



## **CLIMATE OPTIONS FOR THE LONG TERM (COOL)**

### **The European Dialogue**

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## The European Dialogue

### 1.1 The sectors: energy and transport

The European dialogue focuses on two sectors, energy and transport. The energy sector was selected for two main reasons. First, the burning of fossil fuels accounts for the majority of the EU carbon dioxide emissions. Second, the European energy sector is in a period of major transition, not only with respect to liberalisation and merging but also being at the eve of a jump to non-fossil fuels. The transport sector accounts for 26 per cent of total EU carbon dioxide emissions. Carbon dioxide emissions from transport are estimated to increase substantially in the future due to increases in travel, especially air travel and freight transport.

### 1.2 Energy

The European energy sector is in a period of major transition. Markets for electricity and gas are subject to liberalisation at both the Member state and EU levels. Liberalisation is changing the context for climate policies. If liberalisation results in lower prices, then energy demand will be higher than it would otherwise have been. Increased exposure to competition and commercial risk is forcing electricity generators to seek out less capital-intensive forms of generation. This has stimulated investment in gas-fired power. In the longer-term, it could inhibit the adoption of carbon-free renewable energy. Another impact of liberalisation can be a decline in research and technological development activity conducted by utilities in the public interest, as R&D will increasingly be profit-oriented (European Commission, 1998).

The range of technical options available for reducing energy-related carbon dioxide emissions is wide and include at least (*ibid.*):

- improved energy end use efficiency, for example in the heating of buildings;
- behavioural changes related to energy consumption;
- switching to less polluting fossil fuels such as natural gas;
- improving the efficiency of fossil fuel conversion;
- capturing and sequestering carbon dioxide emitted in major installations; and
- investing in non-fossil energy sources such as renewables or nuclear.

The European energy sector is likely to undergo major structural changes in the next 10-20 years. It is imperative that policy signals are sent which facilitate the take-up of climate-friendly technologies, many of which will provide benefits even in the absence of climate change. Otherwise, the capital stock on the sector could become locked into a structure which entails high emissions of greenhouse gases (*ibid.*). It is evident that these signals have to be of a cross-sectoral nature and require co-ordination among the various sectors, as well as among private stakeholders.

### 1.3 Transport

Transport accounts for 30 per cent of all energy consumption in the EU and is responsible for 26 per cent of total EU carbon dioxide emissions. Road transport in particular consumes over

80 per cent of transport-related energy and is responsible for 75 per cent of all transport-related CO<sub>2</sub> emissions. It is also responsible for congestion, noise, traffic, deaths and injuries, land use, and energy dependence.

In the EU, CO<sub>2</sub> emissions from transport are estimated to increase by 39 per cent between 1990 and 2010 in the pre-Kyoto scenario, due to increases in travel, especially air travel and freight transport.

Transport is a sector in which any action to change the course of existing paths is difficult because of the long development times involved; the need for up-front investment in infrastructure, production facilities and maintenance and management systems; and the need to co-ordinate the policies and actions of independent yet interdependent actors deeply committed to existing, climate unfriendly, technological trajectories. The complexity of transport infrastructures is a major obstacle to change, but it should be noted that much of the inertia is due to intransigence at the user level, especially amongst car owners with high mobility life styles (European Commission, 1998). Transformations in life-style closely interact with more institutional and economic-technological transformations, and can hardly be separated from them.

#### 1.4 Policy challenges

*Research and development.* Radical emission reductions of greenhouse gases from the energy and transport sectors require, *inter alia*, the development of new technologies and changes in infrastructure. The policy challenge for Research and Development (R&D) could be summarised in the following way (European Commission, 1998):

- ensure there are adequate public funds for relevant climate change related R&D activities;
- develop appropriate institutional forms for R&D;
- evolve a realistic distribution of tasks and responsibilities between the public and private sectors;
- develop connections between R&D policies and other policies;
- develop institutional and regulatory frameworks which facilitate the generation and flow of information and knowledge between all relevant actors.

Many sources of inertia govern the rate at which techno-economic systems change. These include low capital stock turnover rates in some sectors; the time needed for innovations to incubate; institutional barriers to diffusion; weak mechanisms incapable of translating political or societal imperatives into effective economic signals; and self-reinforcing loops between particular technical options and consumption patterns, which create technological lock-in and discourage radical innovation (*ibid.*).

*Lock-in and inertia.* Problems of lock-in and inertia are particularly keen in complex technology systems characterised by massive investment in long-life capital stock and extensive associated infrastructure, e.g. transport systems and energy production and distribution systems. The inertia of overall socio-technical systems is exacerbated when the options for change within one sector or area are linked or modified by the options for change in other areas. The net result is that the inertia of an inter-related system as a whole is governed by the most inert component of the system. Lock-in then stifles the opportunities for change (*ibid.*).

*Behavioural transformations.* These problems of radical techno-economic change point at the close interrelations with socio-cultural and behavioural aspects of low greenhouse gas emission futures. Any technological transformation will have to take these more behavioural transformations into account. But at the same time, major transformations in life-style patterns can form to some extent an alternative to drastic technological transformations. In both sectors this interplay between ‘technology’ and ‘behaviour’ will be a key focus.

## **2. The workshops**

### **2.1 Goal of the workshops**

The workshops form the core of the COOL European Dialogue. It is in these series of four workshops, for each of the two sectors mentioned above, that the long term sector strategies (2000-2050) are connected with climate policy in a participatory process between policy-makers, scientists and various other stakeholder representatives. The dialogues on transport and energy production are supposed to lead to the elaboration of strategic visions on how an 80 per cent reduction of carbon dioxide emissions from these sectors could be achieved in 2050.

The addressees of the dialogue workshops are in fact twofold, one external to the COOL project and one internal to the COOL project. The strategic visions for long term European climate policy are in the first place meant to contribute to EU climate policy, by indicating what kind of clusters of options are available for climate policy and which measures are necessary on the short and medium-long term to secure more radical emission reduction options on the long term. Secondly, the dialogue workshop will address the two other COOL dialogues. The ideas, strategic visions, and options generated in the EU dialogue will serve as input in especially the national dialogue.

### **2.2 Content and process**

The working method for the dialogue workshops is back-casting (see below for an explanation). The sectoral groups will formulate future images on the basis of existing (sector) scenarios, a sketch of future societies prepared for the Dutch situation by the NRP Theme III project team and other relevant data provided by the project team, as well as the knowledge base of the participants themselves. These future images indicate how the sectoral groups imagine a society in 2050 looks like which has reached the 80 per cent emission reduction goal. From that the group starts back-casting towards the present. In doing so the groups indicate what scientific information they would like to make use of, what kind of (economic, technological, environmental, socio-cultural) information, scenario studies, models, etc. they need for developing a path analysis from the future image to the short term (clusters of) options. In doing so the groups will identify relevant uncertainties in knowledge and direct specific question to the project team, following a demand driven input of science into the participatory policy-making process.

The project team will ensure that sufficient diversity and opposing views on visions, paths, clusters of options, and measures are available for the groups. Diversity of viewpoints on for instance technological versus behavioural alternatives, or - more likely - different mixes of technological and behavioural options/measures are possible, as long as the differences are explicated as well as the assumptions behind them. Consensus on different implementation trajectories is no requirement.

Together with Ecofys (Utrecht) and the Environmental Strategies Research Group (FMS) (Stockholm) the project team will elaborate distinct dimensions of the future images and the path analysis in a starting document for the first workshop. This starting document will also contain the basic rules of the game of the dialogue groups, among which the fact that the participants participate on personal title, the acceptance of the starting position of 80 per cent emission reduction in 2050, the commitment to participate in the four workshops, and the acknowledgement that climate change is a problem that needs to be solved.

The distinct phases of the back-casting process during and in between the four workshops are elaborated more in detail in section 3.

### **2.3 Back-casting**

Back-casting will be the key methodology at the COOL Europe workshops. Back-casting can be operationalised in different ways (see, for example, Dreborg, 1996; Holmberg and Robert, 1999; Mulder and Biesiot, 1998; Rotmans, 1998; and World Bank, 1997). A useful definition of back-casting is provided by Rotmans (1998: 159): “Back-casting or anticipatory scenarios (...) are backward directed, i.e., they start from some assumed final state, and explore the preconditions that could lead to this state, including a palette of strategies to reach this situation.”

The benefits of back-casting will be obvious when discussing some socio-technological alternatives such as the introduction of fuel cells and the organisational transformations that go along with that. Fuel cells can be introduced for automotive purposes if there are suitable fuels available, while it is much more difficult to introduce both fuel cells and a new fuel supply system in one step. For such radical transformations participation from various stakeholders is essential at different points in time. Back-casting thus focuses on the implications of the low GHG futures for the institutional strategies of public organisations and the business strategies of companies. In an exercise of the kind COOL Europe is preparing the dynamic interaction between the different actors may become very interesting as actors may be changing perspectives and move between alternative strategies during the process. Expertise of different kind will be available with the participants and from outside the groups. A demand-driven approach to the use of science will be followed.

According to the Environmental Strategies Research Group in Stockholm, back-casting involves the following steps: (1) problem setting and criteria selection; (2) elaboration of images of the future; (3) path analysis of needs (magnitude of changes, lead-times for penetration of solutions and technological succession, obstacles etc.); (4) short-term implications (institutional aspects, R&D priorities, choice of policy instruments etc.); and (5) formulation of an integrated strategy.

### **2.4 Demand driven scientific input**

The sectoral groups should indicate what scientific information they would like to make use of. They identify relevant uncertainties in knowledge and direct, if necessary, their specific questions to the project team.

### **2.5 Cross-sectoral learning**

A clear-cut added value of the COOL Europe workshops is the generation of new insights about cross-sectoral linkages. The project team will stimulate this learning process by (1) arranging for various forms of interaction between the sector groups (for example, the dialogue groups will be encouraged to consult each other); (2) continuously exchanging the minutes of the sectoral discussions between the sector groups; and (3) exchange with the other two COOL dialogues (see below).

### **2.6 Links with the global and national COOL dialogues**

Various measures will be taken to enhance interaction between the European, national, and global dialogues. Firstly, Marcel Kok and Marleen van de Kerckhof of the national dialogue will participate in the COOL Europe workshops. They will appear as assistants to Magnus Andersson and Willemijn Tuinstra, who are the secretaries of the sector groups. Secondly, participants from the COOL Europe workshops will be invited to the COOL interim workshop in 2000. Thirdly, the policy panel included workshop 4 (see below) will include global, European, and national policy-makers and stakeholders.

## **2.7 General rules for the workshops**

The COOL Europe project team suggests that the following rules will apply for the workshops:

1. The participants in the COOL Europe workshop should not question the assumption that climate change is a problem that needs to be solved.
2. The goal of 80 per cent reduction of the carbon dioxide emissions by 2050 should be generally accepted as a starting-point for the discussions.
3. The dialogue groups should aim at bringing to light diverging arguments and insights from the participants. Consensus on low GHG futures as well as implementation trajectories is no requirement. The participants hence can agree to disagree, as long as the assumptions that make them disagree are explicated.
4. The COOL Europe workshops should not be seen as a forum for negotiations but a forum for generation of new ideas and the manifestation of assumptions underlying the policy positions.
5. Participation in the dialogue group is based on personal title.
6. Chatham House rules will apply for the protocol. (The protocol will thus not link a specific statement to a specific participant.)
7. Participants are urged to participate in all four workshops. If this is not possible for some urgent reason, the project team will discuss substitutes. The substitutes could be proposed by the originally selected participant or by the project team. If there are no proposals, the COOL Europe project team will search for substitutes.

### 3. Phases and time schedule

The logic of back-casting as introduced in 2.3 forms the background for the design of the four workshops (See also Table 1 below).

#### ***Preparation for Workshop 1.***

*(Step I of the back-casting Process)*

Project team together with Ecofys and FMS, Stockholm in October and November 1999: Prepare material on background for the future images and motivation of choices: energy production and industrial use, transport and back-casting. To be sent out to workshop participants not later than 19 November 1999.

#### ***Workshop 1: Future images.***

*(Step II of the back-casting process)*

Input: Background information on the energy and transport sectors. Future images elaborated by the national dialogue. Background information on back-casting. Criteria to be met by images.

Expected outcome: Draft future images that meet the criteria for a solution to the carbon dioxide problem.

Process: The participants will outline images of the future in the following way:

- generate ideas (elements of a solution)
- cluster ideas
- identify links between clusters
- identify priorities
- combine clusters into one or several futures images

Homework for the project team:

1. The project team sends out clusters to participants for those who were not able to participate in the first workshop.
2. The project team elaborates future images and makes stories out of them. One important thing to be done is to sort out internal (sector-specific) and external events (not sector-specific, for example, enlargement and further integration of the European Union). One or two iteration steps.
3. The project team elaborates a tentative path analysis as an input for workshop 2.

#### ***Workshop 2: Path analysis (needs).***

*(Step III of the back-casting process + Exploring issues related to step IV)*

Topics: Magnitude of changes. Lead-times for penetration of solutions and technological succession. Learning about time horizons for certain developments. Compatibility of options. Robustness and flexibility of options. Intermediate steps. Obstacles and uncertainties. Political and Institutional settings: conditions.

Input: Future images and tentative path analysis prepared by the project team.

Expected output: Revised future images, feedback on path analysis, general ideas about short-term policy implications.

Process:

Discussion on elaborated images.

Project team to present outline of a path from 2050 to 2000:

- Adjust the path in the workshop with participants + revise images
- Identify the gap between current trends and the path needed and analyse the results (gap analysis). The gap that emerges indicates what has to be changed. The identification of the gap constitutes a link to the next workshop.

Brainstorming and clustering of ideas about possibilities to close the gap and implications for action in the short term.



Homework for the project team:

1. Revise future images
2. Further work on path analysis
3. Elaboration of ideas about short-term implications.

***Workshop 3: Short-term actions needed to reach long term goals***

*(Step IV of the back-casting process)*

Topics: Policy implications of gap analysis, e.g. as regards institutional aspects (especially EU institutions) and R&D priorities. Policy instruments. Avoiding lock-in situations. Conditions conducive to learning. Creation of dynamics. Criteria for short-term decision-making and investments. Obstacles and uncertainties. Allocation of actions.

Input: Revised future images prepared by project team, path analysis prepared by project team, ideas about short-term policy changes.

Expected output: Criteria for decision-making. Suggestions for near term policy options, e.g. institutional innovations and directions for R&D.

Homework for the project team:

Elaborate draft strategic vision on paper

External feedback: present draft strategic vision to policy-makers and stakeholders who are not in the dialogue but could have relevant input.

Process external feedback and present it to the workshop participants.

***Workshop 4: Strategic vision and policy panel***

*(Step V of the back-casting process)*

Topics: Refinement of the whole strategic vision (future images, path analysis, short-term policy implications, policy recommendations)

Policy panel with key policy-makers in EU climate policy.

Input: Draft strategic vision and external feedback

Expected outcome: agreement on final strategic vision and robust options

Homework for the project team:

Final strategic vision on paper containing:

Future images

Path analysis

Short-term implications: criteria for short-term decision-making, priorities etc.

Recommendations to the EU

Appendix 1: Feedback from policy-makers and stakeholders outside the dialogue setting.

Appendix 2: Report from policy panel

The various steps of this dialogue have been summarized in Table 1.

**Table 1. The COOL Europe dialogue in steps**

	Activity	Input Workshop	Output Workshop	Time schedule
1.	Project team: Prepare background material on <ul style="list-style-type: none"> <li>- Back-casting</li> <li>- Long-term climate policy issues</li> <li>- Format/criteria for future images</li> <li>- Sectoral long term scenarios</li> <li>- Technological options</li> </ul>			November 1999 (send to participants by November 19)
2.	<b>Workshop 1: Future images</b> Discussing and designing low GHG 2050 picture(s) for Europe by clustering of ideas, on: <ul style="list-style-type: none"> <li>- Transport</li> <li>- Energy production and industrial energy use</li> </ul>	<ul style="list-style-type: none"> <li>-Background material on back-casting</li> <li>-Long-term climate policy ideas</li> <li>- Future images elaborated by the national dialogue</li> <li>-Format/criteria for future images</li> <li>-Sectoral long term scenarios</li> <li>-Technological options</li> </ul>	<ul style="list-style-type: none"> <li>- Draft future images agreed upon by participants</li> <li>- Proposals for coming workshops (scientific input, questions to be addressed etc.)</li> </ul>	29 November, 1 day
3.	Project team: <ul style="list-style-type: none"> <li>- send out clusters to participants for those who were not able to participate in the first workshop</li> <li>- elaborate future images (sort out internal and external events)</li> <li>- elaborate a tentative path analysis</li> </ul>			
4.	<b>Workshop 2: Path analysis (needs)</b> <ul style="list-style-type: none"> <li>- Identifying options (technological and other)</li> <li>- Intermediate steps</li> <li>- Scanning the context: obstacles, uncertainties, and opportunities</li> <li>- Short-term policy ideas</li> </ul>	<ul style="list-style-type: none"> <li>- Future images (elaborated by project team)</li> <li>- Tentative path analysis including scientific assessment of options</li> </ul>	<ul style="list-style-type: none"> <li>- Revised future images</li> <li>- Feedback on path analysis</li> <li>- General ideas about short-term policy implications to be used as input for next workshop</li> </ul>	March 2000, 2 days
5.	Project team: Prepare contribution to <b>Interim National Workshop</b> on the basis of information requests from national Dialogue Prepare information requests to the National and Global Dialogues to be addressed at the Interim National Workshop			March 2000
6.	Project team: <ul style="list-style-type: none"> <li>- Revise future images</li> <li>- Further work on Path analysis</li> <li>- Elaboration of ideas about short-term implications</li> </ul>			
7.	<b>Workshop 3: Short-term implications</b> -Formulating short-term	<ul style="list-style-type: none"> <li>-Revised future images</li> <li>-Path analysis</li> </ul>	<ul style="list-style-type: none"> <li>-Criteria for decision-making and investments</li> <li>-Suggestions for R&amp;D and</li> </ul>	June 2000, 2 days

	actions, measures, and major policy choices -Identifying conditions for implementation -Scanning the context: obstacles, uncertainties and opportunities	-Information on short-term policy strategies	institutional innovation	
8.	Project team: Develop draft strategic visions including: (1) future images, (2) path analysis, (3) short-term implications and policy recommendations, based on: -Elaboration of workshop 3 -Comments from workshop participants			August 2000
9.	Project team: -Get feedback on Draft strategic visions from sectoral policy-makers and politicians via letter, email, and phone - Prepare External 'evaluation' report based on this feedback			September 2000
10.	<b>Workshop 4: strategic vision and policy panel</b> -Refinement of strategic visions -Policy panel with representatives of EU institutions and national policy-makers	- Draft strategic visions - External feedback report	- Agreement on strategic visions for the energy and transport sectors	November 2000, 1 day.
11.	Project team: Finalise strategic visions based on discussions within workshop 4 Document outcome of policy panel - Draft strategic vision - Outcome of policy panel - Final strategic visions on paper			January 2001

### 3.2 Place of workshops

The four workshops will be held in Brussels. The first workshop will be organised with the support of the Centre for European Policy Studies (CEPS) and will be located at CEPS. Decisions about the location and timing of the second workshop will be taken at the first workshop.

### 3.3 Workshop participants

As a starting point the COOL Europe project team has identified a number of key stakeholders:

- National climate negotiators from countries that have a distinct position towards climate policies (e.g. the most active countries in the European Council's Ad Hoc Group for climate issues and representatives from southern European countries).
- National sectoral policy-makers, for example, representatives of ministries of transport and ministries of energy
- Representatives leading oil companies with strong interest in renewable energy sources (e.g. BP Amoco and Shell).
- Representatives from power generating companies in Europe (e.g. representative of EdF (F), considered to be one of the most interesting)
- Representatives of car manufacturers, (e.g. from Germany)
- Representatives of leading NGOs involved in climate policy (at the EU level)

- Representatives of local and regional authorities (e.g. those having close links with European transport policies because they locate a major airport or harbor)
- Investors, for example, European Investment Bank or major private banks
- Representatives of the European Commission (DGII, DGVII, DGXI, and DGXVII)
- Representatives of central and eastern Europe (both public and private actors)

At the end of August, the COOL Europe project team began to invite people to the workshops, taking these categories into account. By 1 November, 21 persons had agreed to participate.

#### **4. The project team**

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#### **5. Partners and consultants**

Dr. Tomas Kåberger, researcher at the Institute of Physical Resource Theory, Chalmers University of Technology, Goteborg, Sweden, will have a dual role as (1) chairman of one of the sectoral workgroups and (2) general consultant to the COOL Europe project.

Mr Kornelis Blok and David de Jager, Ecofys in Utrecht, have agreed to take an overall responsibility for the scientific input to be used at the workshops. They will be present during the workshops, provide input and answer scientific questions.

Prof. Peter Steen and Dr Karl H. Dreborg of the Environmental Strategies Research Group (FMS) in Stockholm have applied back-casting in analysing environmentally viable energy and transport policies for the long-term. The COOL Europe project team has decided to link them to the project. FMS will contribute to the COOL project, European Dialogue, by giving advice to Wageningen University as regards back-casting methodology, workshop design and criteria for energy and transport systems that are compatible with an 80 per cent reduction in CO<sub>2</sub> emissions.

#### **References**

- Dreborg, Karl, H. (1996). "Essence of back-casting". *Futures*, Vol. 28, No. 9, pp. 813- 828.
- European Commission (1998). *Climate Change and the Challenge for Research and Technological Development (RTD) Policy*. ETAN Working Paper. Brussels.
- Holmberg, John and Karl-Henrik Robert (1999). "Back-casting from non-overlapping sustainability principles – framework for strategic planning." Unpublished material, Chalmers University of Technology and the Natural Step Foundation, Sweden.
- Mulder, Henk, A. J. and Wouter Biesiot (1998). *Transition to a Sustainable Society: A Back-casting Approach to Modelling Energy and Ecology* (Advances in Ecological Economics Series). Groningen University.

Rotmans, Jan (1998). "Methods for IA: The Challenges and Opportunities Ahead".  
*Environmental Modeling and Assessment*, No. 3, pp. 155-179.

World Bank (1997). *The Effect of a Shadow price on Carbon Emissions in the Energy Portfolio of the World Bank: A Back-casting Exercise*. Washington DC.

Websites:

<http://ag.arizona.edu/futures/fut/semtech.html>

<http://www.nop.nl/cool>