SIXTH FRAMEWORK PROGRAMME

PRIORITY FP6-2004-SSP-4

Policy-orientated research
Scientific support to policies

Contract for:

SPECIFIC TARGETED RESEARCH PROJECT

Annex I - "Description of Work"

Project acronym: **TranSust.Scan**

Project full title: **Scan**ning Policy Scenarios for the **Tran**sition to **Sust**ainable Economic Structures

Proposal/Contract no.: 022773

Related to other Contract no.: (to be completed by Commission)

Date of preparation of Annex I: 7th February 2006

Operative commencement date of contract: (to be completed by Commission)

1 Project summary

The focus of this research project will be to scan a wide range of policy scenarios as to their relevance for the European Sustainable Development Strategy in view of Extended Impact Assessment. Embedded in the TranSust network of researchers, with its expertise in modelling the transition to sustainable economic structures, the project will link and expand an extensive set of available models. Using a scenario approach in cooperation with stakeholders, these models will address the strategic policy options.

In a first step, existing models will be extended to reflect the multifunctionality aspect of sustainability policies and their trade-offs with other policies. In addition to the traditional economic, environmental and social issues, the expanded models will address the new policy agenda as put forward by the Lisbon Strategy of the European Union and the World Summit for Economic Development. The models will therefore be able to deal with competitiveness, economic development, security, the preparations for Beyond-Kyoto policies, and interaction between technological change and the use of natural resources.

In a second step, this enhanced set of models will be used for a comprehensive analysis of a wide range of policy scenarios. In designing the scenarios, a participatory approach will emphasise close cooperation with stakeholders, Commission services, and international organisations. By backcasting the path dependency and by simulating the range of assumptions, the scenario analysis will reveal the sensitivity of forecasts. The methodology and databases will be made available to institutions involved in policy decision-making.

TranSust.Scan aims to enhance European competence and expertise for dealing with the emerging extended facets of sustainability and their implications for policy design. Besides supporting strategic policy preparation for the European Union, the dissemination activities will address non-European institutions.

2 Project objectives

2.1 Overview

At the ***Lisbon Summit*** in March 2000, a new strategic goal for the European Union was established. The European Council formulated a ten-year strategy to make the EU the world's most dynamic and competitive economy. Under the strategy, a stronger economy will drive job creation alongside social and environmental policies that ensure sustainable development and social inclusion. The Lisbon Strategy thus touches on most of the EU's economic, social and environmental activities, thereby strengthening the objective of sustainable development with a special focus on competitiveness.

In the sequel at the Gothenburg Summit in June 2001, the ***European Strategy for Sustainable Development*** was adopted. The revision of this strategy is now under way and will be taken into account. In a nutshell this strategy aims at a restructuring of the European economy by means of integrating economic welfare, environmental integrity and social coherence. The transition to these innovative economic structures poses a major challenge to economic policy design.

The ***World Summit on Sustainable Development*** in September 2002 emphasised the links to economic development, economic security, dissemination of technologies, and the social issues of health and aging in a world that is growing in population. These goals overlap with the targets put forward by the ***United Nations Millennium Project***.

Originating from an FP5 project with the same acronym, TranSust has evolved as a network of researchers devoted to modelling the transition to sustainable economic structures. The TranSust community aims at contributing to a new generation of modelling tools that are more adequate for dealing with sustainability issues. Key results obtained so far emphasise a better integration of all types of technical progress, an extension of the types of stocks ranging from reproducible capital to knowledge and natural capital, and innovative measures of welfare that are based on flows and stocks.

TranSust.Scan intends to build on this expertise by developing and scanning a wide range of policy scenarios as to their relevance for the European Sustainable Development Strategy in view of Extended Impact Assessment. Key feature of the proposed research activity are:

- Expanding the analytical modelling framework for dealing with the extended facets of sustainability.
- Involving stakeholders by a consultation process in the scenario building.
- Forecasting of current policies and trends.
- Backcasting for identifying policy paths for achieving specific targets.
- Simulation of the sensitivity of assumptions.
- Consensus and awareness building for policy recommendations about desirable scenarios.

The overall objective is to develop within an adequate analytical framework a wide range of scenarios for evaluating sustainability policies. For this purpose, existing models of the TranSust network will be expanded to enable an Extended Impact Assessment. Parallel to this a consultation process with stakeholders will be initiated for designing the spectrum of scenarios. All scenarios will be evaluated according to a unified and therefore comparable Extended Impact Assessment. Emphasis will be given to the multifunctionality aspect of sustainability policies and the trade-offs with other policies. By opening this wider perspective on sustainable development, the activities of TranSust.Scan can thus provide

support for current policy decisions and for decisions about future research targets to support the European Sustainable Development Strategy.

2.2 Motivation

For more than a decade, the EU has taken a leading role in the promotion of sustainable development (SD), as is emphasised by various key political decisions ranging from the **Treaty of Maastricht (1992)** to the **Gothenburg European Council (2001)**.

Recently, however, a number of important new policy issues that are of major concern in Europe indicate that a new approach of sustainability will be required in order to deal with them appropriately. This development requires a new way of working with models, and therefore calls for an expansion of the conventional dimensions of sustainability.

A milestone in this context is the ***Lisbon Strategy***, which is a commitment to bring about economic, social and environmental renewal in the EU. The European Commission's annual Spring Report examines the strategy in detail. The recent 2004 report acknowledges progress in certain domains, emphasising however significant problems which hold back the entire strategy. Therefore, the need for an energetic implementation of reform in all the different spheres through integrated strategies is stressed. Indeed, insufficient implementation of the Lisbon strategy could produce significant net costs for Europe, e.g. in terms of reduced economic welfare and a growing gap with some of the large industrial partners in the fields of education and R&D. In order to promote progress towards the Lisbon targets, better ways of incorporating the broader aspects of sustainability are required.

A second recent policy event that has strengthened the commitment to sustainable development - and therefore the need for better modelling approaches - is Russia's decision to ratify the Kyoto Protocol. The Russian ratification opens the way for the Kyoto Protocol to go into effect, thus sending a strong signal for international climate policy.

A third issue that adds weight to new sustainability considerations is the global concern about security. Economic development has obviously neglected the interaction with security. Unfortunately, economic and human security, i.e., the capacity to avoid violent conflict, overcome vulnerability, and respond positively to environmental change, is increasingly threatened throughout the world. In this context, energy security and other developments on the energy market play a fundamental role. New strategies for tackling the concept of security are needed in order to guarantee sustainable development.

Economic development and population growth also trigger the fourth issue that calls for a more extensive sustainability analysis, the increasing pressures on natural resources. Management of natural resources is the front line of the struggle for more sustainable and equitable development, given that environmental degradation is one of the first indications of unsustainable social and economic systems. Recent indicators show that, under current practices, renewable resources such as water and forests, are under extreme pressure, and their productivity is in decline.

Finally, technological change, with its impact on all types of resources - and ultimately on human welfare - continues to be an integrating element of these issues .

As a consequence of these crucial policy developments, the need arises to deal with new dimensions - beyond the three conventional pillars of sustainability - in order to live up to the requirements of day-to-day policy decisions. By thoroughly analysing the mutual relationships between environmental, economic, and social trends, and by developing a scientifically sound forecasting framework, this project contributes in particular to the need for improved access to future scenarios for strategic policy preparation which has become evident in the general context of the European Sustainable Development Strategy.

2.3 Project design

TranSust.Scan is aimed at enhancing European competence and expertise for dealing with the emerging extended facets of sustainability and their implications for policy design.

Given that the TranSust project has become a meeting point of European researchers and a platform for exchanging experience and ideas aimed at improving the current state of economic and environmental models by focusing on sustainability issues, we suggest building on its expertise in the following ways:

- The existing ***network of researchers*** interested in modelling the transition to sustainable economic structures is going to be extended throughout Europe with worldwide linkages. Communication within the scientific community is thus to be improved. In addition, the dialogue with relevant ***stakeholders*** within and outside the Commission will be fostered.
- TranSust.Scan aims at moving to the next generation of model designs. For this purpose, the project proposed aims at widening the conception of sustainability and verifying the impacts of this broader concept by ***collecting available information*** and utilising ***existing modelling approaches.*** Both quantitative and qualitative elements will be combined. In particular, the proposed project will build upon the results of already existing models of recognised research institutions, by expanding and/or linking models.
- Within the project activities, special attention will be given to the ***dissemination and analysis*** of the existing research on the range of sustainability aspects. Based on the findings emerging from the extended sustainability dimensions, a number of ***scientifically sound policy scenarios*** will be scanned as to their relevance for the European Sustainable Development Strategy in view of Extended Impact Assessment.
- Finally, in the comprehensive analytical framework a set of ***consistent environmental sustainability scenarios*** will be developed. The insights arising from this research will be translated into a ***set of policy relevant recommendations***.

To ensure optimal use of the project's results, special attention will be given to the **dissemination of results** by

- using the **Internet** as the main communication tool within the network and as a fast publishing platform,
- organising a series of **meetings, workshops and conferences** in order to increase the awareness on the implications and interactions of sustainable development, to enhance the reflection on possible roads to sustainable development and to reach consensus on desirable scenarios.
- fostering **collaboration with relevant stakeholders** both within and outside the European Commission,
- producing a series of **working papers** that serve as a point of reference on the new topics dealt with in the project, and
- publishing a **book** that serves as a reference on the design of models for extended sustainability issues,
- opening a **dialogue with non-European research communities** by initiating joint workshops and conferences.

2.4 State of the art

The ***European Strategy for Sustainable Development***, adopted at the Gothenburg Summit in June 2001, proposed the introduction of Impact Assessment in order to promote sustainable development. The European Commission has taken the commitment to perform an impact assessment of *all policy proposals* to assess their impacts on sustainability, by highlighting the economic, environmental and social effects. The usefulness of Impact Assessment was confirmed by the review of the strategy and will continue to be an instrument for assessing economic, environmental and social impacts of policies.

Impact Assessment at the Commission is an evolving learning process, as is evidenced through the increasing number of Extended Impact Assessments (ExIAs) conducted (43 in 2003, 46 in 2004). However, the current state of the art of Impact Assessments is characterised by a number of weaknesses some of which have been taken into account in the revised version of the guidelines for Impact Assessment. Most importantly, the quality varies both between and within Impact Assessments, and there is a strong emphasis on assessing primarily the direct costs and benefits of policies. In addition, the impacts addressed by current Impact Assessments are very selective, and do not capture the whole range of interactions relevant from a wider sustainability perspective. The methods used up to now are mostly qualitative and based on limited resources for gathering evidence and data, and lack an overall framework.

As a consequence, there is a strong need for a more comprehensive analysis which applies appropriate tools that address all dimensions of sustainability and allow the highlighting of trade-offs between policies and different sustainability aspects. In this context, particular attention should be paid to the inclusion of quantitative analysis, which has only sporadically been used for Extended Impact Assessments until now. Quantitative modelling tools need to be further improved in order to permit their wider use for Extended Impact Assessments.

The importance of exploring the impacts of policies on sustainable development is also highlighted by the wide range of relevant research projects that have been initiated within both the Fifth and the Sixth Framework Programme. Based upon work from these and additional research project, TranSust.Scan responds to various of the above mentioned weaknesses of current impact studies by providing a better methodological support and an improved information base for Extended Impact Assessments. The main objective of the proposed project is to scan a wide range of policy scenarios as to their relevance for the European Sustainable Development Strategy in view of Extended Impact Assessment. Embedded in the TranSust network of researchers, with its expertise on modelling the transition to sustainable economic structures, a rich set of available models will be linked and expanded to address together with stakeholders in a scenario approach the strategic policy options. In order to capture a wide range of sustainability impacts and enable a comprehensive analysis, the existing models will be extended as to the multifunctionality aspect of sustainability policies and their trade-offs with other policies. Then, this improved set of models will be used for a comprehensive analysis of a wide range of policy scenarios, which are designed in close cooperation with stakeholders, Commission services, and international organisations.
The methodological approach for Extended Impact Assessments will thus be improved, including qualitative and quantitative elements and emphasising an intensive dialogue with relevant stakeholders to maximise the project's policy relevance. TranSust.Scan enhances state-of-art in area of Extended Impact Assessments, in that it extends currently available models to incorporate all dimensions of sustainability, developing thus de facto a new tool for Extended Impact Assessments. In order to enable the wider use of TranSust.Scan's results, keen attention will be paid to their dissemination to enable a capacity building within the European Commission. In particular, the methodology and

databases will be made available to institutions involved in policy decision-making and a set of policy recommendations and future research needs will be specified.

3 Participant list

List of Participants

Partic. Role*	Partic. no.	Participant name	Participant short name	Country	Date enter project**	Date exit project**
CO	1	Oesterreichisches Institut fuer Wirtschaftsforschung	WIFO	Austria	1	30
CR	2	Zentrum fuer Europaeische Wirtschaftsforschung GmbH	ZEW	Germany	1	30
CR	3	Société de Mathématiques Appliquées et de Sciences Humaines	SMASH	France	1	30
CR	4	Energy Research Centre of the Netherlands	ECN	Netherlands	1	30
CR	5	Fondazione Eni Enrico Mattei	FEEM	Italy	1	30
CR	6	Vrije Universiteit Amsterdam	VUA	Netherlands	1	30
CR	7	Institute for World Economics	IfW	Germany	1	30
CR	8	Lodz Institute for Forecasting and Economic Analyses	LIFEA	Poland	1	30
CR	9	Consejo Superior de Investigaciones Científicas	CSIC	Spain	1	30
CR	10	Planning and Environmental Policy University College Dublin	UCD	Ireland	1	30
CR	11	Universitaet Hamburg	UniHH	Germany	1	30
CR	12	University of Economics Prague	VSE	Czech Republic	1	30

*CO = Coordinator

CR = Contractor

** Normally insert “month 1 (start of project)” and “month n (end of project)”

These columns are needed for possible later contract revisions caused by joining/leaving participants

4 Relevance to the objectives of the specific programme and/or thematic priority

The proposed project aims at strengthening the objectives of the SSP Priority ***"Underpinning the economic potential and cohesion of a larger and more integrated European Union"***, by addressing the specific area of "*Forecasting and developing innovative policies for sustainability in the medium and long term* ." Let us now specify its relevant contribution.

The overall objective of TranSust.Scan is to further investigate issues crucial for enabling sustainable development. In particular, a wide range of policy scenarios will be scanned as to their relevance for the European Sustainable Development Strategy in view of Extended Impact Assessment. The proposed project is thus orientated along the lines of general policy context of the SSP Priority as it can be considered important to provide a ***major support to the EU strategy for Sustainable Development (SD)*** and the revision process***.*** This strategy was agreed upon in 2001 at the Gothenburg Summit and was enlarged to an international scale in the context of the Johannesburg Summit on Sustainable Development in 2002. In addition, the strategy has gained further attention in the context of the Lisbon strategy, which focuses on the importance of competitiveness to strengthen sustainable development, resolving major societal issues and supporting the formulation and implementation of other EU policies. Along these lines, TranSust.Scan also emphasises the multifunctionality aspect of sustainability policies and their trade-offs with other policies, contributing thus to a further element emphasised in the relevant SSP Priority, the ***6th Environment Action Programme*** with particular focus on the interactions between different policies.

From the very beginning the concept of sustainable development was meant to be relevant for more than just environmental issues. The pioneering work of the World Council on Environment and Development (WCED, 1987) refers to sustainable development as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*."

In the years since the formulation of the above definition, many political discussions have adopted a relatively narrow focus in that they have often concentrated on areas where sustainability can be defined directly or exclusively in terms of some specific environmental problem. In contrast to this, the present research project aims to promote a wider notion of sustainability which is actually more in keeping with the original intention of the WCED pioneers. Yet, although the concept of sustainable development is far from being fully agreed upon either in a political or in an economic perspective, recent policy developments also seem to stress the need to broaden the narrow interpretation of sustainability. The proposed project thus builds on the experience and insights gained by the TranSust network and extends its analysis on how the transition to sustainable economic structures should be performed. In particular, it concentrates on ***gathering evidence*** to help answer the following question:

- **Which economic structures are able to support economic welfare in the long-run without creating burdens on social, economic and environmental resources?**

Hardly any of the currently available models can claim to provide an answer to this question. A number of policy analyses in the context of energy policies, transport policies and the implementation of climate policies along the lines of the Kyoto Protocol revealed considerable weaknesses, since the models used were mainly designed in flow-oriented paradigms that neglected the dynamic interaction with stocks. Moreover they did not provided an in-depth examination of surrounding uncertainties regarding sustainability challenges, cost of precautionary action and the policy signals. They failed to clarify the economic implications of many policy recommendations and debates. The key objective of

TranSust.Scan is thus to extend current modelling approaches by including a wider range of sustainability aspects in order to appropriately design strategies aimed at a transition to sustainable economic structures. In particular, by scanning a wide range of policy scenarios as to their relevance for the ***European Sustainable Development Strategy*** in view of ***Extended Impact Assessment***, TranSust.Scan aims at addressing together with stakeholders in a scenario approach the strategic policy options.

Through its research focus, TranSust.Scan thus contributes both to several general research objectives of the SSP Priority in consideration and to the specific objectives of the task addressed, as follows:

Development of tools for modelling environmental and climate change policies

Within its first workpackage, TranSust.Scan emphasises the need to broaden the conception of sustainable development and therefore aims at modelling an extended range of sustainability facets. By extending and linking a rich set of existing models to better capture various additional sustainability aspects, a more comprehensive modelling approach will be prepared. This enriched perspective on elements essential for sustainable development is expected to enable an improvement of the tools currently available for modelling air pollution and climate change policies in view of a successful future orientation of the European SD strategy.

Provision of a forecasting framework based on scientifically sound sustainability scenarios

In a first step, TranSust.Scan extends existing models in order to contribute to the European Commission's specific needs of their work on ***Extended Impact Assessments***. Embedded into the TranSust network of researchers, with its expertise on modelling the transition to sustainable economic structures, a rich set of available models will be linked and expanded as to the multifunctionality aspect of sustainability policies and their trade-offs with other policies. In addition to the traditional economic, environmental and social issues the expanded models will address the new policy agenda as put forward by the Lisbon Strategy of the European Union and the World Summit for Economic Development.

The uncertainties of environmental impacts will be analysed, as well as their relevance for policy making. To what extent does it matter that uncertainties in external impacts of e.g. energy production or other economic activities, and their associated damage costs, are inherently present and potentially large? To what extent effect these uncertainties the robustness of policy strategies? These sort of questions will also be addressed in the current proposal

All the findings obtained with respect to the extended sustainability facets will directly feed in the development of the policy scenarios. The linkages between competitiveness aspects, technological change, economic security, economic development, social issues, natural resources and Beyond-Kyoto policies can not only indicate the different future paths, but also highlight the coherence and consistency of how different variables move together. Indeed, the workpackage also investigates and disentangles the mutual relationships and interactions between environmental, economic and social dimensions to appropriately capture the notion of sustainability and to analyse and understand the strengths and directions of those links. The key variables for different future policy scenarios will thus become clear. In this way, TranSust.Scan directly addresses the needs to have ***better access to future scenarios for strategic policy preparation*** and to better ***specify the mutual relationships between environmental, economic and social trends***, as stressed by the SSP Priority.

In a second step, these enhanced set of models will be used for a comprehensive analysis of a wide range of policy scenarios. For the designs of the scenarios a participatory approach will be emphasised by a close cooperation with stakeholders, Commission services, and international organisations. The scenario analysis will reveal by backcasting the path dependency and by simulating the range of assumptions the sensitivity of forecasts. The methodology and databases will be made available to institutions involved in policy decision-making. TranSust.Scan thus contributes to the objective of ***developing a robust and scientifically sound forecasting framework to develop harmonised middle and long term baseline and alternative policy scenarios***.

In order to ensure the implementation of the SD strategy across the enlarged EU and at the world level, ***partners from all over the enlarged EU*** are involved in the proposed support action, and linkages to modelling communities outside of Europe are suggested. Indeed, workpackage 4 aims at interactions with non-European modelling communities in order to include new ideas and results as well as to stimulate global efforts for improving the capability of economic models to deal with sustainability issues. TranSust.Scan emphasises thus the importance of a strong dissemination component by establishing communication channels with non-European institutions, in particular in North America and Asia.

Summarising, TranSust.Scan represents a Specific Targeted Research Project that precisely addresses Task 3 ***"Underpinning the economic potential and cohesion of a larger and more integrated European Union"*** of the Priority "Policy-oriented research Scientific support to policies – SSP", enhancing European competence and expertise for dealing with the emerging extended facets of sustainability and their implications for policy design. TranSust.Scan thus supports strategic policy preparation for the European Union in order to improve the implementation of the European Sustainable Development Strategy. In this sense, the proposed project also corresponds to the overall framework of the SSP, respecting its specific principles, in that it supports "the formulation and implementation of Community policies, by providing scientific contributions to policies that are targeted precisely on needs ("demand-driven"), coherent across the various Community policy areas, and sensitive to changes in policies as they take place".

TranSust.Scan has a strong quantitative and economic orientation with links to interdisciplinary and qualitative analyses for dealing adequately with the wide range of sustainability facets proposed.

5 Potential Impact

The main impacts

The proposed project is expected to have a strong impact in creating a new perspective on the field of sustainable development. TranSust.Scan addresses thus a crucial policy domain of the European Union. By widening the conventional sustainability dimensions with additional aspects that have emerged as important in setting the floor for a comprehensive analysis, more adequate and successful strategies for the transition to sustainable economic structures can be developed. Currently available models will be extended as to the multifunctionality aspect of sustainability policies and their trade-offs with other policies. In addition to the traditional economic, environmental and social issues the expanded models will address the new policy agenda as put forward by the Lisbon Strategy of the European Union and the World Summit for Economic Development. The models will, therefore, be able to deal with competitiveness, economic development, security, the preparations for Beyond-Kyoto policies, the interaction between technological change and the use of natural resources, as well as the emerging social problems related to health and aging. Based on the insights regarding the extended sustainability aspects and in close dialogue with stakeholders as well as relevant international organisations, a range of future policy scenarios will be designed to address strategic policy options. As a consequence, TranSust.Scan is expected to provide the following main strategic impacts:

- ***Support for resolving Europe's economic, environmental and societal problems***, by
  - increasing the awareness on the implications and interactions of sustainable development,
  - highlighting the coherence and consistency of how different variables move together,
  - identifying the key variables for different future policy scenarios by understanding the links between the different forces,
  - enhancing the reflection on possible roads to sustainable development,
  - reinforcing Europe's competitiveness by including competitiveness issues in sustainability considerations.
- ***Support in form of strategic policy preparation for the European Union***, in particular in the context of the ***European Sustainable Development Strategy***, by
  - designing a range of alternative and desirable future policy scenarios,
  - providing a forecasting framework for policy scenarios,
  - enabling backcasting from a specified target for identifying the matching policy paths,
  - making the methodology and databases of the scenario analysis available to institutions involved in policy-making,
  - deriving a set of policy relevant recommendations.

In brief, TranSust.Scan aims at enhancing European competence and expertise for dealing with the emerging extended facets of sustainability and their implications for policy design. Besides supporting strategic policy preparation for the European Union the dissemination activities will address non-European institutions, in particular in North America and Asia.

Innovation-related activities

TranSust.Scan is based on conventional economic modelling, as it uses a set of well-known economic models. Nonetheless, building upon existing work by well-known research institutions like the OECD, EEA, IEA and JRC, the proposed project goes beyond this mainstream approach. In particular, TranSust.Scan extends and links the available models in order to better capture the numerous sustainability facets.

In addition, participatory approaches are integrated as the identification of future policy visions emerges in mutual cooperation with relevant stakeholders, Commission services and international organisations.

Finally, TranSust.Scan stresses the communication and dissemination of existing insights and new results, by continuously searching the dialogue with involved stakeholders and organisations all over the world and making its findings, the applied methodology and databases available to institutions involved in policy decision-making. The used dissimeniation strategy will be explained in detail below.

Summarising, the proposed project adopts an innovative approach, combing quantitative and qualitative elements, and consulting, where appropriate, multi-disciplinary analysis, while maintaining a consistent and integrated approach. Through this innovative activities, the policy-relevance of the project will be maximised.

The dissemination plan

In order to ensure optimal use of the proposed project, strong emphasis is given to the dissemination of information, existing research results and new insights.

This dissemination will be strengthened both within and outside the network of project partners itself. Indeed, in particular, the second strand of information flow is considered important in order to ensure optimum dissemination of results to the larger community interested in sustainability issues.

For this purpose, the dissemination plan of TranSust.Scan is based on four main components:

- The **Internet**

  To enable a wide diffusion of the insights collected and obtained within TranSust.Scan, the Internet will be used as the main communication tool within and beyond the network. The website coordinated by TranSust.Scan will build on the already existing Internet page of the TranSust project, which has become a well-established platform of information exchange for people interested in the transition to sustainability. In addition to the possibility of information exchange and communication, the website will also act as a fast publishing platform that makes results and insights of the current project available in the fastest way in order to support the improvement of strategies aimed at sustainable development.

- Several **scientific events**

  In order to increase the communication among the different research groups involved in the proposed project and to open its discussions to the wider research and policy community, both on a European and a global scale, the organisation of several small meetings, a number of workshops plus two conferences is envisaged. In particular, two small meetings are foreseen to foster a close cooperation with stakeholders, Commission services, and international organisations in a participatory approach. Furthermore, three scientific workshops are planned, where the existing research and new insights will be disseminated. The final conference will draw the lessons learnt during TranSust.Scan and

highlight the insights gained for the support of current and future policy decisions. In particular, it will be specified how the results of the project translate into support for the design of research and policies of the European Commission. In addition, future research needs will be identified in cooperation with invited policymakers.

- A series of **working papers**

  In correspondence to the work packages and its Tasks, a series of working papers will be prepared to ensure the best use of the envisaged activities. These working papers will be developed during the project and immediately made available to the wider scientific and policy community. In this way, the progress of the project will be disseminated without delay. The working papers will serve as references on the new topics dealt with in the project, and are therefore aimed to support decisions on current policies.

- A **final publication in book form**

  In addition to the quick dissemination of the working papers, the main insights and corresponding policy recommendations gained from the project will be collected in a final publication. This final product, in book form, will be an edited collection of articles summarising both the main existing research and outlining the potential improvements of the extended sustainability aspects. The publication should serve as a reference on sustainability scenario building, including findings on the design of models for sustainability issues while having the objective to be accessible, objective, and come to be viewed as a casebook of use to the policy community and academics.

The added value in carrying out TranSust.Scan at a European level

Sustainability is clearly a challenge that requires action at a national, regional and global level. Given the various dimensions of sustainability, comprising economic, environmental and social issues, a multi-disciplinary approach is necessary to deal with the complexity of the target. As a consequence, research and new thinking has been conducted all over the world, within a range of scientific disciplines, with the same overall goal, namely enabling the transition to sustainable structures by shedding more light on potential future scenarios. However, notwithstanding the strong research focus on the field of sustainable development, the communication among the different research groups and with relevant stakeholders has been weak. Only recently, through the project TranSust, first links across the modelling community have been initiated. During the project, the necessity of extending the discussion and learning from additional research institutions has been highlighted. In particular, recent policy developments such as the enlargement of the European Union and increased globalisation have demonstrated the need to deal with sustainability issues at a European level, including both research and policy institutions and involved stakeholders. Based on these considerations, TranSust.Scan covers a broad range of European countries to improve the mutual exchange of information on sustainability requirements and policies.

The consortium of the proposed project includes the leading European research institutions, and their position implies that they are also involved in other national and/or international research activities. These research activities cover a wide range of issues related to economic, environmental and social questions. This link is thus important for the proposed project, given the strong dissemination component. In order to support activities both for the design of research and policies of the Commission, TranSust.Scan indeed has a strong focus on collecting and disseminating existing research. In correspondence to the main scientific objective, i.e. the extension of the conventional sustainability aspects, a large number of issues and disciplines are involved. Existing national and/or international research activities in the field of the relevant sustainability issues are

therefore taken into account in order to ensure the most comprehensive approach to support decision making. In particular, the possibility of benefiting from existing cooperations with research groups and stakeholders within national or international research activities improves the expected outcomes of the project.

The added value in involving non-European research groups in TranSust.Scan

TranSust.Scan will foster interaction with research communities outside of Europe in order to ensure the achievement of the most comprehensive knowledge on aspects related to the transition to sustainable economic structures. An important aim is to extend the network of excellence for research groups interested in sustainability issues that has been initiated by the TranSust project to include experts from other countries and disciplines. External quality assurance and access to information from the non-European community represent the main implications of this strategy. Given a broader base of knowledge, the impact of the whole project is expected to increase in two ways: European knowledge on the design and implementation of sustainability policies will be made accessible to non-European partners who in turn will provide their expertise for judging the operational ability of sustainability strategies in non-European environments.

Summarising, the proposed project emphasises three components in order to ensure an optimal exploitation of its results:

- A strong focus on ***communication*** within and beyond the project consortium.
- A strong focus on the ***involvement of relevant stakeholders*** to maximise the project's policy relevance.
- A strong focus on ***dissemination*** of the insights gained for fostering consensus building about desirable policies.

Based on this strategy, TranSust.Scan is expected to provide major decision support for the EC by improving the understanding on the complexities of sustainable development and identifying future policy scenarios aimed at supporting the ***European Strategy for Sustainable Development.***

6 Project management and exploitation/dissemination plans

6.1 Project management

Let us now briefly describe the organisation, management and decision making structures of the project.
The management structure of the TranSust.Scan project consists primarily of four levels:

- **Scientific board**

  The project will be overseen by a scientific board. This board will be composed of the senior researchers of consortium, and in addition, Raymond J. Kopp**,** Senior Fellow at Resources for the Future, Washington D.C., will be part of this board. On the one hand the involvement of Mr. Kopp ensures external quality assurance, and on the other hand TranSust.Scan gains access to information from the US research community trough this external adviser, thus increasing the impact of the whole project.

  The board as a whole will steer the project, assess its progress and assure the quality of deliverables. The board will be regularly informed by the project co-ordinator and will meet every six months. In some cases we will make use of telephone and video conferences.

- **Project co-ordination**

  Austrian Institute of Economic Research (WIFO). Stefan Schleicher, professor of economics, will be responsible for overall management and together with the scientific board for assuring the quality of the workpackages of the project. He will be assisted by a research fellow and a staff member of WIFO responsible for administrative tasks.

- **Workpackage leaders**

  The workpackage leaders take the lead role in the workpackages and also co-ordinate the outcome of the sub-tasks to ensure that the objectives of the workpackage as whole and not only those of the sub-tasks are fulfilled. The workpackage leaders have to report periodically to the project co-ordinator

- **Lead participant for tasks**

  Based on the projected workplan and on the detailed workplan which will be completed after the kick-off meeting, the lead participants take the responsibility for the research in the tasks and ensure – together with the contributing participants – the fulfilment of the main scientific objectives. The lead participants report periodically to their workpackage leader on the work done and planned.

Since most of the many project partners are involved in almost all workpackages, special efforts will be made to safeguard the timetable of the workplan. A tool on the intranet of the project will serve both to exchange the information flow among the project partners and to maintain the timetable.

6.2 Plan for using and disseminating knowledge

6.2.1 Communication

The kick-off meeting in month two of the project will lay the basis for all further communication. As an integrating internal communication tool and as a means of dissemination the project results will serve the project's website. Workpackage leaders are required to report to the project co-ordinator every second month about the progress of the work. The project co-ordinator himself will continuously update the homepage

based on the information he gets. As a consequence, all participants are informed – at all times – about the current status of the project. In accordance with the principle of subsidiarity, no formal rules for communication within each sub-task will be imposed, since this presents the risk of increasing the burden of co-ordination costs beyond tolerable levels.

External communication will focus on producing working papers that end up in journal articles and a book. In addition project results will be presented at various conferences, in particular the final conference and meetings with Commission services.

The communication strategy of TranSust.Scan is based on the existing infrastructure of TranSust, which has proven to be very useful. The intranet section of website has increased the exchange of information among the project partners, and will be particularly important for the proposed STREP given the strong dissemination component. Indeed, in order to ensure a comprehensive overview of existing research in the various workpackages, all the information collected by the partners will immediately be put on the website. In addition we can observe an increasing number of hits to the public section of the TranSust website which has become a depository of new research results on sustainability modelling.

6.2.2 The plan for the management of knowledge, of intellectual property and of other activities arising in the project.

TranSust has gained over the past two years considerable experience in managing and disseminating knowledge. We realised the importance of communicating internally in workshops, via working papers and the internal website. Given these experiences we will continue using standardised questionnaires for producing joint research reports which undergo internal and external peer review. These reports finally evolve into publications for journals and books.

The TranSust website has emerged also an important communication tool to the outside. We will continue expanding this website as a knowledge base for all issues and references related to sustainability modelling.

The internet holds thus a crucial position in managing and disseminating knowledge. Given that the knowledge of consolidated centres of excellence and those in the process of strengthening their scientific standing should be further integrated, enhancing thus the level of co-operation across disciplines and geographical spots the collaboration in the proposed action will mainly involve groups acting at a distance. The degree of communication and co-operation within the virtual centre of excellence depends thus on the establishment of an e-infrastructure.

With this assumption in mind, TranSust has developed an interactive web site operating as a knowledge management platform. That offers the appropriate IT tools to address the management/co-ordination and dissemination/interaction activities of the proposed project. Besides, it is essential as a means to save money on travels (e.g. because it makes meetings among the partners less necessary) and optimise time. The knowledge platform is designated to serve many purposes.

Let us now briefly summarise the three main components of TranSust.Scan's plan for the management of knowledge, of intellectual property and of other activities arising in this project:

The internet as a knowledge management platform

- Intranet service. We believe it is important to develop an intranet facet where partners can meet and exchange internal information (scientific and structural).

The internet as a knowledge dissemination platform

- Dissemination of information. Clearly, the activities conducted by TranSust.Scan must be visible to all parties interested. Information will be presented in a friendly and easy downloadable way, considering the necessities of the general public and those willing to study in depth the issues at stake.
- Documentation of existing research. In order to support current and future decisions on EC policies and indicate key future research needs, TranSust.Scan's knowledge platform will serve as an essentially informative tool covering existing research from inside and outside of Europe.

The management of Intellectual Property Rights (IPR)

Rules concerning knowledge management and intellectual property rights are designed on the basis of the principle of full compliance with the EC FP6 rules, as defined in the EC Regulation No 2321/20024.

6.2.3 Linkage of the projects FORESCENE and TranSust.Scan

The Commission advised the consortium of TranSust.Scan to exploit synergies - such as the topic of natural resources - with the project FORESCENE by establishing links, since there is substantial complementarity between both projects as to the topics, methods and dissemination plans.

In several meetings representatives of FORSCENE and TranSust.Scan planned to have the following joint activities:

- All meetings will be open to all partners of both projects.
- Some joint sessions will be foreseen in the meeting schedules, for example back-to–back kick-off meetings will be organized with some time devoted to interactions between the two projects.
- Any other means for exchanging information will be used, in particular access to internal documents on the project websites.
- A Common Advisory Group will be set up and will be composed of external experts and the coordinators of both projects.

7 Workplan– for whole duration of the project

7.1 Introduction - general description and milestones

Although TranSust.Scan is embedded into the existing research network that has originated from the FP5 project TranSust, it is not a continuation of the previous project. The TranSust community however will provide the available models for extending the analytical framework to deal with facets of sustainability beyond the traditional economic, environmental and social dimensions.

Wherever adequate, interdisciplinary approaches and qualitative judgements will be used for enhancing the policy support expected from this project.

Key milestones of the project, therefore, will involve conceptual and analytical work on the issue of extended facets of sustainability, the development of policy scenarios based on a consultation process with European stakeholders, and close interactions with non-European Institutions.

7.2 Design of workplan

The project will be conducted over 30 months and organised in five work packages with the following contents:

- ***Workpackage 1: Integrating and extending the analytical framework***
  The core models of TranSust are prepared for Impact Assessment (IA) and joint policy simulations.
- ***Workpackage 2: Dealing with extended facets of sustainability***
  The traditional economic, environmental and social dimensions of sustainability are extended.
- ***Workpackage 3: Developing policy scenarios***
  Based on a consultation process with stakeholders and a harmonised baseline a wide range of policy simulations is generated.
- ***Workpackage 4: Interactions with non-European institutions***
  The issues and results of the project will be presented for feedback to relevant institutions in the United States, Australia and Japan.
- ***Workpackage 5: Management, internal and external dissemination***
  The management tasks involve quality assurance within the project and the communication with stakeholders.

The design of the workpackages emphasises a participatory approach by establishing an accompanying consulting process with stakeholders that serves shaping the policy scenarios and evaluating them as to their desirability and policy relevance. Similarly all project partners participate in all workpackages (except in the management tasks) in order to foster capacity building and to make use of the full knowledge capital of the project network.

7.3 Design of workpackages

7.3.1 Workpackage 1: Integrating and extending the analytical framework

Workpackage Leader: IVM
in cooperation with all modelling groups

The first workpackage is devoted to develop the analytical framework for consistent scenario building by preparing the core models that are currently available in the TranSust network for the policy simulations. The following modelling projects provide models on national, European, and global scales for this task:

- DEMETER
  an integrated assessment model emphasizing learning effects for energy technologies.
- FEEM-RICE
  an integrated assessment model featuring different forms of technological change.
- IMACLIM
  a static CGE model with varying elasticities of substitution.
- PACE
  a dynamic CGE model including rational expectations.
- DART
  a dynamic CGE model generating off-steady state growth paths.
- MARKAL
  a highly disaggregated energy technology model.
- GAIN
  a macroeconomic model focusing on stock-flow interactions.
- W8-D
  a macroeconometric model with disequilibrium specifications.

These core models will be augmented by a number of satellite models that are the outcome of the extended sustainability analysis in Workpackage 2.

This procedure for providing the analytical framework for the policy simulations reflects the insight that there is no specific model that fits all requirements for a comprehensive and scientifically sound analysis of sustainability issues but rather a package of models and methods depending on the policy measures or issues to be assessed and the availability of data.

Since the common evaluation criterion for all types of policy simulations will be Impact Assessment (IA), this feature will be an essential part in preparing the core models for the joint model applications.

Task 1: Preparing the core models for Impact Assessment (IA) and policy simulations

Leading Partner: ZEW
in cooperation with all modelling groups in the TranSust.Scan consortium

Two integrating activities are necessary for preparing the core models for the policy simulations. First, the models will be extended, if necessary, as to the list of variables needed for *Impact Assessment (IA)*. Second, matching input variables will be defined for the forecasting, simulation, and backcasting analyses. The result of this task will be a comprehensive analytical framework that integrates the comparative advantages of various model designs and emphasises issues related to sustainability.

Impact Assessment (IA) in terms of a “careful assessment of the full effects of [any larger] policy proposal [that] must include estimates of its economic, environmental and societal inputs inside and outside the EU” is now mandatory for all major EU policy initiatives. The argument behind this is that *SIA* can improve the sustainable development coherence of policy initiatives across various areas by identifying spillovers and inter-linkages. Numerical (quantitative) models accommodate the systematic and rigorous assessment of

the many forces that interact in society and ecology thereby determining the ultimate economic, environmental and societal impacts of policy interference. In general, there is no specific model that fits all requirements for comprehensive *SIA*, but rather a package of models (or methods) depending on the policy measure or issue to be assessed and the availability of data.

Against this background, the TranSust network has already reviewed the various complementary model approaches of the project partners with respect to the coverage of key indicators listed in policy-relevant benchmarking systems (e.g. the CSD theme indicator framework by the United Nations or the structural indicators by the *EC*). In addition, the EC and Belgian Ministry of Scientific Affairs organised in 2001 a workshop to give an overview and classification of tools and methodologies for underpinning SD policies. A set of models was presented and their contribution to SD policy discussed with respect to their ability to take into account five methodological criteria which are of crucial importance as far as SD issues are considered: risk and uncertainty, interdisciplinarity, glocality (globality/locality), long-term and stakeholders' participation.

Given this background, the main activities within Task 1 are:

- The increase of the range of indicators covered by the various models either by systematic (complementary) inter-linkages or by straightforward specific model extensions.
- The matching of input variables as a prerequisite for joint model application for forecasting, simulation, and backcasting.

Task 2: Linking core and extended models

Leading Partner: FEEM
in cooperation with all modelling groups in the TranSust.Scan consortium

The outcome of Workpackage 2 that is dealing with extended facets of sustainability will be for specific topics a number of complementary satellite models that need to be linked to the core models. Different methodologies to link satellite models will be explored. One approach that is analysed in more detail is the decomposition approach. In essence this involves an approximation of the satellite model by numerical differencing. This approach provides a clear-cut interface between the core models and satellite models with two advantages: The information contained in a satellite model of any complexity will be condensed in a set of interaction equations that will only modestly increase the computational needs of the augmented core model. This methodological approach for dealing with extended sustainability aspects provides a comprehensive and flexible modelling framework for dealing with a wide range of environmental issues. Options to use numerical differencing to link core and extended models of Workpackage 2 will be explored.

Linking, thus, the core and extended models in Task 2 requires:

- Defining the interface between core models and satellite models for extended sustainability aspects.
- Generating by numerical differencing the interaction equations that describe the link between the two type of models.

Task 3: Sensitivity analysis

Leading Partner: ZEW
in cooperation with all modelling groups in the TranSust.Scan consortium

Systematic sensitivity analysis will be another methodological feature that enhances the robustness and scientific quality of the model simulations. Several approaches will be

used depending on the type of model and computing requirements. We will consider for evaluating the sensitivity of key parameters (e.g trade elasticities, energy demand and supply elasticities) both non-stochastic approaches, such as variation within certain ranges, and stockastic approaches, such as Monte Carlo and Gaussian quadrature type methods.

Evaluating the sensitivity of model simulations Task 3 will involve:

- Deterministic approaches for sensitivity analysis based on varying the key parameters within a defined range.
- Stochastic approaches for sensitivity analysis based on Monte Carlo and Gaussian quadrature type methods.

Task 4: Documentation of simulation methodology and results

Leading Partner: WIFO
in cooperation with all modelling groups in the TranSust.Scan consortium

Transparency and reproducibility of all policy simulations will be given top priority. All stages of a simulation exercise will be thoroughly documented and made available on the TranSust website.

Task 4, therefore, will deal with a comprehensive documentation of all stages of the policy simulations as:

- Consultation process with stakeholders.
- Consensus building for simulation of baselines and the range of scenarios.
- Documentation of analytical modelling framework and databases.

7.3.2 Workpackage 2: Dealing with extended facets of sustainability

Workpackage Leader: IfW
in cooperation with all modelling groups

This workpackage extends the traditional economic, environmental, and social dimensions of sustainability. A number of additional dimensions, as competitiveness, technological change, economic development, and the use of natural resources, as water and soil, and the issues of security have emerged as most relevant in the context of policies targeted towards sustainability.

Five tasks will investigate these new issues as to the requirements for modelling. Both methodological work regarding the extension of current economy-environment models and steps toward implementing these extensions will be done. The overall objective is to expand existing models in order to enable Impact Assessment.

All tasks are structured along the following criterions as to their policy relevance:

- **Desirability of sustainability**
  This criterion concentrates on the reasons why one wants to be sustainable, dealing thus with aspects related e.g. to welfare and intergenerational equity.
- **Feasibility**
  This criterion checks for limits caused by the interaction of various measurement indicators and their trade-offs.
- **Implementation**
  Under this criterion policy instruments are investigated as to their adequacy for implementing a certain policy paths.

- **Generalisation**
  This criterion verifies whether the insights found in specific policy area could be widened to a broader range of policies.

Task 1: Competitiveness and sustainability

Leading Partner: ZEW
in cooperation with IfW.

Competition and sustainability can be seen as a first extension of the traditionally used dimensions of sustainability.. In fact, the topic has been on the agendas of governments since the 1990s. Environmental policy measures are often accompanied by the fear that they will entail negative competitiveness effects and lead to financial losses of domestic firms or in the worst case a relocation of „dirty" industries to countries with less stringent environmental regulation. Especially with the ongoing process of globalisation, characterised (among other factors) by increasing international trade flows, the interaction between environmental policies and international competitiveness is becoming more important, and needs to be analysed. In this context, the energy system has an important role to play in terms of improving the competitiveness of European enterprises. This task will investigate how the energy issue can be dealt with in an adequate analytical framework. The aim is to show how economy/environment models can be used for a comprehensive analysis of competitiveness effects of relevant policy measures, and to develop such models. This requires an analysis of the link between macro-economic and trade models that are able to assess competitiveness effects, e.g. via the channel of international trade on an international level and sectoral models that focus more on the detailed effects on the sectoral level. Such a comprehensive analysis has to take into account the different national and international aspects of competitiveness, considering thus impacts of international and national policies that induce internal and external imbalances.

The core activities within Task 1 are:

- The derivation of meaningful competitiveness indicators and a corresponding assessment regarding which models are especially fitted to deal with these indicators.
- The assessment of analysis tools for policies aimed to improve the position of the EU economy in combination with the development of sustainable energy strategies; e.g. market for renewables, market-based energy policies, etc.
- The assessment of the performance of models that can address the issues crucial for competition and sustainability.

Task 2: Technological change and sustainability

Leading Partner: FEEM
in cooperation with LIFEA and WIFO

This task focuses on the key role of technological change in the transition to sustainable economic structures. In particular, the following issues will be addressed: Inertia, uncertainty, diffusion; learning curves; and parameterisation.

The key role of technological change in the decline of energy and carbon intensities of aggregate economic activities is widely recognised. This has brought great attention to the issue of modelling endogenous technological change, and, with few exceptions, this is done in a completely deterministic framework. Nevertheless, technological change is a dynamic process which is uncertain by nature. The two main vectors of technological change, learning through R&D investments and learning by doing, evolve and cumulate in a stochastic manner. In addition to this, the effect of technological progress on the

processes of decarbonisation and of energy saving is inherently uncertain. This is due to lock-in/lock-out effects, which may produce lag times between new discoveries and the diffusion of the new technology, as well as to cluster diffusion of technology. Overall, this results in the inertia, as well as in the uncertainty, characterising the dynamics of these macro phenomena. Thus, accounting for uncertainty is crucial when designing optimal climate policy strategies, in terms of optimal abatement efforts and of R&D expenditures.

A further issue to be analysed relates to learning or experience curves that describe technological progress as a function of accumulating experience with the production and the use of a technology during its diffusion. Learning curves have been suggested as meaningful presentations of technological change in economy/environment models, and their strengths and weaknesses in the context of a sustainability perspective are to be investigated.

The core activities of Task 2 are:

- An assessment of the role of uncertainty and how it can be incorporated in the modelling of endogenous technical change in order to produce more reliable forecast.
- A review of existing research on learning curves and their role for sustainability.
- The identification of key problems related to the parameterisation in order to outline future research needs.

Task 3: Economic development and sustainability

Leading Partner: SMASH
in cooperation with IVM, LIFEA and IEEP

Developing countries will be decisive in shaping the success of the EU strategy focused on sustainable development. Although they face a drastic increase in environmental pollution, as e.g. in greenhouse gas emissions, mitigation actions do not rank high among their priorities. The relative unwillingness with which the majority of developing countries approach executive policies aiming at sustainability issues stems from their different understanding of preferences regarding economic development. The obvious reason lies in the necessity for them to continue the development process, which is characterised by pressing needs other than emission control. Being economically poorly or less developed, they tend to give priority to economic growth rather than to ecological issues, even at the expense of devastating their natural environment. Therefore the key question is whether or not the environmental policy provides an opportunity for their economic development.

The only way to accelerate the participation of developing countries in environmental policies – and therefore to come closer to the goal of a global sustainable development – seems to be the design of strategies which enable their economic development. Conditions should be created that are conducive to environmental protection and sustainable growth on a global scale. Greater emphasis must therefore be placed on elements such as international equity and economic development. In particular, an approach should be adopted which starts from the viewpoint of development and not climate change mitigation. A first step is to prepare a development strategy for a country and to consider where in this strategy the measures to reduce greenhouse gas emissions can be integrated. This approach is also sometimes referred to as "sustainable development policies and measures" or "development first" and is particularly attractive for developing counties, as has also been confirmed by various research studies.

The core activities within Task 3 are:

- An overview on and the analysis of "development first" architectures.

- The identification and assessment of possible sustainable development policies and measures.

Task 4: Natural resources

Leading Partner: UniHH
in cooperation with ECN, IfW, FEEM and CSIC.

Substitutability and irreversibility are core concepts of sustainability. Food, soil and water cannot be substituted for, and extinct species are gone forever. Natural resources are therefore at the centre of any discussion on sustainability. But potential measures to reduce environmental pressure also affect natural resources, for example if forests are used as carbon sinks or agricultural land to grow biofuels. Indeed, in the near future climate change - and measures against climate change - will affect all sectors and activities, including forestry and terrestrial biodiversity. Forests will suffer new stresses due to a changing environment, and the same will be true for entire spectrum of animals and plants living in terrestrial ecosystems.

Four activities will be developed, each building on previous and ongoing projects funded by DG Research and other agencies. Firstly, the linkage between economy-environment models and natural resources models will be investigated. In particular, we will apply the GTAP community CGE model and the global land and water use model developed in Hamburg and Venice to questions of scarcity of food and water. Alternative scenarios of population growth and technological progress, and policy scenarios on environmental regulation and other issue (e.g., trade liberalisation) will be used. Secondly, we will look at trade-offs between the growing of food and biofuels, and reduction of carbon in the EU, candidate countries and neighbouring countries. In this as well as other contexts, the EU-FASOM model will again be used to analyse alternative scenarios of environmental regulation as well as other developments (e.g., further enlargement, CAP reform). Thirdly, the inclusion of biodiversity will be studied. In particular, the possibility of extending existing models to include a simple model of biodiversity will be investigated, so that the trade-offs between human expansion (particularly in developing countries) and nature on a global scale, and between food / fuel / carbon and nature on a European scale can be explored. Fourthly, special attention will be given to the issue of CCS (carbon capture and storage),

Many existing efforts to include a range of natural resources in environment/economy models are as yet unlinked or only partially linked, and this task aims to bring them together.

The core activities within Task 4 are:

- The overview and assessment of existing modelling approaches in the context of natural resources, with a focus on land, water and biodiversity.
- The assessment of existing attempts to link natural resources to environment/economy models, and of their potential for a wider applicability (according to the ideas outlined above).
- The identification of data requirements and conceptual problems in order to outline directions for future research.

The objective is to integrate natural resources such as land, water and biodiversity in an analytical framework in order to obtain a better understanding of their interactions.

Task 5: Security and sustainability

Leading Partner: ECN
in cooperation with SMASH

The establishment and/or maintenance of economic and social security constitute aspects of sustainability that are often neglected in scientific and policy debates on sustainable development. In particular, the issue of whether a secure energy supply can be guaranteed in the long run (nationally or internationally) contributes to the level of sustainability societies can reach. Not only the access to various energy resources, but also the volatility of fuel prices for different energy alternatives, determine how secure a country can be in its ability to acquire and afford the energy it needs to fuel its economy. The capacity of a country to provide its economy with necessary energy resources also contributes to determining the welfare level it may reach. International cooperation, both at the EU level and on a global scale, remains one of the keys to enhancing energy security, and thus to the sustainability that a country may attain. While it may not be straightforward to quantify the social and economic dimensions of energy supply security, in the context of this proposal it is intended to continue to include aspects of energy security in the broader analysis and modelling of sustainability.

The core activities within Task 5 are:

- An overview and assessment of existing research on energy supply security.
- An outline of a proposal for improving energy security considerations in current modelling approaches
- Identification of potential policies aimed at improving energy security.

7.3.3 Workpackage 3: Developing policy scenarios

Workpackage Leader: UCD
in cooperation with all modelling groups

Based on the analytical framework established in workpackages 1 and 2 the following procedure will be applied for generating a wide range of policy scenarios that serve the purpose of strategic policy preparation in particular in the context of the European Sustainable Development Strategy:

- A **consultation process** will accompany all stages for developing the policy scenarios, ranging from the design, the evaluation, and the consensus building for certain policy strategies.
- The **time horizon** for all analyses will be a medium and long term range 2015 – 2030.
- The **scenario building** work will involve
  - ***forecasting*** of future states given the implementation of currently know policies,
  - ***simulation*** of deviations from business-as-usual strategies
  - ***backcasting*** the policy patterns needed for achieving certain policy targets.
- The **common evaluation criterion** for all scenarios will be *Impact Assessment (IA)*.

Task 1: Consultation process with stakeholders

Leading Partner: WIFO
in cooperation with all partners of the TranSust.Scan consortium

A consultation process with stakeholders will accompany TranSust.Scan over the whole project period and will involve Commission services and other institutions interested in the outcome of the project.

This consultation procedure will be used to

- provide information about the implementation of currently envisaged policies,

- contribute to the development of harmonised middle and long term baselines,
- identify a number of precise targets or desired states for backcasting the matching policy paths, and
- build a consensus for desirable policy options.

This consultation process will be activated at all stages of the project that require the above indicated inputs and communication.

Task 2: Harmonised baseline (2015-2030)

Leading Partner: IVM
in cooperation with all partners of the TranSust.Scan consortium

A harmonised baseline will serve as a benchmark for a wide range of policy scenarios. The baseline will cover the period 2015 – 2030 and will be implemented in all core models.

Main activities of this task will involve:

- Collecting information from the consultation process with stakeholders
- Agreement about the implementation of currently decided or planned policies
- Identifying and coping with differences in individual model forecasts

Task 3: Promotion of low carbon technologies

Leading Partner: ECN
in cooperation with IVM and WIFO

A wide range of scenarios can be summarised as low carbon strategies with substantial impact on technological innovation, competitiveness, economic growth, resource use, and security of supplies.

The detailed profile of the simulations will be developed in the framework of the consultation process with stakeholders. Key elements of the scenarios will be:

- The dynamics of energy services for consumption and production.
- Technology options for application and transformation of energy with emphasis on buildings and cogeneration.
- Targets for raising the share of renewables in energy supply and the matching policy patterns obtained from backcasting.

Task 4: Stimulating innovative mobility systems

Leading Partner: UCD
in cooperation with ECN

Current transport and mobility systems play a critical role in the growth of our economies, the state of our environment and impact significantly on the use of fossil fuels and thereby related security of supply issues. Similarly, the structure of future mobility systems for the transport of individuals and goods on urban, national and international pathways will undoubtedly impact strongly in each of these aforementioned areas.

As such a range of scenarios will be developed to look at the sustainability or otherwise of current mobility systems, the impact of new policies and changes from the current ‘business as usual’ systems, and finally, the mobility systems required to achieve desired sustainable policy targets.

Scenario development will adapt based on information gained from stakeholder consultations, however an initial 'non-exhaustive' list of issues to be incorporated into the range of scenarios would include:

- Demand and supply side measures for influencing trip reduction and reducing the amount of mobility services used in the mobility of persons and goods.
- Demand and supply side measures for influencing the modal split of the transport sector.
- Targets for the fuel efficiency of cars and the matching penetration dynamics of corresponding technologies.
- Incentives for improved penetration of alternative fuels and vehicle technologies across all modes.

Task 5: Identifying Beyond-Kyoto policies

Leading Partner: FEEM
in cooperation with ECN, UniHH, UCD and ZEW

With the Kyoto Protocol in force since February 16, 2005, climate policy has gained new momentum. This range of policy simulations aims at examining strengths and weaknesses of alternative designs of global agreements to combat climate change after the Kyoto period 2008-2012.

In cooperation with stakeholder consultation the core activities within Task 5 will encompass:

- An overview on and the analysis of alternative climate policy architectures for the post-Kyoto period.
- The assessment of alternative climate policy targets for the post-Kyoto period.
- The identification and review of possible policy options for the post-Kyoto period.

A range of policy options will be analysed by this task. In addition to the rather traditional policies, such as emissions trading, a variety of other policies will be discussed, mainly based on stimulating technological innovation. Particular attention will be given to carbon capture and (geological) storage (CCS). Since one of the main options will be to store underground (rather than in the ocean), CCS affects water (acidification), which again has detrimental effects on soil and potentially biodiversity too. Thus CCS is a example for applying a multidimensional approach for assessing the complex implications from implementing this technology.

Task 6: Strengthening social coherence

Leading Partner: SMASH
in cooperation with LIFEA, IEEP, UniHH

This task aims at examining how the social dimension of the sustainability agenda is or could be treated in currently available models, and at deriving methodological proposals to upgrade this treatment (modifications of existing models, coupling with other models, new generation of models). This social dimension of sustainability often works synergistically with the environmental dimension but its main drivers may be different in nature. This forces us to enter a dialogue with modellers specialised in fields other than energy and environment. Representing the focus of Task 6's core activities, the following issues will be explored as to adequate and operational approaches for developing model components:

- Evolution of the pyramid of ages, as a consequence of demographic population dynamics including the impact of migration internally to EU 25 and between EU 25 and the rest of the world.
- Income distribution and social exclusion due to imbalances in the access to basic infrastructures or accelerated migration flows.
- Impact of aging and of domestic and cross-country population dynamics on :
  - final demand in terms of energy intensive goods and services
  - demand for health services and other care services
  - infrastructure requirements (health systems, energy, transportation)
- Impact on the formation and direction of saving capacity and its implications on trade and capital flows, insurance systems and on the funding of infrastructure, social security systems and environmental policies,

These components will also be helpful in upgrading our understanding of the internal and external vulnerability of European societies to external shocks such as the volatility of energy prices and environmental hazards (including health impacts) in the context of an aging population.

7.3.4 Workpackage 4: Interaction with non-European institutions

Workpackage Leader: FEEM

This workpackage continues to promote one of the main objectives already set within the first phase of the TranSust network, namely the interaction with research and policy institutions outside of Europe. In particular, this activity is aimed at augmenting the perspectives on sustainability issues and on related future policy scenarios.

Indeed, in the first phase TranSust has benefited greatly from communication with the modelling community in the United States, which has proven to be particularly valuable for comprehensive discussions. These contacts of the extended TranSust.Scan consortium will be expanded in the second phase to Japanese and Australian research institutions, stakeholders an policy experts in order to exchange new perspectives both in the context of modelling and policy issues.

The core activities of Workpackage 4 are:

- Extension of the current network of modelling groups devoted to sustainability issues to non-European scientific communities
- Increasing communication, information exchange and dissemination of existing research among European and non-European research institutions.
- Assuring quality of the project's outcome through peer review by the participating non-European institutions.
- Exchanging information about policy issues addressed in the simulation exercises conducted within the TranSust.Scan project.

This interaction will be most evident at the workshops, and especially at the conferences organised by TranSust.Scan where selected leading sustainability experts not directly involved in the project will serve as scientific advisers. In addition, the non-European institutions will be asked to react to the ongoing work of the project. They will contribute relevant information on the issues of the first three workpackages in order to improve the overview on existing research and the identification of future research needs. Furthermore, they will be asked to prepare comments on the periodical reports of the Workpackage Leaders in order to ensure the scientific quality and policy relevance of the project's outcomes.

The interaction with non-European institutions will serve several aims:

- It will expand the knowledge of existing research on sustainability modelling that has been done within the TranSust community by including all major research groups.
- It will include the results of these research groups in the development of policy scenarios, and improve the analytical framework for sustainability scenario building.
- It will stimulate global efforts for improving the capability of economic models to deal with sustainability issues.

This workpackage will thus improve the proposed project's support to current and future policy decisions in relation to the European Sustainable Development Strategy as well as the project's ability to identify pressing future research needs.

7.3.5 Workpackage 5: Management, internal and external dissemination

Workpackage Leader: WIFO

The final workpackage concentrates on the management and internal, as well as external, dissemination of TranSust.Scan. WIFO, the co-ordinating partner, is in charge of both management and of the project as a whole. This workpackage has to ensure that a common understanding of the project is achieved and that contact with the other participating institutions is maintained. In addition, a crucial component is to ensure a close dialogue in the framework of stakeholder consultations within and outside the Commission in order to maximise the policy relevance of the proposed project.

The project co-ordinator will provide continuous monitoring of the progress of individual elements and check on the overall coherence of the project. The co-ordinator will also have to organise the meetings of the scientific board. Furthermore, the co-ordinator also ensures the constant cooperation with relevant stakeholders.

Using the Internet as the main communication tool within the network and as a fast publishing platform, a central task to be handled by the co-ordinator is the continuous updating of the well established TranSust website (www.transust.org) in order to provide optimum information flows into, within, and out of the network.

The coordinator shares his responsibility with the, workpackage leaders for an efficient use of the allocated resources, the interaction within and between workpackages, and the scientific quality of the outcomes.

The preparation of a publication plan that includes various outputs, ranging from more extensive scientific publications aimed at serving as a reference on the design of models and policy simulations for sustainability issues, to concise policy recommendations emerging from the project, will mark the last milestone of the project.

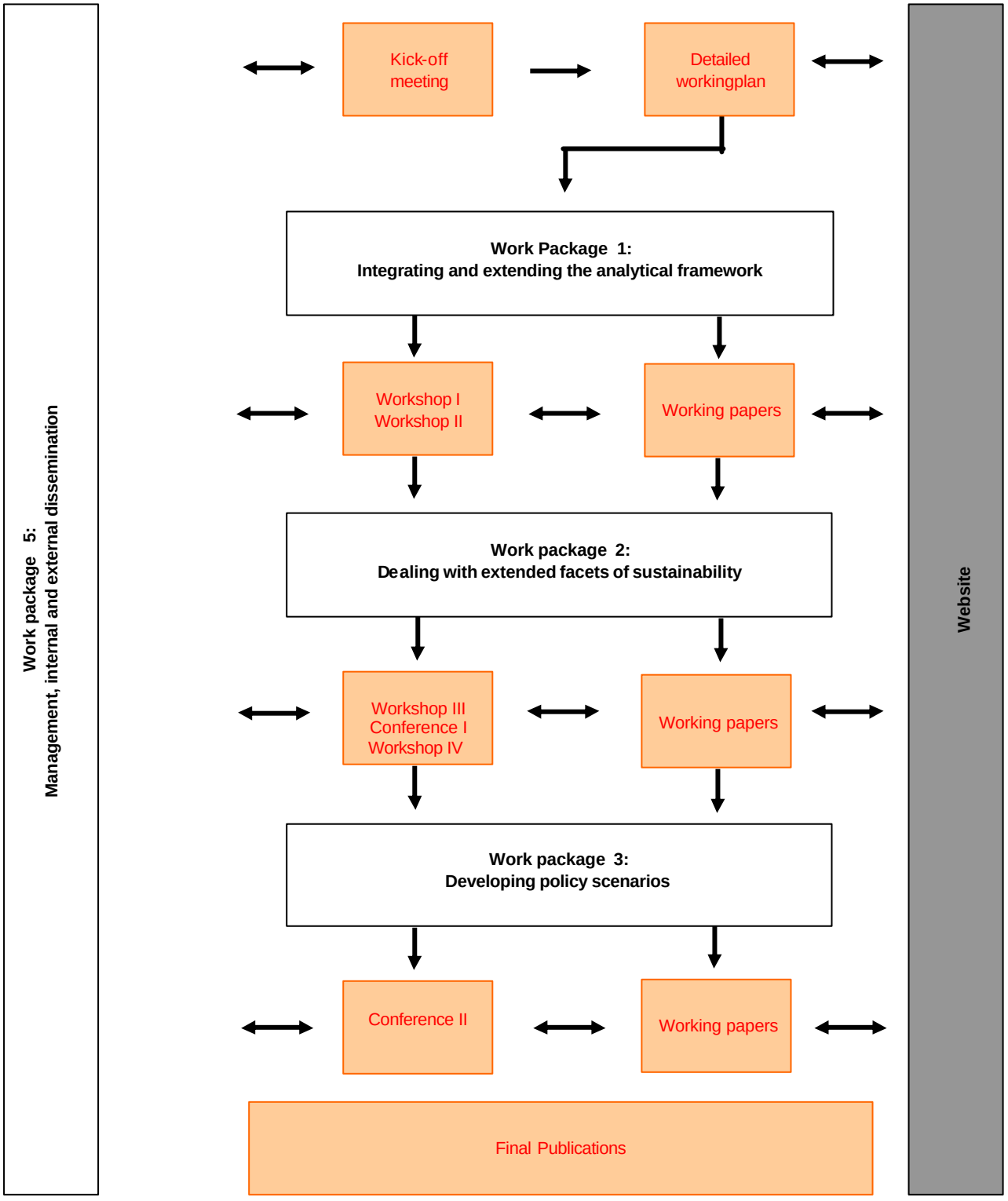
The results of the project will be presented in a final conference to a general audience and in dedicated meetings to Commission services and stakeholders.

7.4 Workplanning and timetable

Gantt diagram of work planning

Milestones	**Month**																													
Workpackages	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Kick-Off meeting , Workshop 1, Workshop 2	⬇				⬇					⬇																				
WP1																														
Task 1: Preparing the core models for Impact Assessment (IA) and policy simulations																														
Task 2: Linking core and extended models																														
Task 3: Sensitivity analysis																														
Task 4: Documentation of simulation methodology and results																														
Workshop 3														⬇																
WP2																														
Task 1: Competitiveness and sustainability																														
Task 2: Technological change and sustainability																														
Task 3: Economic development and sustainability																														
Task 4: Natural resources																														
Task 5: Security and sustainability																														
Workshop 4, Conference 1																		⬇					⬇							
WP3																														
Task 1: Consultation process with stakeholders																														
Task 2: Harmonised baseline (2015-2030)																														
Task 3: Promotion of low carbon technologies																														
Task 4: Stimulating innovative mobility systems																														
Task 5: Identifying Beyond-Kyoto policies																														
Task 6: Strengthening social coherence																														
Conference 2																												⬇		
WP4																														
Website, Publications		⬇																												⬇
WP5																														

7.5 Graphical presentation of workpackages



7.6 Workpackage list /overview

WPL	**Workpackage list**					
Work package No	Workpackage title	Lead contractor No	Person-months	Start month	End month	Deliv-erable No
WP-1	**Integrating and extending the analytical framework**	IVM	19	2	30	4, 5, 6
WP-2	**Dealing with extended facets of sustainability**	IfW	25,25	2	30	4, 7
WP-3	**Developing policy scenarios**	UCD	29,25	7	30	4, 8
WP-4	**Interaction with non-European institutions**	FEEM	2,5	1	30	1, 2, 3, 4, 9
WP-5	**Management, internal and external dissemination**	WIFO	7	1	30	1,11
	TOTAL		**83**			

7.7 Deliverables list

DL	**Deliverables list**			
Deliverable No	**Deliverable title**	Delivery date	Nature	Dissemination level [1]
D-1	**Kick-off meeting**	**1**	**O**	**CO**
D-2	**Detailed workplan**	**2**	**R**	**RE**
D-3	**Website**	**2**	**O**	**PU**
D-4	**Workshop 1**	**5**	**O**	**RE**
D-5	**Drafts of first working paper WP 1 and working paper WP 2**	**5**	**R**	**PU**
D-6	**Workshop 2**	**10**	**O**	**RE**
D-7	**Workshop 3**	**14**	**O**	**RE**
D-8	**First draft of working paper WP 3**	**14**	**R**	**PU**
D-9	**Conference 1**	**18**	**O**	**RE**
D-10	**Draft of second working paper WP 1**	**19**	**R**	**PU**
D-11	**Workshop 4**	**23**	**O**	**RE**
D-12	**Second draft of working paper WP 3**	**23**	**R**	**PU**
D-13	**Conference 2**	**28**	**O**	**PU**
D-14	**Final drafts of working papers WP1, working paper WP-2 and working paper WP-3**	**29**	**R**	**PU**
D-15	**Publications**	**30**	**R**	**PU**

[1] Codes for the dissemination level:

PU = Public
PP = Restricted to other programme participants (including the Commission Services).
RE = Restricted to a group specified by the consortium (including the Commission Services).
CO = Confidential, only for members of the consortium (including the Commission Services).

7.8 Workpackage descriptions

WPD-1	**Integrating and extending the analytical framework**											
Workpackage number	1	**Start date or starting event:**			Month 2							
Participant id	1	2	3	4	5	6	7	8	9	10	11	12
Person-months per participant	1,5	3	1,75	1,5	1,5	1,5	2	2	0,75	1	1	1,5

Objectives

Developing the analytical framework for consistent scenario building by preparing the core models that are currently available in the TranSust network for the policy simulations.

Description of work

Two integrating activities are necessary for preparing the core models for the policy simulations. First, the models will be extended, if necessary, as to the list of variables needed for *Impact Assessment (IA)*. Second, matching input variables will be defined for the forecasting, simulation, and backcasting analyses.

The result of this task will be a comprehensive analytical framework that integrates the comparative advantages of various model designs and emphasises issues related to sustainability.

For specific topics, as competitiveness, technological change, economic development and natural resources, options for linking a number of complementary satellite models to the core models will be assessed. A methodology analysed in more detail will be the decomposition approach. In essence this involves an approximation of the satellite model by numerical differencing.

Furthermore systematic sensitivity analysis will be another methodological feature employed for enhancing the robustness and scientific quality of the model simulations.

Finally, for the sake of transparency and reproducibility all stages of the simulation exercises will be thoroughly documented and made available on the TranSust website.

Deliverables

- Month 5: Workshop 1 (in cooperation with WP 2)
  on preparing the core models for Impact Assessment and options for linking the core models with the extended models.
- Month 5: Draft of a Working Paper documenting the augmented core models.
- Month 10: Workshop 2 (in co-operation with WP 2)
  on implementing systematic sensitivity analysis .
- Month 19: Draft of a Working Paper reporting systematic sensitivity analysis with the core models.
- Month 29: Final version of the Working Papers

Milestones

- Month 5: Workshop 1 (in co-operation with WP 2)
- Month 5: Summary and documentation of Workshop 1.
- Month 10: Workshop 2 (in co-operation with WP 2)
- Month 11: Summary and documentation of Workshop 2.
- Month 29: Final Working Papers as specified above

Expected results

- An integrated set of core models that are suitable for joint policy simulations and capable of Impact Assessment.
- Extended facets of sustainability can be taken into account by linking a set of satellite models to the core models.
- Systematic sensitivity analysis will enhance the robustness and scientific quality of the policy simulations.
- All stages of the simulation exercises will be thoroughly documented and made available on the TranSust website.

WPD-2	**Dealing with extended facets of sustainability**											
Workpackage number	2	**Start date or starting event:**			Month 2							
Participant id	1	2	3	4	5	6	7	8	9	10	11	12
Person-months per participant	1	1,75	2	2	2,5	2,25	3,5	3	0,75	1,75	2,5	2,25

Objectives

Adding the dimensions of competitiveness, technological change, economic development, and the use of natural resources, as water and soil, and the issues of security to sustainability policy design.

Description of work

This workpackage extends the traditional economic, environmental, and social dimensions of sustainability. A number of additional dimensions, as competitiveness, technological change, economic development, and the use of natural resources, as water and soil, and the issues of security have emerged as most relevant in the context of policies targeted towards sustainability.

Five tasks will investigate these new issues as to the requirements for modelling. Both methodological work regarding the extension of current economy-environment models and steps toward implementing these extensions will be done. The overall objective is to expand existing models in order to enable an Impact Assessment.

Accordingly the activities in this workpackage focus on the following issues:

- As to *competitiveness*, indicators and policies are derived in an adequate modelling framework for improving the position of the EU economy.
- As to *technological change,* the parameterisation of the dynamics, the incorporation into models, and the handling with uncertainty will be investigated.
- As to *economic development*, focus will be given to the integration of development strategies that match sustainability requirements.
- As to *natural resources*, the crucial role of limited resources as soil and water, but also biodiversity will be put into the framework of sustainability strategies.
- As to *security,* emphasis will be given in particular to the role of energy supplies for maintaining economic and social security.

These issues will be dealt with in an analytical framework that enables addressing this extended dimensions of sustainability in the policy simulations.

Deliverables

- Month 5: Workshop 1 (in co-operation with WP 1) on designing the extended models for Impact Assessment and options for linking them to the core models.
- Month 5: Draft of a Working paper documenting the concepts for the extended sustainability issues and the corresponding models.
- Month 10: Workshop 2 (in co-operation with WP 1 and 3) on implementing the extended models into the comprehensive analytical framework.
- Month 29: Final version of the Working Paper

Milestones

- Month 10: Workshop 2 (in co-operation with WP 1 und 2)
- Month 11: Summary and documentation of Workshop 2.
- Month 14: Workshop 3 (in co-operation with WP 1 und 2)
- Month 15: Summary and documentation of Workshop 3
- Month 18: Conference 1 (in co-operation with WP 4)
- Month 23: Workshop 4 (in co-operation with WP 1 und 2)
- Month 24: Summary and documentation of Workshop 4.
- Month 28: Conference 1 (in co-operation with WP 4)
- Month 30: Final Reports as specified above

Expected results

Decision support for current EU policies through

- A set of satellite models that are able to address extended issues of sustainability as competitiveness, technological change, economic development, and security.
- An operational procedure for linking this satellite models to the core models in policy simulations.
- Better insights into the multidimensional aspects of policy design in the context of the European Sustainability Strategy.

WPD-3	**Developing policy scenarios**											
Workpackage number	3	**Start date or starting event:**			Month 7							
Participant id	1	2	3	4	5	6	7	8	9	10	11	12
Person-months per participant	2	2,5	2,75	3	2,5	2,5	2,5	3,25	1	2,5	1,75	3

Objectives

Developing a wide range of policy scenarios based on stakeholder consultations and evaluating forecasts, simulations, and backcasts by Impact Assessment (IA)

Description of work

Based on the analytical framework established in workpackages 1 and 2 the following procedure will be applied for generating a wide range of policy scenarios that serve the purpose of strategic policy preparation in particular in the context of the European Sustainable Development Strategy:

- A **consultation process** will accompany all stages for developing the policy scenarios, ranging from the design, the evaluation, and the consensus building for certain policy strategies.
- The **time** horizon for all analyses will be a medium and long term range 2015 – 2030.
- The **scenario building** work will involve
  - ***forecasting*** of future states given the implementation of currently know policies,
  - ***simulation*** of deviations from business-as-usual strategies
  - ***backcasting*** the policy patterns needed for achieving certain policy targets.
- The **common evaluation criterion** for all scenarios will be *Sustainable Impact Assessment (SIA)*.

In order to enhance policy-relevance of the policy simulations, besides stakeholder consultations research results by other institutions, e.g. OECD, EEA, IEA and JRC, will be taken into account.

By investigating the multiple dimensions of sustainability and their relationships to policy developments, this task will increase the awareness on the implications and interactions of sustainable development, and enable the derivation of scientifically sound future scenarios. As a consequence, support for the European Sustainable Development Strategy will be provided.

Deliverables

- Month 5 Workshop 1 (in co-operation with WP 1 and 2)
  Preparing the stakeholder consultation process
- Month 10: Workshop 2 (in co-operation with WP 1 and 2)
  First designs of policy simulations
- Month 14: Workshop 3 (in co-operation with WP 1 and 2)
  First results of policy simulations
- Month 14: First draft of Working Paper on policy simulations
- Month 18: Conference 1
  First presentation of project results
- Month 23: Workshop 4 (in co-operation with WP 1 and 2)
  Refining the policy simulations
- Month 23: Second draft of Working Paper on policy simulations
- Month 28: Conference 2:
  Final presentation of project results
- Month 28: Final version of the Working Paper
- Month 30: Final report

Milestones

- Month 10: Workshop 2 (in co-operation with WP 1 und 2)
- Month 11: Summary and documentation of Workshop 2.
- Month 14: Workshop 3 (in co-operation with WP 1 und 2)
- Month 15: Summary and documentation of Workshop 3
- Month 18: Conference 1 (in co-operation with WP 4)
- Month 23: Workshop 4 (in co-operation with WP 1 und 2)
- Month 24: Summary and documentation of Workshop 4.
- Month 28: Conference 2 (in co-operation with WP 4)
- Month 30: Final Report

Expected results

- Decision support for the European Sustainability Development Strategy by extending the traditional dimensions of sustainability.
- Uniform evaluation of policy simulation by applying Impact Assessment.
- Enhancing the relevance of policy simulations by incorporating them into a stakeholder consultation process.

WPD-4	**Interaction with non-European institutions**											
Workpackage number	4	**Start date or starting event:**			Month 1							
Participant id	1	2	3	4	5	6	7	8	9	10	11	12
Person-months per participant					2,5							

Objectives

Extending the communication with non-European institutions involved in research and design of sustainability policies.

Description of work

This workpackage fosters interactions with modelling communities outside of Europe in order to augment the perspectives on sustainability issues and on related future policy scenarios. The main task of this workpackage is to extend the network of excellence for modelling groups working on sustainability issues that was initiated by TranSust, and has proven to be particularly valuable for comprehensive discussions and improved communication among research groups from different countries. In order to build on TranSust and improve the already existing network on a global scale, special attention is paid to contacts with non-European institutions. For this purpose, already existing communication with the research community in the United States will be strengthened, and new contacts with Japanese and Australian research groups will be promoted, including new perspectives both in the context of modelling and policy issues.

The core activities of workpackage 4 are:

- Extension of the current network of modelling groups devoted to sustainability issues to non-European research communities.
- Increasing communication, information exchange and dissemination of existing research across European and non-European institutions.
- Assuring quality of the project's outcome through peer review by the participating non-European institutions.
- Exchanging information about policy issues addressed in the simulation exercises conducted within the TranSust.Scan project.

This interaction will be most evident at the workshops and especially at the conferences organised by TranSust.Scan, where selected leading sustainability experts not directly involved in the project will serve as scientific advisers. Based on previous experience with external scientific experts, TranSust.Scan is expected to benefit significantly from this workpackage. Indeed, the extended communication activities will serve several aims:

- They will expand the knowledge of existing research on sustainability modelling that has been done within the TranSust community by including all major research groups.
- They will include the results of these research groups in the development of policy scenarios, and improve the analytical framework for sustainability scenario building.
- They will stimulate global efforts for improving the capability of economic models to deal with sustainability issues.

This workpackage will thus improve the proposed project's support to current and future policy decisions in relation to the European Sustainable Development Strategy as well as the project's ability to identify pressing future research needs.

Deliverables

- Month 10: Intermediate comment summarising views of non-European modelling groups on first draft of Working Papers of WP 1
- Month 16: Intermediate comment summarising views of non-European modelling groups on first draft of reports of WP 2
- Month 18: Interaction at Conference 1
- Month 22: Intermediate comment summarising views of non-European modelling groups on first draft of Working Papers of WP 3
- Month 28: Conference 2 on a global view of extended sustainability considerations in the context of scenario building
- Month 29: Final comments summarising experiences and views of non-European modelling groups on Working Papers of WP 1, WP 2 and WP 3

Milestones

- Month 18: Conference 1 (in co-operation with WP 3)
- Month 19: Summary and documentation of Conference 1
- Month 28: Conference 2 (in co-operation with WP 3)
- Month 29: Summary and documentation of Conference 2
- Month 29: Contributions to final report

Expected results

- Widened perspective on sustainability issues and on scientifically sound future scenarios through increased information exchange activities.
- Decision support for current and future EC policies through improved dialogue on sustainability issues

WPD-5	**Management, internal and external dissemination**											
Workpackage number	5	**Start date or starting event:**		Month 1								
Participant id	1	2	3	4	5	6	7	8	9	10	11	12
Person-months per participant	4			0,5	0,5		0,5		0,5	0,5		0,5

Objectives

Co-ordination of the project and allocation of responsibilities for joint activities, ensuring high-quality management of the whole project.

Description of work

The co-ordinating partner is in charge of management and of the project as a whole. He has to ensure that a common understanding of the project is achieved and that communication with all participating institutions is maintained. This co-ordinator will also be responsible for the organisation and the realisation of the kick-off meeting, where the participants will finalise the detailed workplan and schedule for the project. This detailed project plan will be prepared by the co-ordinating partner immediately after the kick-off meeting. Furthermore, the co-ordinator will provide continuous monitoring of the progress of individual tasks and check the overall coherence of the project. The co-ordinator will also organise the meetings of the scientific board.

In addition, a crucial task for the success of the project is to ensure a close dialogue with relevant stakeholders within and outside the Commission, in order to maximise the policy relevance of the proposed project. The project co-ordinator is therefore in charge of ensuring the constant cooperation with relevant institutions representing stakeholders relevant to the project.

Using the Internet as the main communication tool within the network and as a fast publishing platform, a central task to be handled by the co-ordinator is the development and continuous updating of the website in order to provide optimum information flows into, within, and out of the network.

Also the, workpackage leader takes part of the responsibility for co-ordinating - and also allocating resources – in order to manage project activities within their respective workpackage .

The preparation of a publication plan that includes various types of outputs, ranging from more extensive scientific publications aimed at serving as a reference on the design of sustainability policies, to concise policy recommendations emerging from the project, will mark the last milestone of the project.

Deliverables

- Month 2: Kick-off meeting
- Month 2: Update of website
- Month 15: Interim report about the progress of the project
- Month 30: Final Publication as a manuscript for a book that summarises the insights and identifies future research needs on the basis of TranSust.Scan, describing in particular the methodology of the analytical framework for sustainability scenario building and the resulting range of sustainability scenarios. This publication will serve as a reference on the design of models incorporating sustainability scenario building.

Milestones

- Month 1: Kick-off meeting
- Month 2: Detailed work plan
- Month 15: Intermediate report on activities
- Month 30: Dissemination of all final TranSust.Scan Publications

Expected results

- Widened perspective on sustainability issues through increased communication, information exchange, and dissemination activities.
- Decision support for European Sustainable Development Strategy through clear description of analytical framework for environmental sustainability scenario building, including the methodology and the results.
- Decision support for current and future Commission policies through improved dialogue amongst leading research institutions and with crucial stakeholders.

8 Project resources and budget overview

8.1 Efforts for the project

	WIFO	ZEW	SMASH	ECN	FEEM	IVM	IfW	LIFEA	CSIC	UCD	UniHH	IEEP	TOTAL PARTNERS
Reserach/innovation activities													
WP 1: Integrating and extending the analytical framework	1,50	3,00	1,75	1,50	1,50	1,50	2,00	2,00	0,75	1,00	1,00	1,50	19,00
WP 2: Dealing with extended facets of sustainability	1,00	1,75	2,00	2,00	2,50	2,25	3,50	3,00	0,75	1,75	2,50	2,25	25,25
WP 3: Developing policy scenarios	2,00	2,50	2,75	3,00	2,50	2,50	2,50	3,25	1,00	2,50	1,75	3,00	29,25
WP 4: Interactions with non-European institutions					2,50								2,50
WP 5: Management, internal and external dissemination													0,00
Total research/innovation activities	4,50	7,25	6,50	6,50	9,00	6,25	8,00	8,25	2,50	5,25	5,25	6,75	76,00
Demonstration activities													
WP 1: Integrating and extending the analytical framework													0,00
WP 2: Dealing with extended facets of sustainability													0,00
WP 3: Developing policy scenarios													0,00
WP 4: Interactions with non-European institutions													0,00
WP 5: Management, internal and external dissemination													0,00
Total demonstration activities	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Consortium management activities													
WP 1: Integrating and extending the analytical framework	0,50						0,50						1,00
WP 2: Dealing with extended facets of sustainability				0,50					0,50				1,00
WP 3: Developing policy scenarios					0,50					0,50		0,50	1,00
WP 4: Interactions with non-European institutions													0,00
WP 5: Management, internal and external dissemination	3,50												3,50
Total consortium management activities	4,00	0,00	0,00	0,50	0,50	0,00	0,50	0,00	0,50	0,50	0,00	0,50	7,00
Total Activities	8,50	7,25	6,50	7,00	9,50	6,25	8,50	8,25	3,00	5,75	5,25	7,25	83,00

8.2 Overall budget for the project (Forms A3.1 & A3.2 from CPFs)

Financial information - whole duration of the project								
Participant n°	Organisation short name	Cost model used	Estimated eligible costs and requested EC contribution (whole duration of the project)	Costs and EC contribution per type of activities			Total (4)=(1)+(2)+(3)	Total receipts
				RTD or innovation related activities (1)	Demonstration activities (2)	Consortium Management activities (3)		
1	WIFO	FCF	Direct costs (a)	137.860,00		18.782,00	156.642,00	
			of which subcontracting					
			Indirect costs (b)					
			Total eligible costs (a)+(b)	137.860,00		18.782,00	156.642,00	
			Requested EC contribution	**68.930,00**		**18.782,00**	**87.712,00**	
2	ZEW	AC	Direct costs (a)	53.806,00		2.400,00	56.206,00	
			of which subcontracting					
			Indirect costs (b)	10.761,00		480	11.241,00	
			Total eligible costs (a)+(b)	64.567,00		2.880,00	67.447,00	
			Requested EC contribution	**64.567,00**		**2.400,00**	**66.967,00**	
3	SMASH	FC	Direct costs (a)	112.622,00		2.000,00	114.622,00	
			of which subcontracting					
			Indirect costs (b)					
			Total eligible costs (a)+(b)	112.622,00		2.000,00	114.622,00	
			Requested EC contribution	**55.311,00**		**2.000,00**	**57.311,00**	
4	ECN	FC	Direct costs (a)	135.908,00		6.978,00	142.886,00	
			of which subcontracting					
			Indirect costs (b)					
			Total eligible costs (a)+(b)	135.908,00		6.978,00	142.886,00	
			Requested EC contribution	**67.954,00**		**6.978,00**	**74.932,00**	
5	FEEM	AC	Direct costs (a)	89.165,00		4.800,00	93.965,00	
			of which subcontracting					
			Indirect costs (b)					
			Total eligible costs (a)+(b)	89.165,00		4.800,00	93.965,00	
			Requested EC contribution	**89.165,00**		**4.800,00**	**93.965,00**	
6	VUA	AC	Direct costs (a)	55.320,00		2.000,00	57.320,00	
			of which subcontracting					
			Indirect costs (b)	11.064,00			11.064,00	
			Total eligible costs (a)+(b)	66.384,00		2.000,00	68.384,00	
			Requested EC contribution	**66.384,00**		**2.000,00**	**68.384,00**	

7	IfW	AC	Direct costs (a)	75.554,00		4.086,00	79.640,00	
			of which subcontracting					
			Indirect costs (b)					
			Total eligible costs (a)+(b)	75.554,00		4.086,00	79.640,00	
			Requested EC contribution	**75.554,00**		**4.086,00**	**79.640,00**	
8	LIFEA	FCF	Direct costs (a)	80.158,00		1.500,00	81.658,00	
			of which subcontracting					
			Indirect costs (b)					
			Total eligible costs (a)+(b)	80.158,00		1.500,00	81.658,00	
			Requested EC contribution	**40.079,00**		**1.500,00**	**41.579,00**	
9	CSIC	FC	Direct costs (a)	55.035,00		3.504,00	58.539,00	
			of which subcontracting			1.800,00	1.800,00	
			Indirect costs (b)	38.082,00			38.082,00	
			Total eligible costs (a)+(b)	93.117,00		3.504,00	96.621,00	
			Requested EC contribution	**46.559,00**		**3.504,00**	**50.063,00**	
10	UCD PEP	AC	Direct costs (a)	68.830,00		4.129,00	72.959,00	
			of which subcontracting					
			Indirect costs (b)					
			Total eligible costs (a)+(b)	68.830,00		4.129,00	72.959,00	
			Requested EC contribution	**68.830,00**		**4.129,00**	**72.959,00**	
11	UniHH	AC	Direct costs (a)	48.890,00		2.000,00	50.890,00	
			of which subcontracting					
			Indirect costs (b)					
			Total eligible costs (a)+(b)	48.890,00		2.000,00	50.890,00	
			Requested EC contribution	**48.890,00**		**2.000,00**	**50.890,00**	
12	VSE	AC	Direct costs (a)	43.656,00		3.041,00	46.697,00	
			of which subcontracting					
			Indirect costs (b)					
			Total eligible costs (a)+(b)	43.656,00		3.041,00	46.697,00	
			Requested EC contribution	**43.656,00**		**3.041,00**	**46.697,00**	
	TOTAL		**Eligible Cost**	**1.016.711,00**		**55.700,00**	**1.072.411,00**	
			Requested EC contribution	**735.879,00**		**55.220,00**	**791.099,00**	

Estimated breakdown of the EC Contribution per reporting period:

Estimated breakdown of the EC contribution per reporting period				
Reporting Periods	**Start month**	**End month**	**Estimated Grant to the Budget**	
			Total	**In which first six months**
Reporting Period 1	1	12	276.884,00	
Reporting Period 2	13	24	355.995,00	177.997,00
Reporting Period 3	25	30	158.220,00	79.110,00

8.3 Management level description of resources and budget.

TranSust.Scan involves a co-operation of 12 partner institutions. Together they will mobilise 83 person-months of manpower, 7 of them being needed for management activities. The allocation of manpower to the five workpackages is indicated in Table 1, the Project Effort Form. The person-months allocated to the partners reflect their role in the workpackages. In the Project Effort Form, workpackage leaders and workshop and conference organisers get an 0,5 extra person month.

Tables 2 and 3, cost summary total costs and cost summary requested grant, report the costs. Total project costs sum up to €1.072.411 of which €791.099 are applied for as a grant from the European Commission. The requested grant comprises personnel costs, travel and subsistence costs, and other specific costs (as the kick-off meeting in Vienna, workshops in Kiel, Prague, Dublin and Madrid, conferences in Amsterdam and in Venice, and publication costs for FEEM). All partners with the exception of ECN apply for an overhead rate of 20% to all cost categories. The audit costs that were assigned to each partner include no overhead rate.
Individual grants for the project partners range from €41.579 to €93.966 and vary as to their individual efforts and cost structures.

9 Ethical issues

The project does not expect to have ethical issues as synthesised in the following table:

Does your proposed research raise sensitive ethical questions related to:	**YES**	**NO**
Human beings		X
Human biological samples		X
Personal data (whether identified by name or not)		X
Genetic information		X
Animals		X

The project does not involve:

- Research activity aimed at human cloning for reproductive purposes,

- Research activity intended to modify the genetic heritage of human beings which could make such changes heritable

- Research activity intended to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

Confirmation: The proposed research involves none of the issues listed in section B	**Yes**	**No**
		X

10 Appendices

10.1 Appendix A - Consortium description

10.1.1 The role of the participants and the specific skills of each of them

Austrian Institute of Economic Research (WIFO)

WIFO, the Austrian Institute for Economic Research, analyses national and international economic trends and prepares short to medium-term economic forecasts. Together with studies on European integration, competitiveness and location of industries and services, these trends and forecasts provide the basis for economic policies and corporate strategies. WIFO's activities increasingly include commissioned research and consulting for domestic and international decision-making bodies, the European Commission, the OECD, and major business and financial institutions. Advanced analytical methods, a wide range of national and international databases, and intimate knowledge of the institutional and political structures guarantee the quality of WIFO's work. The use of international networks as well as an independent and non-partisan approach gives particular weight to findings. WIFO has been involved in a number of modelling projects targeted on sustainability issues as policy designs for sustainable consumption, the impact of stimulating renovation activities for the stock of buildings, improving the fuel efficiency of the car fleet and switching to renewable energy sources. The models used are of a macroeconometric and multisectoral type with extensions that take into account embedded and induced technical progress, the interaction of flows and stocks and alternative measures of economic welfare, which are based on the proposition that flows and stocks together generate the welfare determining services for consumption and production. WIFO has been involved in a number of FP projects and has been coordinating the TranSust project. WIFO will serve as coordinator in this project and lead the tasks "Documentation of simulation methodology and results" and "Consultation process with stakeholders".

Centre for European Policy Research (ZEW)

The Centre for European Economic Research (ZEW) in Mannheim, Germany, focuses primarily on the challenges resulting from the internationalisation of economics and the process of integration in Europe for companies and economic politics. Founded in 1991, the institute has established itself as one of the leading economic institutions in the field of applied, empirical economic research in Germany within a relatively short period of time. ZEW is devoted to economic research in several areas, among which economic modelling in the context of environment and sustainability play a dominant role. ZEW has also been recognised internationally for its policy-relevant comparative analyses and for assembling important scientific databases. The institute commands thus a broad expertise in the empirical evaluation of policy interference along the three dimensions of sustainable development, i.e. environmental quality, economic performance (gross efficiency) and equity concerns. It coordinates and participates in various research projects and networks that deal with the development and application of analytical tools to investigate economic, environmental and societal impacts of policy reforms. Given its expertise, ZEW is leader of the tasks "Preparing the core models for Impact Assessment", "Sensitivity analysis", and "Competitiveness and Sustainability".

Société de Mathématiques Appliquées et de Sciences Humaines (SMASH)

SMASH is a research organisation involved in the development of mathematical methods applied to the social sciences. It has specific competence on modelling and data bases in

the field of energy and the environment. Along with its technical competence, SMASH has conducted social scientific research in energy planning, energy economics, the rational use of energy and renewables. CIRED is a scientific department which was founded in 1973 by Professor Ignacy Sachs to study the tensions between economic development, long-term natural resources management and environmental protection. SMASH/CIRED will lead the tasks "Economic development and sustainability" and "Strengthening social coherence".

Energy Research Centre of the Netherlands (ECN)

The Energy research Centre of the Netherlands (ECN) is internationally among the leading centres for ***energy research and development***. ECN conducts technology and policy research to find implementable solutions to meet social needs for energy services in a safe, efficient and clean way. ECN comprises 700 staff, structured into eight departments: Solar Energy; Wind Energy; Biomass; Energy Efficiency; Clean Fossil Fuels; Fuel cells, Renewable Energy in the Built Environment, and Policy Studies. ECN Policy Studies is participant in this TranSust.Scan study proposal. The Policy Studies unit was established in 1974 and employs some 45 scientific staff of various disciplines. ECN Policy Studies possess a broad international reputation for extensive expertise in the research fields of climate change related studies, energy and environmental policy design and energy systems modelling, sector studies on energy efficiency, transportation and energy-intensive industry, clean fossil fuels, renewables, policy instrument evaluation and the liberalisation of energy markets. ECN Policy Studies is involved in several major activities related to carbon capture and storage, notably though the IPCC and has a long-term experience in cost assessments of a large range of energy and related technologies, notably renewables and sustainable energy resources. ECN will lead the tasks "Security and sustainability" and "Promotion of low-carbon technologies".

Fondazione Eni Enrico Mattei (FEEM)

FEEM is a non-profit, non-partisan research institution carrying out research in the field of ***sustainable development***. One of its principal aims is to promote interaction between academic, industrial and public policy spheres in order to comprehensively address concerns about economic development and environmental degradation. FEEM's activities are guided by four fundamental criteria: i) to analyse relevant and innovative research areas; ii) to focus on "real" world issues; iii) to integrate multi-disciplinary approaches; iv) to create and foster international research networks. FEEM is and has been partner in several networks and scientific research projects, providing technical and scientific support to institutions at the national and international level. FEEM's research results have been distributed through a number of channels thanks to its experience in dissemination. In particular, FEEM has organised a large number of scientific workshops and major conferences, and published over 1000 working papers and thirty books. The web site, established in 1994, received over 16.000.000 visits in 2003. FEEM will lead the workpackage "Interaction with non-European institutions" and the tasks "Linking core and extended models" and "Identifying Beyond-Kyoto policies".

Department of Economics and Technology, Institute of Environmental Studies, Vrije Universiteit Amsterdam (IVM)

The Institute for Environmental Studies (Instituut voor Milieuvraagstukken, IVM) is the oldest environmental research institute in the Netherlands, and has considerable experience in dealing with the complexities of environmental problems. Its purpose is to contribute to sustainable development and the rehabilitation and preservation of the environment through academic research and education. IVM's research community of about 100 scientists and support staff addresses challenging environmental problems and offers solutions that are both pragmatic and innovative. Since 2001 IVM has been a part of the Faculty of Earth and Life Sciences at the Vrije Universiteit. The institute has four

departments: Biology and Chemistry, Economics and Technology, Environmental Policy Analysis, and Spatial Analysis and Decision Support. Given the multidisciplinary approach typical for IVM, most of its projects include researchers from more than one department. For TranSust.Scan, IVM will exploit its economic modelling and analysis capacities. IVM has a rich history of building integrated economic-environment models, both for theoretical or academic analysis, and for applied policy analysis. Past research has led to many awards and publications in internationally renowned economic journals (for example, the paper "Trade Liberalization and Carbon Leakage", authored by Kuik and Gerlagh from IVM, was given the Best Paper Award in *The Energy Journal* in 2003). The general experience with modelling and policy advice will enable IVM to steer the joint modelling effort in academically sound and politically relevant directions. IVM also hosts the programme on Poverty Reduction and Environmental Management, funded by the Dutch Ministry of Foreign Affairs, which annually selects and finances 8 projects based on cooperation between southern and northern research institutes, on development and environment. The specific expertise with energy modelling, climate policies, trade, technology, and development is essential for its contribution to the other workpackages. VIM will lead the workpackage "Integrating and extending the analytical framework" and the task "Harmonised baseline 2015-2030".

Institute of World Economics, Kiel (IfW)

The IfW at the University of Kiel is an international centre for economic policy research and documentation. The Institute's main activities are economic research, economic policy consulting, and the documentation and provision of information about international economic relations. The Institute's publications and services are addressed to academics in Germany and abroad as well as to decision-makers in both the public and private sectors, and to those people in the general public interested in domestic and international economic policy. Research activities in the Environmental and Resource Economics Department focus on the allocation of environmental and natural resources. The factors influencing the increasing scarcity of natural resources are investigated and their impact on the allocation of factors of production and goods in the world economy is assessed. National as well as international aspects of environmental policy and allocative as well as distributional effects are analysed and efficient and rational policy instruments are developed. IfW has a long tradition in environmental-economic modelling. In particular, general equilibrium models have been used for more than two decades, analysing issues such as stabilization and structural adjustments programs in developing countries, environmental taxes and, in the last few years, climate policy. IfW also has impressive experience in interdisciplinary research in several research projects, e.g. on climate change, biofuels, and biodiversity, where it has been cooperating with several national and international research institutions. IfW will participate in the modelling activities of TranSust.Scan with its dynamic, multi-regional, multi-sectoral computable general equilibrium model DART. IfW will lead the workpackage "Dealing with extended facets of sustainability".

Lodz Institute of Forecasts and Economic Analyses, University of Lodz (LIFEA)

LIFEA (Lodz Institute of Forecasts and Economic Analyses) is a non-profit, private research institute dealing with utilising and improving economic models of the Polish economy. The institute elaborates medium and long-run forecasts as well as alternative policy scenarios for Poland by means of macro-econometric models constructed at the Chair of Econometric Models and Forecasts, University of Lodz, Poland. Its expertise is in great demand from governmental and bank agencies. For example, model W8-2000 has been installed at the Ministry of Economy of Poland. The quantitative tools at its disposal make LIFEA well suited to run analyses of the kind envisaged in the project. This is so because the existing models, especially the extended and modified version of the W8D model, link ecological aspects with economic ones, enabling elaboration of long-run policy

scenarios accentuating ecological issues and their interlinkage with the economy. Besides, the models have well-developed blocks of equations generating formation of TFP and human capital, being two main factors determining technological progress. Moreover, cooperation with a Polish representative of the INFORUM group makes it possible to run selected aspects of the analyses by sectoral breakdown using on input-output methodology. Finally, all the models can be extended or modified in such a way as to cover most of the sustainability issues outlined in the project. LIFEA will contribute to all policy simulations and the tasks "Economic development and sustainability" and "Strengthening social coherence".

Spanish Council for Scientific Research (CSIC)

The Spanish Council for Scientific Research is the largest research institution in Spain, covering all research areas from natural sciences to social sciences. The Institute of Economics and Geography is one of the two institutes devoted to research in economics, and one of the main research areas in its department of economics is environmental economics. The researchers involved in this proposal at the IEG-CSIC have impressive experience in natural resource economics, and have participated in a large number of national and European projects. In recent years, Alejandro Caparrós, Pablo Campos, Pablo del Río, Félix Hernández, and other researchers at the IEG-CSIC have worked extensively on climate change issues and on the relationship between climate change and natural resources. In fact, one of the main research topics has been the development of dynamic models for analysing the interaction between climate change and natural resources, especially biodiversity and forest resources. This recent research experience will be extremely useful for Task 4 in Workpackage 2, where IEG-CSIC will be in charge of analysing interactions between climate change policies, forestry and biodiversity conservation.

University College Dublin, Ireland

University College Dublin has a wide range of expertise in the environmental fields, including environmental aspects of air, water, inland fisheries, health, farming, wetlands, transport, ecosystem studies, environmental industries, building conservation, urban studies, radiation, peatlands, economic development in developing countries, tourism, and economics and policy. A uniquely wide range of disciplines and skills are engaged in research and consultancy in these and related fields. These groups have established the Environmental Institute to help project, more effectively, what they have to offer and to facilitate interdisciplinary co-operation. UCD has a long history of European environmental economics and policy work and has been involved in numerous successful European research and Coordination Action 5th Action projects, most recently as co-ordinator of *CATEP* (Concerted Action on Emissions Trading – www.emissionstradingnetwork.com) and *CAMBI* (Concerted Action on Market based instruments), and partner in *CAVA* (Converted Action on Voluntary Agreements). UCD will contribute to mobility issues in the project by drawing on expertise in the area of transport demand management policy and price sensitivity, particularly the influence of parking pricing on modal choice, congestion and environmental quality. Other research expertise involves understanding the variability of traffic flows in an urban setting, the role of emerging information technologies in transport research and management and transport operations and planning. In addition UCD will lead the workpackage dealing with the development of policy scenarios.

Centre for Marine and Climate Research, University of Hamburg, Germany (UniHH)

The Centre for Marine and Climate Research (ZMK) is the Hamburg University's outstanding centre for earth system science. The ZMK will be represented in this project by the Sustainability and Global Change research unit (FNU), one of its six member institutes. The FNU is devoted to building bridges between the natural and social sciences

by conducting multi-disciplinary research on human-induced environmental change that is either global in nature or pervasive around the world. Current research foci are climate change, marine resources, and land and water use. Methodologically, the areas of emphasis are statistical analysis and environmental-economic modelling. In TranSust.Scan, UniHH has the lead responsibility for natural resources – the analysis of which requires a close integration of natural science and economic knowledge. The emphasis will be on coupled modelling, an area of specific expertise. In addition, UniHH will contribute to the analysis of international climate policy, and the social component of sustainability, again areas where team members of UniHH have a proven track record.

Institute for Economic and Environmental Policy, University of Economics, Prague (IEEP)

IEEP was established at the University of Economics in Prague in 1997, and it is one of the University Departments. While IEEP focuses on conducting research in environmental economics and policy, its activities are varied, including consultancies, scientific research, education, and publishing documents in the fields of state policy in ***economics*****,** ***social sphere, environment and regional development*****.** IEEP has successfully realized a number of research projects at the national and international level**.** The major areas of IEEP's activities include: evaluation of environmental damages and externalities, regional policy and use of EU structural funds and cohesion funds, analysis and proposal on use of market-based instruments in the area of environmental protection, analysis of the effects of state interventions, approximation with EU legislation, modelling impacts of the policies, and organisation of seminars and conferences. IEEP will contribute to all policy simulations and to the task “Strenghtening social coherence”.

10.1.2 Personal profiles

These are the personal profiles of key researchers responsible for workpackages and tasks:

Christoph Böhringer, Professor at the University of Heidelberg, has been the head of the research department of “Environmental and resource economics, environmental management” at ZEW (Centre for European Economic Research) since the beginning of 1999. Having completed his studies in 1991, he worked as a member of the scientific staff with the Institut für Energiewirtschaft und Rationelle Energieanwendung (IER) at the University of Stuttgart, where he also successfully finished his postgraduate studies, attaining a Ph.D. in economics in 1995. His main research topics are the numerical analysis of efficiency and distributional effects associated with environmental or energy policy interference.

Barbara Buchner, Ph.D. in Economics, University of Graz, Masters Degree in Economics within the Economics / Environmental Sciences Joint Program, University of Graz and University of Technology of Graz, is Researcher at the Fondazione Eni Enrico Mattei (FEEM). She joined FEEM in 2000 to work as a Junior Researcher within the Young Researcher training network EEP, Enforcing Environmental Policies, funded by the Improving Human Potential Programme. Currently, she is involved in a number of activities of FEEM’s Climate Change Policy and Modelling Unit. In particular, she is working on the economic evaluation of climate policies, trying to analyse the incentives that are caused by different strategies. Special attention is given to the ancillary benefits of abatement measures and to effects concerning endogenous technical change induced by various policies. Within the FEEM research activities she is furthermore working on the analysis of international negotiations and the formation of international economic coalitions, focusing on climate negotiations.

Alejandro Caparrós is PhD in Economics (University Complutense Madrid) and Tenured Researcher at the Spanish Council for Scientific Research. He has worked extensively on climate change issues, focusing on international negotiation analysis and on the interactions with other natural resources, especially forestry and biodiversity. He has published more than 20 articles on these issues and has participated in a number of projects funded by the European Union and other agencies. He has also participated in several COPs to the UNFCCC.

Carlo Carraro, University of Venice and FEEM, Ph.D. in Economics, Princeton University, MA in Economics, Princeton University, Laurea in Economia e Commercio, University of Venice. He is Professor of Econometrics and Environmental Economics at the University of Venice and FEEM Research Director. His research activities include the econometric evaluation of environmental policies to control global warming; the micro-analysis of environmental policies and of their impact on market structure, the analysis of international negotiations and the formation of international economic coalitions (with particular emphasis on environmental negotiations). Since 1992, he has been working in several OECD and EU projects. The most important of these dealt with modelling environment-economy linkages, studying environmental innovation, analysing climate policies, market based policy instruments and in particular, voluntary agreements.

Frank Convery, Heritage Trust Professor of Environmental Policy at the Department of Planning and Environmental Policy at University College, Dublin, has degrees in forestry and resource economics. Prior to taking up his post at UCD, he was Assistant and then Associate Professor of Natural Resource Economics at Duke University, USA and Research Professor at the Economic and Social Research Institute, Ireland. Frank Convery is active on a number of EU wide investigations and bodies, including membership of the Science Committee of the European Environment Agency and President of the European Association of Environmental and Resource Economists. He has written extensively on resource and environmental economics issues with particular reference to agriculture, forestry, energy, minerals, land use, transport, urbanisation, environment and development in developing countries. At present, his research relates to European Union Environmental Policy with particular reference to the use, potential and effectiveness of market-based instruments.

Waldemar Florczak, PhD Economics 1999, Department of Econometric Models and Forecasts, University of Lodz, specializes in applied econometrics with emphasis on macroeconometric models for Poland. Current research interests focus on long-term growth aspects and on modeling interactions between economy and ecology.

Marzio Galeotti, University of Bergamo and FEEM, Ph.D. in Economics, New York University, Laurea in Economiche e Sociali, Bocconi University. He is Professor of Economics and of Energy Economics at the University of Bergamo. He also teaches at Bocconi University, at University of Milan in the Doctoral Program in Economics and at Scuola Superiore ENI Enrico Mattei in the Master Program in Energy and Environmental Economics. His research activities include the econometric evaluation of environmental policies to control global warming; the study of market based instruments of environmental policy; the analysis of environment, energy, and economy linkages; the microeconomics of the firm, with special emphasis on factor demand, investment, labor, energy, inventories and production. He is the coordinator of FEEM's Climate Change Modeling and Policy Research Unit.

Reyer Gerlagh holds a PhD in economics, Vrije Universiteit Amsterdam and subsequently received the Vernieuwingsimpuls, a prestigious grant of 650.000 Euro from the Netherlands Organisation for Scientific Research to continue his innovative research. He is associate professor in environmental economics at the Institute for Environmental Studies of the Vrije Universiteit, Amsterdam, and has broad research experience ranging from pure academic to policy supporting research, including research in the field of

sustainable environmental resource use, energy economics, economic growth and technology.

Frédéric Ghersi, PhD (economics), is researcher at the CNRS and an associate of the CIRED since 1997. His research has focused on the macroeconomic assessment of climate policies, leading to the development of a computable general equilibrium model, IMACLIM, specifically designed to enhance the description of technical changes in energy production and consumption. Among others, IMACLIM has been extensively used to test the consequences of various carbon-tax recycling options, including in their distributional consequences.

Marjan Hofkes is acting head of the department of Economics and Technology of the Institute for Environmental Studies (IVM) of the Vrije Universiteit, Amsterdam, the Netherlands. In 2004 she was acting director of the same institute. Since 1999 she has been associate professor and programme manager of the programme unit Modelling and Economic Analysis at IVM. She has a broad research experience ranging from pure academic to policy supporting research. From 1993 to 1997 she did research in the field of economic growth, environmental quality, technology and the labour market at the Department of Economics of the Vrije Universiteit, Amsterdam. From 1991 to 1993 she worked as a policy advisor at the Ministry of Finance, Den Haag. In 1991 she received her PhD in mathematical economics. At the moment her main fields of interest are economic modelling, sustainable development, endogenous technology and transitions

Jean-Charles Hourcade, PhD (economics), is Research Director at CNRS and EHESS, and is the scientific director of CIRED. He has been member of the National Committee of CNRS for 8 years. Since 1990 he has acted as an expert for the French Government, the European Community and OECD on climate negotiations and on the adaptation of economic instruments to environmental issues. In addition, he participated in the 3rd assessment report of the Intergovernmental Panel on Climate Change as a convening and leading author (WGIII, chapter 8); he is also scheduled to participate to the fourth assessment report of the same body

Gernot Klepper, M.S. in Economics at the University of Heidelberg, Germany; PhD in Agricultural Economic at the University of Kentucky, USA; 1983-1984 Research Associate at the Department of Economics at the University of Mannheim, 1994-1990 Research Associate at the Kiel Institute of World Economics, Trade Policy Research Division. Since 1995 Head of Department “Environmental and Resource Economics” at the Kiel Institute of World Economics. Furthermore, he is Co-chair of the German National Committee on Global Change Research (NKGCF) and member of the Scientific Committee of the International Human Dimensions Programme (IHDP).

Andreas Löschel is a senior research fellow at the Centre for European Economic Research since 1999. He studied economics at the University of California, Los Angeles (UCLA), Wayne State University, Detroit (MA, 1995) and the University of Erlangen-Nuremberg (Diploma, 1998). 1998-2003, he was Research Fellow of the graduate program .Environmental and Resource Economics at the University of Heidelberg and the University of Mannheim. He received his PhD in Economics from the University of Mannheim in 2003. 2003 he was Visiting Scholar at the Massachusetts Institute of Technology (MIT), Joint Program on the Science & Policy of Global Change. In his research he concentrates primarily on environmental economics and policy, climate change policies and computable general equilibrium modelling.

Sonja Peterson is a research fellow at the Kiel Institute for World Economics since 2002. She holds an MA in economics from the University of Colorado at Boulder and a diploma in Mathematical Economics from the University of Hamburg as well as a Ph.D. in Agricultural Economics from the University of Kiel. She is experienced in interdisciplinary research and has a strong background in environmental-economy modelling. Currently

her main research interests are international climate policy and computable general equilibrium modelling.

Stefan P. Schleicher, Professor of Economics at the University Graz, holds the position of a scientific consultant at the Austrian Institute of Economic Research (WIFO). He held academic positions at the University of Bonn, at the University of Pennsylvania and at Stanford University. His research focuses on applied econometrics and environmental economics, with particular emphasis on energy and climate change issues. His current research investigates the potential for induced technological change, implicit incentives of the Kyoto Mechanisms and models for sustainable development. He coordinated a project for the Austrian allocation plan for the European Emissions Trading System, he is a Lead Author for IPCC Working Group III and he has been the co-ordinator of TranSust since 2003.

Koen Smekens is a researcher at ECN Policy Studies specialized in energy and climate policy supporting analysis since 1999. Before joining ECN he worked as graduated M Sc in electrotechnical engineering of the University of Gent for industry, regional authorities and for the Flemish institute Vito. At Vito he gained experience in climate policy work as researcher and as scientific member of the Belgian UNFCCC delegation. In this capacity he was active in several Belgian (federal and regional) working groups on energy and climate change and climate change policy as well as in international work. At the same time he developed his methodological skills in emission inventories, projections (MARKAL model) and policy evaluation. At ECN he continued working on energy and climate related studies for a wide range of policy makers and interest groups (EA, VROM, EC, UNFCCC, IPCC). He also became an expert in supporting developing countries in using methodological tools for energy policy analysis and projections (China, Indonesia, South-Africa). He is currently Co-ordinating Lead Author of the costs and scenarios chapter of the IPCC Special Report on carbon dioxide capture and storage.

Wladyslaw Welfe, PhD Economics 1961, School of Planning and Statistics, Warsaw, Habilitation (second PhD) 1964 School of Planning and Statistics, Warsaw. Professorship by President of Poland, 1978. Professor of Economics, former director of the Institute of Econometrics and Statistics, University of Lodz, Poland, member of the Polish Academy of Science. He is known for his research in macroeconometric modelling, especially of Poland. W-series of econometric macromodels were built under his supervision and used in numerous forecasting and simulation exercises. Member of the Project LINK.

Aleksander Welfe, PhD Economics 1985, Warsaw University, Habilitation (second PhD) 1990, Wroclaw Academy of Economics. Professorship by President of Poland, 1996. Professor of Economics, chairman of the Department of Econometric Models and Forecasts at the University of Lodz, Poland. He participated in construction and use of macroeconometric models for Poland, being responsible for the new quarterly model. He is specialising in modern econometric techniques, especially applied to the analysis of inflation and unemployment. He was the co-ordinator of an ACE project on Inflation and Unemployment in Economies of Transition.

Bob van der Zwaan is researcher at the Energy research Centre of the Netherlands (ECN) and research fellow at Harvard University. He received graduate degrees in economics (MPhil, 1997, University of Cambridge, King's College), physics (PhD, 1995, CERN and University of Nijmegen; MSc, 1991, Utrecht University) and international relations (Certificate, 1994, IUHEI, Geneva). He has held various research positions, among which at the Vrije Universiteit Amsterdam (IVM), Stanford University (CISAC) and the Institut Français des Relations Internationales (Paris). He has been visiting scholar at IIASA (Laxenburg) and CNRS (Paris), as well as scientific consultant to the OECD (Paris). His research interest covers various subjects related to energy economics, global warming, technological innovation, and science and international affairs. He is (co-)author of about 75 articles in refereed multidisciplinary scientific journals, as well as author of two

books and co-editor of two peer-reviewed volumes on the future of nuclear energy and, respectively, the interrelations between consumption, population and the global loss of biodiversity

10.2 Appendix B – References

10.2.1 General references

Böhringer, C. (2004), Sustainability Impact Assessment, The Use of Computable General Equilibrium Models, *Economie Internationale* (forthcoming).

Böhringer, C. und A. Löschel (2004), Measuring Sustainable Development: The Use of Computable General Equilibrium Models, *Vierteljahrshefte zur Wirtschaftsforschung - Quarterly Journal of Economic Research*, Vol. **73,** 1, pp. 31-52.

Böhringer, C., T.F. Rutherford, and A. Löschel (2005), Decomposing Integrated Assessment of Climate Change: Methodology and Sample Application, Centre for European Economic Research (ZEW), Discussion Paper 05-07, Mannheim.

Bosello, F., B. Buchner and C. Carraro (2003), Equity, Development and Climate Change Control. Journal of the European Economic Association, Vol. 1, 2-3, pp. 601-611.

Boulanger P-M., Bréchet Th. (2002), Setting concepts into motion: improving scientific tools in support of sustainable development decision-making, booklet for the EC and the Belgian Ministry of Scientific Affairs, May.

Boulanger P-M., Bréchet Th. (2001), *Sustainable development and R&D policies*, proceedings of the EC Workshop, Brussels, November.

Buchner, B. and C. Carraro (2004), Economic and Environmental Effectiveness of a Technology-based Climate Protocol. FEEM Working Papers 61.2004, Milan.

Buchner, B. and M. Galeotti (2004). Climate Policy and Economic Growth in Developing Countries: The impact of Kyoto. *International Journal of Global Environmental Issues*, Vol. 4, Nos.1/2/3, 109-138.

Buchner, B., C. Carraro and I. Cersosimo (2002), Economic Consequences of the US Withdrawal from the Kyoto/Bonn Protocol, *Climate Policy* 2 (2002), 273-292.

Buonanno, P., C. Carraro and M. Galeotti (2003), Endogenous Induced Technical Change and the Costs of Kyoto, *Resource and Energy Economics* 25 (2003) 11-34

Caparrós, A., A. Campos and D. Martín (2003), Influence of carbon dioxide abatement and recreational services on optimal forest rotation. *International Journal of Sustainable Development*, 6(3): 345-358.

Caparrós, A. and F. Jacquemont (2003), Conflicts between biodiversity and carbon offset programs: economic and legal implications. *Ecological Economics*, 46: 143-157

Caparrós, A., J.-C. Pereau and T. Tazdaït (2004). North-South Climate Change Negotiations: a Sequential Game with Asymmetric Information. *Public Choice*, 121 (3-4): 455-480.

Chander, P. and H. Tulkens (1997), "The core of an economy with multilateral environmental externalities", *International Journal of Game Theory* 26: 379-401.

Jacquemont, F. and A. Caparrós (2002), The Convention on Biological Diversity and the Climate Change Convention ten years after Rio: towards a synergy of the two regimes? *Review of Europ. Community and International Environmental Law*, vol. 11(2): 169-180.

Germain, M., Ph. Toint, H. Tulkens and A. de Zeeuw (2003), "Transfers to sustain core-theoretic cooperation in international pollutant control", *Journal of Economic Dynamics and Control* 28: 79-99.

Hernández, F., Gual, M.A., Del Río, P. and A. Caparrós (2004), Energy Sustainability and Global Warming in Spain. *Energy Policy*, 32: 383-394.

Gerlagh, R. and B.C.C. van der Zwaan (2004), "A sensitivity analysis of timing and costs of greenhouse gas emission reductions under learning effects and niche markets", *Climatic Change*, 65, pp.39-71.

Gerlagh, R., B.C.C. van der Zwaan, M.W. Hofkes, and G. Klaassen (2004). Impacts of CO2-taxes in an economy with niche markets and learning-by-doing. *Environmental and Resource Economics*, 28, pp. 367-394

Jenkins, R. (1997). Environmental Regulation and International Compettitiveness: A Reviwe of Litearature and Some European Evidence. United Nations University Discussin Paper Serices 9801, Maastricht.

Klepper, G. and S. Peterson (2004). The EU Emissions Trading Scheme: Allowance Prices, Trade Flows, Competitiveness Effects. *European Environmental Journal* 14 201-218.

Klepper, G. and, S. Peterson (2004). Marginal Abatement Cost Curves in General Equilibrium: the Influence of World Energy Prices. Nota di Lavoro 136.2004. Fondazione Eni Enrico Mattei, Venice, Italy.

Klepper, G. (2003). Climate Protection Strategies: International Allocation and Distribution Effects. In Stephen H. Schneider (ed.).: Climatic Change. An Interdisciplinary, International Journal Devoted to the Description, Causes and Implications of Climatic Change. Vol. 56, 1-2. January 2003. Kluwer Academic Publishers, Dordrecht, Boston, London.

Kok, M.T.J., W. van den Bovenkamp, R. Folkert, E. Honig, A. Osthoff Barros, A. Van Pul, R. Swart, A. Verhagen, D. van Vuuren, M.M. Berk, H. Hilderink and B. Metz (2002) Development and Climate – Exploring An Integrated Approach, RIVM.

Peterson, S. (2004). The Contribution of Economics to the Analysis of Climate Change and Uncertainty: A survey of Approaches and Findings. *Kiel Working Paper No. 1212*.

Peterson, S. (2004). Monitoring, Accounting and Enforcement in Emissions Trading Regimes. In: OECD (ed.): Greenhouse Gas Emissions Trading and Project-based Mechanismns. Proceedings of the OECD Global Forum on Sustainable Development: Emissions Trading 17-18 March 2003, OECD. Paris.

Torvanger, A., M Tweena and J. Vevatne (2004): “Climate Policy beyond 2012. A survey of long-term targets and future frameworks” CICERO Report 2004:2. Oslo.

van der Zwaan, B.C.C. and A. Seebregts, "Endogenous Learning in Climate-Energy-Economic Models: An Inventory of Key Uncertainties", *International Journal of Energy Technology and Policy*, 2, 1/2, 2004, pp. 130-141.

van der Zwaan, B.C.C. and A. Rabl, "The learning potential of photovoltaics:implications for energy policy", *Energy Policy*, 32, 13, 2004, pp. 1545-1554

10.2.2 TranSust references

www.transust.org

Model comparison analysis

Model Comparison Part 1: Model Characteristics.
Information about the models used by TranSust partners.

Model Comparison Part 2: Model Simulations.
Impact of CO2 taxes on GDP, energy, and CO2 emissions.

Model Comparison Part 3: Model Structures.
Input for cross-cutting papers.

Cross-cutting papers

Terry Barker, Sebastian De-Ramon and Hector Pollitt.
Revenue recycling and the labor market in TranSust models.

Christoph Boehringer.
Measurement of indicators for sustainable development

Marzio Galeotti.
Technical progress

Reyer Gerlagh and Stefan Schleicher.
Impact of CO2 taxes on GDP and emissions

Jean-Charles Hourcade.
Measuring the costs of climate policies: watch out for conceptual traps

Gernot Klepper and Sonja Peterson.
The role of energy prices for assessing the costs of climate policies

Kurt Kratena.
Welfare and consumption.

Stefan Schleicher.
Stock and flows: interaction and substitution

Bob van der Zwaan.
Carbon capture and storage and renewable energy technologies.