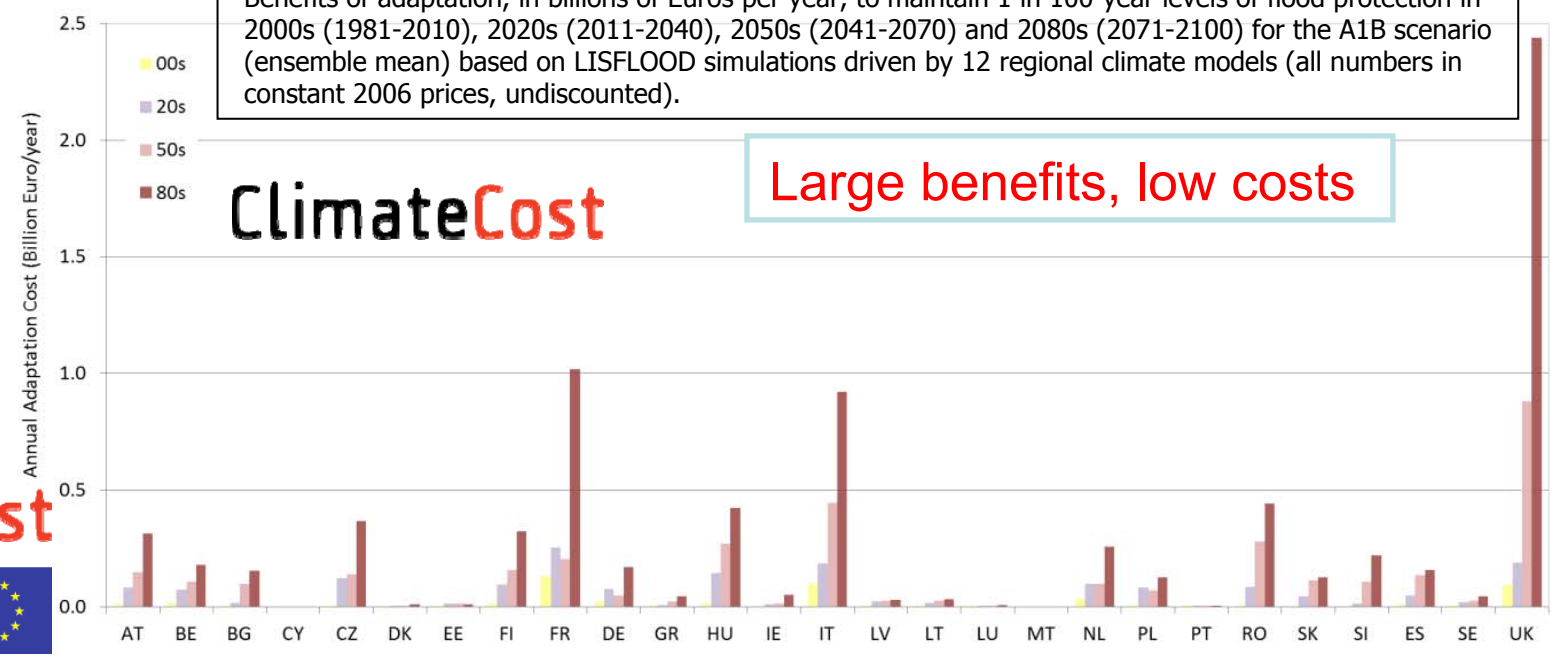


Adaptation Costs and Benefits - River floods



Benefits of adaptation, in billions of Euros per year, to maintain 1 in 100-year levels of flood protection in 2000s (1981-2010), 2020s (2011-2040), 2050s (2041-2070) and 2080s (2071-2100) for the A1B scenario (ensemble mean) based on LISFLOOD simulations driven by 12 regional climate models (all numbers in constant 2006 prices, undiscounted).

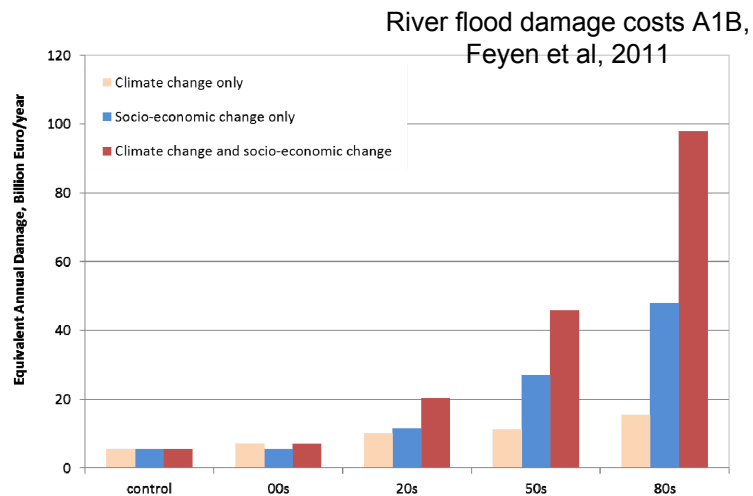
COSTS



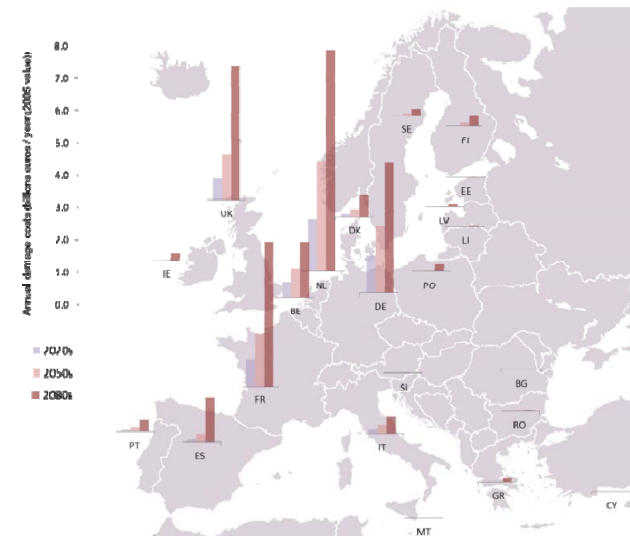
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Economic costs of climate change

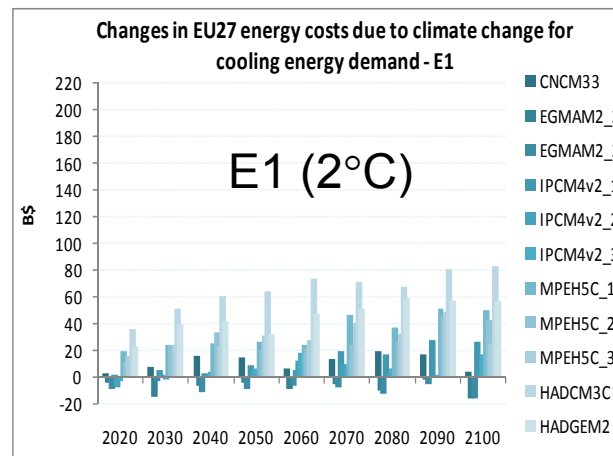
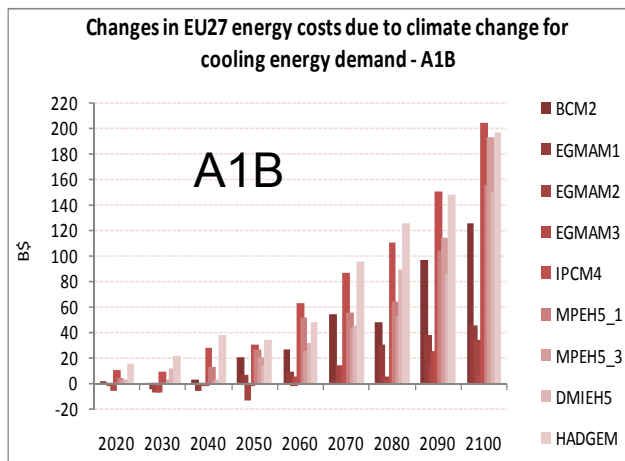


1) Economic costs of climate change are very large



2) Strong distributional patterns across Europe

Coastal damage costs A1B, Brown et al, 2011



3) Economic costs are significantly lower under a 2 degrees scenario

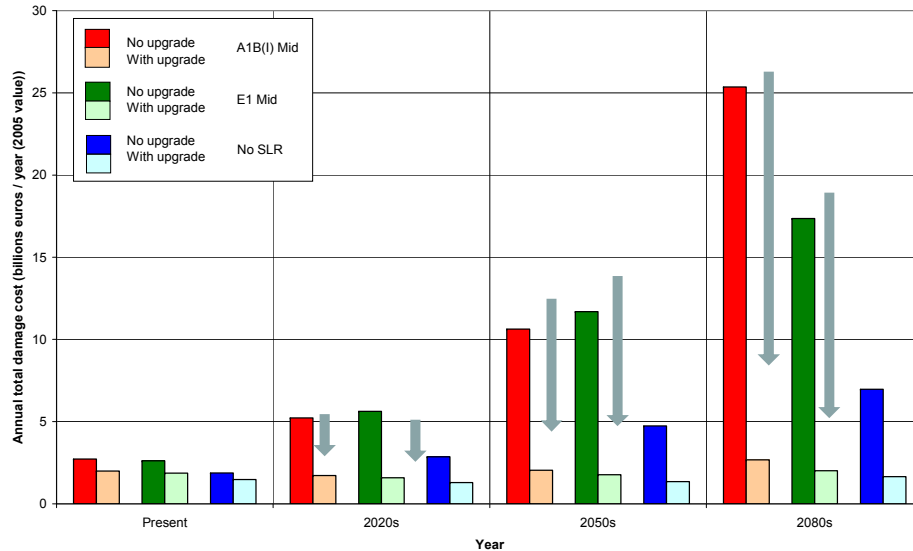
Energy costs of additional cooling demand from climate change. Source Mima et al 2012

ClimateCost



Costs and Benefits of Adaptation

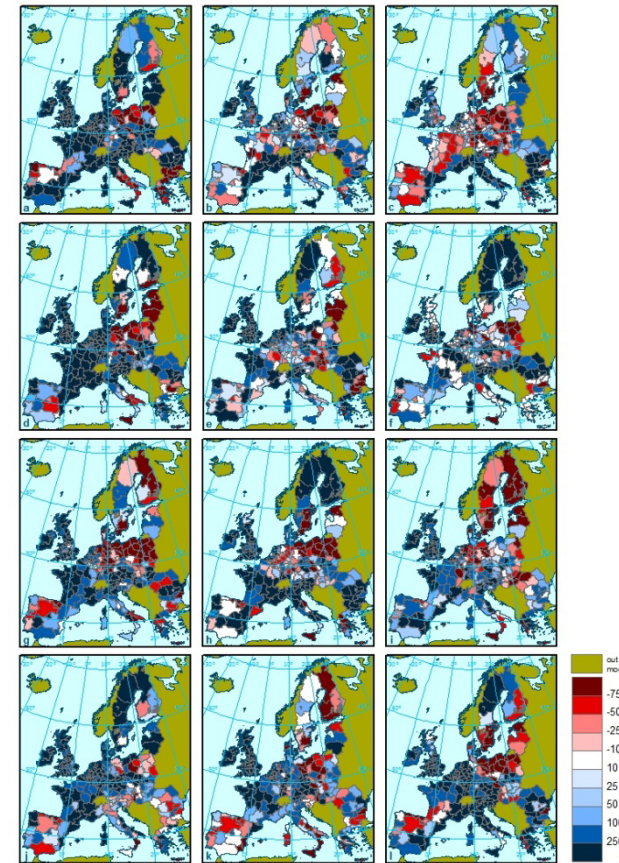
Benefits of adaptation ↓



4) Adaptation appears potentially very cost-effective in reducing costs of CC

Coastal damage costs with and without adaptation
A1B, Brown et al, 2011

Change in flood damage for the 12 individual climate model A1B RCM runs. Feyen et al, 2011



5) But consideration of uncertainty is key

Highlights need for iterative decision making under uncertainty

ClimateCost





IMPACT2C

*Quantifying projected impacts
under 2°C warming (2011-14)*

Co-ordinator: Helmholtz-Zentrum Geesthacht Centre for Materials and Coastal Research (GKSS), Germany

EU funding € 6.5m

- Main scientific objectives include:
 1. Detailed **ensemble-based climate change scenarios** for the time slice in which the global temperature is simulated to be of 2°C > pre-industrial level;
 2. Detailed assessment of **risks, vulnerabilities, impacts** and associated **costs** for a broad range of sectors (water, energy, tourism, transport/infrastructure, forestry, health, etc.), with a particular focus on **vulnerable regions** in Europe, as well as Bangladesh, Africa (Nile and Niger basins) and the Maldives
 3. **Mix of response strategies** accounting for the regional differences in adaptive capacities.

www.impact2c.eu

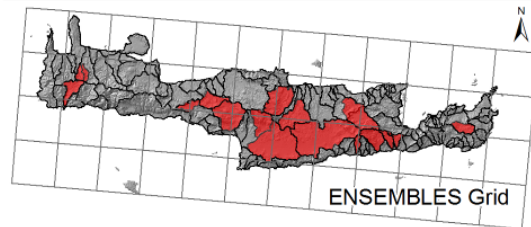
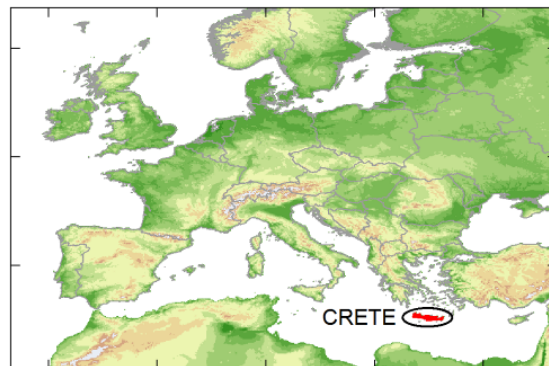




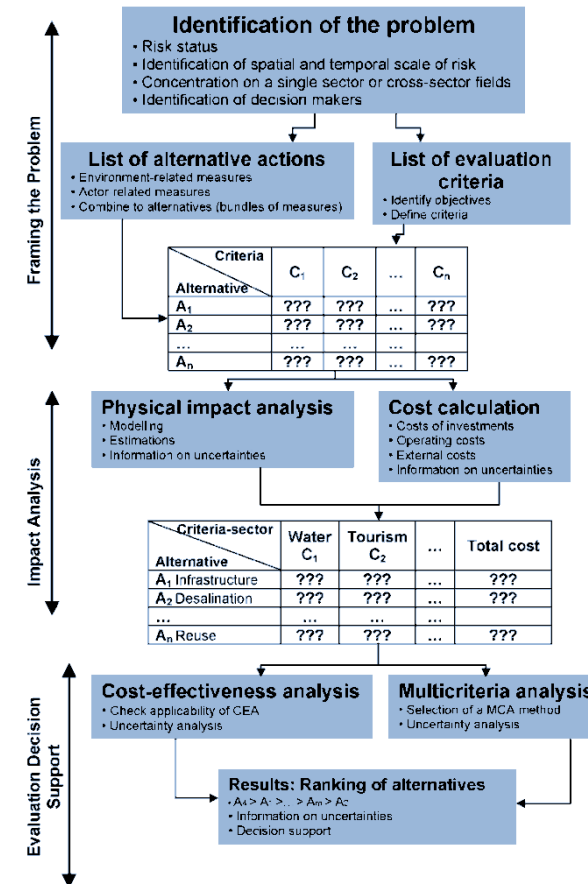
Vulnerable regions exposed to multiple (cross-sectoral) impacts

Objectives:

- To examine the impact of 2°C warming from a multi-sector approach under different emission scenarios.
- To assess the uncertainty propagation from climate model output to impact, adaptation and cost in various sectors.
- To perform a cross-sector integration of climate change impacts within a socioeconomic-vulnerability- adaptation capacity and cost of adaptation framework, in collaboration with local stakeholders and policy makers.



Sector oriented background including: water resources sector, infrastructure sector, agricultural sector, tourism sector, energy sector.



Framing the cross-sector integration includes: Identifying the decision maker, Identifying the risks, List of objectives, Criteria, Potential measures, Set-up of the decision matrix following a Cost calculation and Cost-effectiveness - Multicriteria analysis.

Other key IPCC AR5 WG II and III inputs



LIMITS	Low Climate Impact Scenarios and the Implications of Required Tight Emission Control Strategies
Duration	Oct 2011- Sep 2014
Consortium	8 European Partners + 2 International (CH, IN)
EU Contribution	EUR 3.5 m
Objective	
More information	www.feem-project.net/limits/
Key research questions:	
<i>The LIMITS project is currently assessing its first study protocol. It aims at investigating the feasibility and economic impacts of climate policies consistent with a 2C target along the following main dimensions:</i>	
<ul style="list-style-type: none"> • Global emissions reductions consistent with 2C • The role of interim national and regional policies in achieving climate stabilization • Regional emissions peaks and transitional pathways to decarbonization • Burden sharing and regional economic impacts of climate policies • International carbon markets and efficiency • Financial needs and transfers for investing in a low carbon economy 	

European
Commission

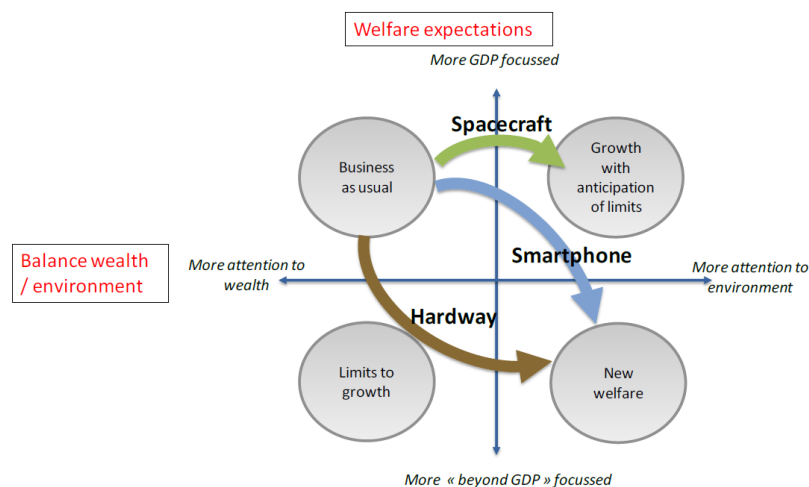


AMPERE

	Quantifying the costs of mitigating climate change by means of activities involving joint climate and economic modelling
Duration	Feb 2011- Jan 2014
Consortium	17 European Partners + 4 International (JPx2, CH, IN)
EU Contribution	3.1 MEUR
Objective	Improve knowledge on mitigation pathways and on costs of achieving ambitious climate targets
Achievements	<ol style="list-style-type: none"> 1. Establishment of a European energy-economy-climate modelling platform with strong links with teams in the US, China, India, Japan. 2. This research will shed light on: <ul style="list-style-type: none"> - Achievability of long term targets for various short term commitments until 2030 - The consequences of Europe acting as first mover towards a global climate regime - Uncertainties in the costs of mitigation

Long-term visions and challenges of the transition

The projects PACT, VLEEM and the WETO-T report have explored the main challenges of the transition to a low carbon economy. Their scenarios show different paradigms, converging on a possible stabilisation at 500 ppm CO₂.



Three main technological paradigms:

- Fossil fuels with CCS
- Hydrogen + nuclear
- Renewables

More info:

www.VLEEM.org

www.pact-carbon-transition.org

http://ec.europa.eu/research/social-sciences/pdf/publication-weto-t_en.pdf



Other key initiatives launched in 2012

- *A 12 M€ initiative on techno-economic modelling of climate change with the objective of developing new powerful and transparent tools for mitigation trajectories and policy support (building on the AMPERE and LIMITS projects)*
- *A 17 M€ cluster of projects on adaptation, with focus on cost/benefit assessment (ToPDAd, RAMSES, BASE)*

Forthcoming topics for the Work Programme 2013

- *Impact of higher-end scenarios ($>2^{\circ}\text{C}$)*
- *Consumption-based emissions*
- *Economics of adaptation*
- *Transition to sustainable, low carbon societies*





Thank you for your attention!

Find out more:

www.ec.europa.eu/research/horizon2020