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TranSust.Scan – Scanning Policy Scenarios for the Transition to Sustainable Economic Structures Final Activity Report

Stefan Schleicher (Project co-ordinator)

November 2009

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ÖSTERREICHISCHES INSTITUT FÜR WIRTSCHAFTSFORSCHUNG
AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH

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Final Activity Report

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Austrian Institute of Economic Research

Commissioned by the European Commission

Abstract

The focus of TranSust.Scan was to explore 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 linked and expanded the set of available models to reflect the multidimensional aspect of sustainability policies and their trade-offs with other policies (Workpackage 1).

TranSust.Scan widened the conception of sustainability and verified the impacts of this extended concept. This was done by collecting available information, utilising existing modelling approaches and combining quantitative and qualitative elements. In addition to traditional economic, environmental and social aspects, expanded models addressed the new policy agenda as put forward by the Lisbon Strategy of the European Union and the World Summit for Economic Development dealing with competitiveness, economic development, security, preparations for Beyond-Kyoto policies and interaction between technological change and the use of natural resources (Workpackage 2).

Using a scenario approach in cooperation with stakeholders, the TranSust.Scan models addressed strategic policy options. The insights arising from the development of this scenario approach were translated into a set of policy relevant recommendations (Workpackage 3).

To ensure optimal use of the project's results, special focus was given to the dissemination of results by using the internet as the main communication tool within the network and as a fast publishing platform. A series of meetings, workshops and conferences were organised, fostering collaboration with relevant stakeholders both within and outside the EC. Numerous working papers were published and a special edition of a journal is coming forward. All these dissemination channels serve as a reference on the design of models for extended sustainability issues, provide insights for policy options and have opened a dialogue with non-European research communities (Workpackages 4 and 5).

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TranSust.Scan

Scanning Policy Scenarios for the Transition to Sustainable Economic Structures
www.TranSust.org

SIXTH FRAMEWORK PROGRAMME

PRIORITY FP6-2004-SSP-4

Policy-orientated research

Scientific support to policies

SPECIFIC TARGETED RESEARCH PROJECT

Publishable final activity report

Project acronym: **TranSust.Scan**

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

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TranSust.Scan

Publishable final activity report

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1 Project Summary

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2 Participants

1	**WIFO Austria** Austrian Institute of Economic Research	7	**IfW Germany** Institute for World Economics, Kiel
2	**ZEW Germany** Centre for European Policy Research	8	**LIFEA Poland** Lodz Institute of Forecasts and Economic Analyses, University of Lodz
3	**SMASH France** Société de Mathématiques Appliquées et de Sciences Humaines	9	**CSIC Spain** Spanish Council for Scientific Research
4	**ECN Netherlands** Energy Research Centre of the Netherlands	10	**UCD Ireland** University College, Dublin
5	**FEEM Italy** Fondazione Eni Enrico Mattei	11	**UniHH Germany** Centre for Marine and Climate Research, University of Hamburg
6	**IVM Netherlands** Department of Economics and Technology, Institute of Environmental Studies, Vrije Universiteit Amsterdam	12	**IEEP Czech Republic** University of Economics Prague

3 Work performed

For more than two decades, 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 (1993) over the Lisbon Summit (2000) to the Gothenburg European Council (2001).

TranSust.Scan provides new perspectives on sustainable development. By widening the traditional dimensions of sustainability with additional aspects, more adequate and successful strategies for the transition to sustainable economic structures can be developed. Existing models were extended as to the multifunctionality aspect of sustainability policies. In addition to the traditional economic, environmental and social dimensions the expanded models address competitiveness, economic development, security, the preparations for Post-2012 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 was designed to address strategic policy options.

3.1 Workpackage 1: Integrating and extending the analytical framework

The TranSust.Scan consortium has access to a wide range of models covering different geographical and sectoral scales. As to the modelling methodology applied general equilibrium concepts, combinations of top-down and bottom-up structural approaches, but also multisectoral macroeconomic models were used. Within the project these models were extended for dealing in particular with sustainability issues, impact assessment and related policy issues.

Special capabilities of these models comprise a detailed analysis of the dynamics of technological change and the convergence of technologies across countries. The sectoral coverage focused in particular on the issues of transport, water, agriculture and forestry. Analyses of policy issues were concentrated on competitiveness and social aspects.

An essential insight of the project is that instead of a seemingly comprehensive overall modelling design rather specialised model components coupled with core models should be preferred. The models used within the TranSust.Scan project are documented on the project website. Design and results of model simulations are described in papers related to model applications in Workpackages 2 to 4.

For tackling the issue of sensitivity analysis both deterministic and the stochastic approaches were investigated. An improved version of Gauss-Quadrature based on orthogonal polynomials was developed and its advantages both with respect to computational burden and numerical stable were demonstrated.

3.2 Workpackage 2: Dealing with extended facets of sustainability

Workpackage 2 focused on the extended facets of sustainability including competitiveness, technological change, economic development, natural resources, and energy security.

Competitiveness issues in the context of sustainability were analysed by ZEW and IfW. ZEW conducted a review on competitiveness indicators. ZEW focused on the competitiveness effects of EU climate policy, in particular the EU 2020 goals set by the European Commission in January 2008. The PACE model was extended by the competitiveness indicators to investigate the impact of a unilateral EU abatement policy on competitiveness and leakage. IfW implemented the competitiveness indicators in the DART model to assess competitiveness effects of the most recent EU climate policy proposal.

The issue of technological change and learning curves was extensively analysed and results were documented in various papers. FEEM discussed the role of uncertainty in the returns to R&D and technology spill-overs in the context of greenhouse gas concentration stabilization. WIFO discussed modelling and theory of technology learning curves. Based on a literature survey on technological change and a questionnaire to the project partners the paper analysed the TranSust.Scan models in the context of technological change theory. LIFEA analysed the role of knowledge capital in total factor productivity. In addition, new directions of modelling a knowledge-based economy were presented for Poland.

The issue of economic development was addressed by the partners SMASH, IfW, IVM and LIFEA. SMASH discussed the issue of development first architectures. The analysis is based on the North-South divide around climate affairs and shows how development and climate policies interact and proposes a guidance to develop a future climate regime with serious emission restrictions. IfW has discussed the economic effects of different Post-Kyoto climate architectures. Based on simulations with the DART model a harmonised international carbon

tax was compared to a cap and trade system with different allocation rules for the emission caps, focusing in particular on the economic incentives for developing countries to join an international agreement. IVM discussed burden sharing of adaptation financing. Three principles were identified that can serve as a basis for the fair international burden sharing of adaptation costs, namely deontology, solidarity and consequentialism. They were then translated into criteria that can be applied in assigning a share of a financial burden to individual countries, namely historical responsibility, equality and capacity to pay. LIFEA studied economic development and sustainability and the effects of a carbon tax in Poland.

As to natural resources and sustainability the topics of land use, agriculture, biofuels, biodiversity and water scarcity were analysed. CSIC analysed the issues of carbon sequestration and reforestation and a paper on land use and carbon mitigation in Europe. IFW focused on modelling land-use and analysing the implications of increased biofuel production on food prices. UniHH extended the KLUM model to analyse land-use and water resources. Based on the extended model UniHH discussed the role of water resources in agricultural land use modelling and analysed the interdependencies between food and biofuel production in European agriculture.

ECN conducted a literature review on VOLL (Value of Lost Load) as a monetary expression for the costs associated with inter- or disruptions of electricity supply as a result of production, transmission or distribution failures. VOLL is found to be a useful variable that allows the quantification of an important dimension of energy supply security of a country, region or economic sector.

3.3 Workpackage 3: Developing policy scenarios

The core fields of Workpackage 3 included policies promoting low carbon technologies, policy scenarios for mobility, post-2012 policies, and social coherence.

The implementation of low carbon technologies was analysed by WIFO and ECN. WIFO has worked on the integration of the approach of stabilisation wedges (Pacala and Socolow, 2004) to model low energy and low carbon strategies for 18 European countries, Japan and the United States. The paper distinguishes between energy services as the only relevant indicator for welfare related conclusions and resulting energy flows both for final energy and gross energy. Motivated by recent policy discussions ECN investigated the role of Carbon Capture and Sequestration (CCS) to mitigate CO_2 emissions using the MARKAL and DEMETER model.

UCD and SMASH discussed policy scenarios in the context of mobility. UCD investigated the policy agenda in the European Union as it stands and also the projected policy path with respect to transportation. This analysis was combined with a data analysis by SMASH and integrated into harmonised energy-economy simulations of the IMACLIM-R and POLES models. Simulations with these models covered the EU-27 countries disaggregated into 23 zones and track emissions of CO_2 for a range of vehicles and technologies.

The analysis of post-Kyoto policies was a central issue within the TranSust.Scan project. FEEM discussed global climate policies and how they perform along the economic, environmental and equity dimensions. In addition, FEEM addressed the issue of banking when analysing stabilisation policies and their efficiency given alternative allocation rules. WIFO analysed the pilot phase of the EU Emission Trading Scheme (EU ETS) with respect to the stringency of the total allocation cap and allocation differences both among the Member States and a selection of emission intensive sectors, the distribution of the size of installations; and

the spread of allocation discrepancies and possible allocation biases regarding the size of installations. Based on this analysis of the pilot phase of the EU ETS WIFO analysed complementary activities within the framework of the decisions of December 2008 to empower the carbon market in the post-Kyoto phase. Other work of WIFO included possible target sharing scenarios for the EU-27 based on contraction and convergence mechanisms. Work of IfW, LIFEA and ZEW described in the sections on competitiveness and economic development in Workpackage 2 also refers to the issue of beyond-Kyoto policies.

SMASH and LIFEA analysed issues of social coherence. SMASH worked on the implementation of a modified IMACLIM-S to assess the distributive consequences of a carbon tax reform in the case of France. LIFEA discussed the macroeconomic determinants of life expectancy in Poland and wage inequality.

Special attention was given to the issue of baseline projections. Instead of a uniform baseline the modelling groups decided to give more emphasis to the deviation of various policy scenarios with respect to a reference scenario. This reflects insights that it is the policy impact, which is not only more reliable but also of more relevance to policy makers than any business-as-usual path, which is obviously more vulnerable as to the economic and political environment. Most policy suggestions based on the model simulations, therefore, are even robust as to the current economic crisis. The reference scenarios used in the various models are based on different information requirements and therefore it was decided to give more emphasis to their transparency instead of full harmonization.

The conference in Brussels in November 2008 aimed at presenting and discussing the project results with stakeholders focusing on policy analysis of Workpackage 3. The conference also served to exchange project results with the FP6 FORESCENE project which as to content and methodological complementarities is linked to TranSust.Scan. Commission officials, representatives from energy industries and companies were among the participants of the conference.

3.4 Workpackage 4: Interaction with non-European institutions

Workpackage 4 promoted the interaction with research and policy institutions outside of Europe. In particular, activities were aimed at augmenting the perspectives on sustainability issues and on related future policy scenarios.

The core activities of Workpackage 4 were:

- 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.

In order to fulfil these core activities a number of promoting actions have been undertaken with the two TranSust.Scan conferences as key elements.

The first TranSust.Scan conference in Chia (Sardinia) on 27/28 September 2007 was organised by FEEM. The conference focused on a wide range of policy scenarios relevant for the

European Sustainable Development Strategy, with specific attention to Climate Change. The conference covered a broad spectrum of policy relevant issues (competitiveness, technology, transport, natural resources management, uncertainty). Topics were discussed in different sessions, each composed of two presentations: one given by a project partner, the other by an external (typically non-European) expert. This dialogue format served to foster the exchange of information within and outside the EU, as well as to appraise the research carried out in TranSust.Scan.

Conference 2 in Brussels (26 November 2008) was organised by UCD in cooperation with the Center for European Policy Studies (CEPS). The focus of the conference was put on a broad range of issues related to energy and climate policy, including carbon leakage and competitiveness, transportation, land use, and carbon capture and storage. The Brussels conference aimed at the dissemination of the project results to stakeholders, such as members of the European Commission, international institutions and industries. These publications shall also be part of a journal special issue.

During the whole project period, partners contributed to the international dissemination of the TranSust.Scan project through publications and conference participations, as documented in Chapter 5.

3.5 Workpackage 5: Management, internal and external dissemination

Built on the existing TranSust website the website for TranSust.Scan was set up. The TranSust.Scan website was regularly updated by the coordinator and served as the main dissemination tool. All finalised results of the project were made available in the open domain of the website in order to accelerate dissemination and to stimulate policy decisions and research related to sustainability issues. The intranet section of the website served the internal communication on the current status of the project.

The two TranSust.Scan conferences in Sardinia and Brussels (Workpackage 4) were key elements in the dialogue with external experts and in the ongoing stakeholder process. The four TranSust.Scan Workshops served the project planning and the internal discussion of work progress and results.

Workshop 1 in Vienna in October 2006 was organised by the coordinator at WIFO. This workshop turned out to be valuable in keeping the project on track. First results showing the progress in the project were presented by the partners. In addition two external experts – Reyer Gerlagh from University of Manchester and Thierry Bréchet from Université Catholique de Louvain – provided new insights to the TranSust.Scan consortium.

Workshop 2 in Prague in January 2007 was organised by IEEP. This workshop mainly served to summarise the first year of TranSust.Scan and plan the activities for the second project period.

Workshop 3 in Dublin in May 2007 was organised by UCD. At this workshop progress in the different workpackages was discussed and the implementation of sustainable development strategies in the models was launched. In addition two external experts – Reyer Gerlagh from University of Manchester and Richard Tol from the Economic and Social Research Institute, Dublin – provided new perspectives to the TranSust.Scan consortium discussing the Stern Review Report.

Workshop 4 in Madrid in April 2008 was organised by CSIC. The TranSust.Scan partners presented and discussed their research results with a special focus on the climate and en-

ergy package of the European Commission and the communication of project results to a policy oriented audience. In addition, Reyer Gerlagh as an external expert and member of the TranSust.Scan Scientific Advisory Board presented new insights on strategic oil dependence.

4 End results

TranSust.Scan – Scanning Policy Scenarios for the Transition to Sustainable Economic Structures – focused on two issues:

- firstly on extending the scope of sustainability and implementing these extended facets into a wide range of available models, and
- secondly on a wide range of policy scenarios from the perspective of this extended concept of sustainability.

The conceptual frameworks developed in TranSust.Scan reveal operational approaches for shifting the perspective of sustainability beyond the traditional economic, ecological and social dimensions. Extensions to this three pillar concept of sustainability include competitiveness, technological change, economic development, the use of natural resources and the issue of energy security. These conceptual findings contribute to the current discussion stimulated by the Stiglitz Commission on beyond GDP issues and sustainability indicators.

The implementation of these conceptual frameworks into the wide range of models of the TranSust.Scan consortium was a challenging task of the project. All models required extensions in scope and scale, often using satellite components. A main finding was that a zoo with a variety of models, each fitting to particular aspects of sustainability, reveals more information on policy options than just one elephant type model.

This set of improved and expanded models finally was used for extensive policy analyses. In addition to the policy topics envisaged at the start of the project – as low carbon technologies, mobility, post-2012 policies and social coherence – during the project period exiting new policy issues have developed in the context of the EU Energy and Climate Package. Implicitly all model simulations included an extended impact analysis by investigating a wide range of indicators depending on scope and size of the models.

Based on the extended policy framework, TranSust.Scan carried out a broad range of policy simulations. These are some of the key findings for developing extended sustainability perspectives:

- **Post-2012 climate change policies**

  Sharing emissions reduction targets and related costs is a major challenge both on global and on European level. On global level a financial burden sharing methodology was developed based on the criteria historical responsibility, equality and capacity to pay. A hybrid approach that combined historical responsibility and capacity to pay was used to analyse different policy scenarios. According to this methodology Annex I countries would have to take responsibility of 55 - 68% of the costs to mitigate climate change.

  On European level emission reference scenarios for all Member States have been developed up to 2020. In addition, based on a structural model alternative target sharing procedures have been analysed based on construction and convergence

mechanisms. In contrast to other ad-hoc suggestions for target sharing rules the procedures put forward are based on a structural modelling approach.

In addition the impact of banking carbon allowances in emissions trading schemes was investigated with the result that this would substantially lower the cost of climate change mitigation. Furthermore banking would enhance early investment in research and development (R&D) and renewables.

- **Competitiveness**

  Carbon leakage – a loss of competitiveness of the domestic industries and a relocation of industries to foreign markets – triggered by a unilateral EU emissions reduction target up to 2020 is of major concern. Examining the effectiveness of integrated emissions trading (IET) - that includes also imported commodities - and border tax adjustments (BTA) shows that both instruments are adequate to tackle carbon leakage. IET, however, is more effective in protecting domestic competitiveness while BTA reduces foreign emissions to a larger extent. Both instruments might still bear negative effects on sectors not covered by the EU ETS because of emissions abatement shifting to these sectors.

  If no measures to tackle leakage are applied, the EU 2020 targets might cause a loss in competitiveness in some emissions-intensive sectors while the overall competitiveness impacts are estimated to be relatively small. Effects differ, however, between Member States and depend on the particular design of the EU Emission Trading Scheme (EU ETS).

- **Moving towards low carbon technologies**

  Extensive policy simulations support the position that only a fundamental restructuring of the energy system will allow to control climate change. Both energy efficiency and de-carbonisation measures have to be deployed to reach the required greenhouse gas stabilisation targets. Both investments in technologies and R&D investments for stimulating new low emission technologies have to be undertaken. Extensive R&D policies should therefore complement climate stabilisation policies.

  Carbon capture and storage (CCS) can supplement energy efficiency measures and large-scale development of renewables. CCS is found to be an effective measure for mitigating climate change if leakage rates of stored CO_2 are low.

- **Mobility**

  As to transport our simulations indicate that implementation of uniform economy-wide carbon prices will not succeed in triggering a transformation of the transport sector that is compatible with biofuel penetration and CO_2 intensity targets. Even in the longer term and under high CO_2 prices, emissions from ground transportation can only be reduced slightly below their baseline trend given current attitudes and behaviour. Therefore it will be necessary to implement transport-specific policy measures.

- **The role of natural resources**

  The issues of biofuel production and land use for mitigating climate change have been extensively discussed. As to the mitigation potentials of land use, a variety of options is available. The analysis shows that land-use based emissions reduction policies might contribute 13 - 52% to the proposed EU 2020 targets. In order to realise this potential, 8 - 13% of the agricultural land of the EU-25 would be needed for afforestation and for biofuel production.

Biofuels are considered a valuable option for reducing emissions in the transport sector. The analysis shows that because of differences in the efficiency of production depending on the level of output, moderate biofuel production targets will lead to an expansion of biodiesel production, while more stringent targets will be connected to an increase in bioethanol production.

- **The special position of economies in transition**

  Economies in transition face a special situation in view of sustainability issues because of the inherent dynamics of transition processes triggered by other factors than sustainability considerations, as e.g. their exposure to international competition. Environmental policies thus need to be considered in a different setting as compared to the established Member States. This is demonstrated for the Czech Republic and Poland. The analyses indicate a unique opportunity for integrating the transition to sustainable economic structures into the comprehensive transition process of the transformation of the new Member States.

Special attention was given dissemination in various aspects. Besides using the TranSust.Scan website (www.transust.org) as a communication platform both for internal and external use, two conferences targeted to particular communities were organized. The first conference served improving discussions on sustainability issues with researchers in Non-European countries as the United States and Japan. The second conference was targeted towards stakeholders from the Commission, international organisations, and companies. The project produced a large number of working papers and journal articles. In addition a special edition of the journal Energy Policy is in the publication process.

Altogether TranSust.Scan could achieve

- an awareness for a wider perspective of sustainability along the additional dimensions of competitiveness, technological change, economic development, the use of natural resources and the issue of energy security;
- operational procedures for dealing with these extended facets of sustainability in a wide range of different modelling paradigms;
- insights for current European policy tasks in the context of extended sustainability and energy and climate policies in particular for post-2012 strategies; and
- a broad dissemination of these results both to stakeholders and researchers.

Thus, TranSust.Scan can present results that fully match the targets aimed for in the work program of the project.

The TranSust.Scan consortium has thoroughly enjoyed working on this project and wants to thank to all that have inspired the design, the cooperation, and the completion of this project.

Dissemination and use

TranSust.Scan emphasised the dissemination of existing insights and new results by a communication process with stakeholders and organisations all over the world and making its outputs available to institutions involved in policy decision-making. The dissemination plan was based on four main components:

- The internet,
  to enable a wide diffusion of the insights collected and obtained within TranSust.Scan.
- Scientific events,
  to increase the communication among the involved research groups and to open discussions to the wider research and policy community both on a European and on a global scale.
- A series of working papers,
  to ensure the fast availability of the project results.
- A final comprehensive publication;
  to summarise the main findings and policy recommendations as a special journal issue.

Overall, the dissemination of knowledge has followed the following criteria:

- The need to be creative to attract the interest of potential participants (e.g. in the design of an open Conference)
- The need to address a very broad range of recipients (research community, national governments, local authorities, public and private funders, NGOs, civil society, lay people, students, etc.) in a research topic that affects everybody.
- The need to use a variety of dissemination means to reach the widest audience possible, with a specific focus on non-European institutions.

In particular, different international publications and dissemination activities were undertaken by project partners to ensure interaction with non-European institution.

Some of the papers presented at the TranSust.Scan Conference in Brussels (November 2008) shall be part of a journal special issue.

Table 1 below provides an overview of the dissemination activities implemented by TranSust.Scan.

Table 1: Overview of dissemination activities

Planned/ actual dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible/ involved
10/2006	Project Meeting in Vienna	Research community	All Countries	n/a	WIFO
1/2007	Publication of presentations of the TranSust.Scan Vienna Meeting on the TranSust.Scan webpage www.transust.org	Research community Decision-makers Stakeholders	All Countries	n/a	WIFO
1/2007	Presentation of TranSust.Scan in FEEM website	Research community Decision-makers Stakeholders	All Countries	n/a	FEEM
1/2007	Project Meeting in Prague	Research community	All Countries	small	IEEP, WIFO
2/2007	Publication of presentations of the TranSust.Scan Prague Meeting on the TranSust.Scan webpage www.transust.org	Research community Decision-makers Stakeholders	All Countries	n/a	WIFO
2/2007	Publication of a TranSust.Scan related paper on “Uncertain R&D, Backstop Technology and GHGs Stabilization” as a FEEM Working Paper 06.07.	Research community	All Countries	n/a	FEEM
2/2007	Presentation of TranSust.Scan related paper "Stringency and Distribution in the EU Emissions Trading Scheme – The 2005 Evidence” , IEWT, Vienna, Austria	Research community	All Countries	medium	WIFO
3/2007	Publication of a TranSust.Scan related paper on “The WITCH Model. Structure, Baseline, Solutions” as a FEEM Working Paper 10.07.	Research community	All Countries	n/a	FEEM
3/2007	Promotion of TranSust.Scan on FEEM/WITCH website http://www.feem-web.it/witch/	Research community Decision-makers Stakeholders	All Countries	n/a	FEEM
3/2007	Publication of the announcement of the TranSust.Scan Conference on “The Economics of Climate Change and Sustainable Development” in the FEEM website	Research community Decision-makers Stakeholders	All Countries	n/a	FEEM

3/2007	Publication of a TranSust.Scan related paper on “Stringency and Distribution in the EU Emissions Trading Scheme –The 2005 Evidence” as FEEM Working Paper 22.07.	Research community	All Countries	n/a	WIFO
5/2007	Project Meeting in Dublin	Research community	All Countries	small	UCD, WIFO
6/2007	Publication of presentations of the TranSust.Scan Dublin Meeting on the TranSust.Scan webpage www.transust.org	Research community Decision-makers Stakeholders	All Countries	n/a	WIFO
6/2007	Publication of the TranSust.Scan related paper “Carbon Sequestration with Reforestations and Biodiversity-Scenic Values” as a FEEM Working Paper 28.07.	Research community	All Countries	n/a	CSIC
6/2007	Presentation of TranSust.Scan related paper "Stringency and Distribution in the EU Emissions Trading Scheme – First Evidence” , Stanford, California	Research community	All Countries	medium	WIFO
6/2007	Presentation of TranSust.Scan related paper "Stringency and Distribution in the EU Emissions Trading Scheme – First Evidence” , Thessaloniki, Greece.	Research community	All Countries	medium	WIFO
6/2007	Presentation of TranSust.Scan related paper "Geological CO2 Storage and Leakage" EAERE Conference 2007, Thessaloniki, Greece.	Research community	All Countries	medium	ECN
6/2007	Presentation of TranSust.Scan related paper “Optimal Energy Investment And R&D Strategies To Stabilise Greenhouse Gas Atmospheric Concentrations” RISO International Energy Conference 2007, Copenhagen, Denmark.	Research community	All Countries	medium	FEEM
6/2007	Presentation of TranSust.Scan related paper “Uncertain R&D, Backstop Technology and GHGs Stabilization " at the 9th IAEE European Energy Conference, http://www.iaeeu2007.it/	Research community	All Countries	medium	FEEM
6/2007	Publication of a TranSust.Scan related paper on “Optimal Energy Investment And R&D Strategies To Stabilise Greenhouse Gas Atmospheric Concentrations” as a FEEM Working Paper 95.07.	Research community	All Countries	n/a	FEEM

6/2007	Presentation of the TranSust.Scan related paper “Carbon Sequestration with Reforestations and Biodiversity-Scenic Values” at the EAERE Workshop on Carbon Sequestration in Agriculture and Forestry. Thessaloniki, Greece.	Research community	All Countries	medium	CSIC
6/2007	Presentation of the TranSust.Scan related paper “The effect of different biological or physical sequestration functions on the time path and implementation of carbon sequestration” at the EAERE Workshop on Carbon Sequestration in Agriculture and Forestry. Thessaloniki, Greece.	Research community	All Countries	medium	CSIC
8/2007	Presentation of TranSust.Scan on FEEM Newsletter	Research community Decision-makers Stakeholders General public	All Countries	Large (1144)	FEEM
9/2007	TranSust.Scan Conference on “The Economics of Climate Change and Sustainable Development”	Research community Decision-makers Stakeholders	All Countries	n/a	FEEM
9/2007	Publication of papers and presentation of the TranSust.Scan Conference on “The Economics of Climate Change and Sustainable Development” on FEEM website http://www.feem.it/Feem/Pub/Conferences/Programmes/CONP2007-09-27-01.htm?SC_Month=9&SC_Year=2007	Research community Decision-makers Stakeholders	All Countries	n/a	FEEM
9/2007	Publication of a TranSust.Scan related paper on “The impacts of long-term CO2 objectives on short-term transportation trends in the European Union”, in *Energy for Sustainable Development*, vol. XI, no. 3	Research Community	All Countries	n/a	SMASH/ CIRED, UCD
10/2007	Presentation of TranSust.Scan related paper "Stringency and Distribution in the EU Emissions Trading Scheme – First Evidence” , CGET, Munich, Germany	Research community	All Countries	medium	WIFO
4/2007	Publication of a TranSust.Scan related paper on “Modelling linkages between climate policy and land use: An Overview” as a Kiel Working	Research community	All Countries	n/a	IfW

	Paper 1323				
5/2007	Publication of a TranSust.Scan related paper on “Modelling linkages between climate policy and land use: An Overview” as a FEEM Working Paper 56-2007	Research community	All Countries	n/a	IfW
4/2007	Presentation of TranSust.Scan related paper “Biofuels and Climate Policies” at the 70. Scientific meeting of the ARGE (Arbeitsgemeinschaft deutscher wirtschaftswissenschaftlicher Forschungsinstitute – Working group of German economic research institutions) in Berlin	Research community	Germany	medium	IfW
9/2007	Presentation of TranSust.Scan related paper “Biofuels and Climate Policies” at the TranSust.Scan conference on Sardinia	Research community	All Countries	medium	IfW
10/2007	Publication of a TranSust.Scan related paper on “Biofuels and Climate Policy” in Applied Economics Quarterly Vol 53 Supplement (2007)	Research community	All Countries	n/a	IfW
9/2007	Publication of a TranSust.Scan related paper on “Distribution Matters – taxes vs. Emissions Trading in Post-Kyoto Climate Regimes” as a Kiel Working Paper 1380	Research community	All Countries	n/a	IfW
5/2007	Presentation of “Stern’s Review, Critiques, and Replies”, Dublin, by R. Gerlagh	Research community	All Countries	small	IVM
9/2007	Presentation of “Linking Climate and Innovation policy”, Sardinia, by R. Gerlagh	Research community	All Countries	small	IVM
04/2008	Project Meeting in Madrid	Research community	All Countries	small	CSIC
05/2008	Publication of presentations of the TranSust.Scan Madrid Meeting on the TranSust.Scan webpage www.transust.org	Research community Decision-makers Stakeholders	All Countries	n/a	WIFO
01/2008	TranSust.Scan related paper: Bosetti, V., C. Carraro, E. Massetti, A. Sgobbi and M.Tavoni (2008) "Optimal Energy Investment and R&D Strategies to Stabilise Greenhouse Gas Atmospheric Concentrations", published in Resource and Energy Economics	Research community	All Countries	n/a	FEEM
05/2008	Publication of a TranSust.Scan related paper on “Uncertain R&D, Backstop Technology and GHGs	Research community	All Countries	n/a	FEEM

	Stabilization", on Energy Economics				
07/2008	TranSust.Scan related paper Bosetti, V. Buchner, B. (2008) "Using DEA to assess the Relative Efficiency of Different Climate Policy Portfolio published in Ecological Economics	Research community	All Countries	n/a	FEEM
06/2008	Publication of a TranSust.Scan related paper on "CO2 Capture and Storage with Leakage in an Energy-Climate Model", on Environmental Modeling and Assessment, forthcoming, 2008.	Research community	All Countries	n/a	ECN
12/ 2008	Final TranSust.Scan Workshop in Brussels	Research community	All Countries	n/a	WIFO
2008	TranSust.Scan related paper Claudia Kettner, Angela Koppl, Stefan P Schleicher and Gregor Thenius (2008) Stringency and distribution in the EU Emissions Trading Scheme: first evidence. Climate Policy, Volume 8, Number 1, 2008, p.41-61.	Research community	All Countries	n/a	WIFO
3/2008	Presentation of a TranSust.Scan related paper on "Distribution Matters – taxes vs. Emissions Trading in Post-Kyoto Climate Regimes" at the NERO/OECD Workshop „The Economic of Climate Change" in Paris	Research community Decision-makers Stakeholders	All Countries	medium	IfW
6/2008	Presentation of a TranSust.Scan related paper on "Distribution Matters – taxes vs. Emissions Trading in Post-Kyoto Climate Regimes" at the EAERE conference in Gothenburg	Research community	All Countries	medium	IfW
9/2008	Presentation of a TranSust.Scan related paper on "Distribution Matters – taxes vs. Emissions Trading in Post-Kyoto Climate Regimes" at annual meeting of the "Verein für Socialpolitik" in Graz	Research community	All Countries	medium	IfW
9/2008	Publication of the announcement of the TranSust.Scan Conference on "The Economics of Climate Change and Sustainable Development" at www.transust.org	Research community Decision-makers Stakeholders	All Countries	medium	WIFO
11/2008	TranSust.Scan Conference in Brussels	Research community Decision-makers Stakeholders	All Countries	medium	WIFO UCD

11/2008	TranSust.Scan related paper “The Competitiveness effects of the EU climate policy” s a Kiel Working Paper 1464	Research community	All Countries	n/a	IfW
11/2008	Presentation of the TranSust related paper “The competitiveness effects of EU climate policy” at the TranSust.Scan final conference in Brussels	Research community Decision-makers Stakeholders	All countries	medium	IfW
12/2008	Publication of presentations of the TranSust.Scan Conference in Brussels on the TranSust.Scan webpage www.transust.org	Research community Decision-makers Stakeholders	All Countries	n/a	WIFO
2008	TranSust.Scan related paper Claudia Kettner, Angela Koppl and Stefan P Schleicher (2009) Empowering the EU ETS allowance market: safeguarding against price volatility and carbon leakage. Submitted at the 2009 EAERE conference.	Research community	All Countries	n/a	WIFO
11/2008	Bízek, V. (2008) Nový trend : Integrovaný přístup k ochraně ovzduší a klimatu [New trend: Integrated approach to air and climate protection] ERGO journal, Prague TranSust.Scan related paper	Decision makers Stakeholders	Czech Republic	medium	IEEP
1/2009	Jilkova, J., Knapek, J., Bizek, V. (2009) Integration of policies related to climate and energy TranSust.Scan related working paper www.ieep.cz	Research Community	All countries	medium	IEEP
2008	Interdisciplinary Bilateral Winter and Summer School on Energy Systems in Austria and Czech Republic The course Energy and Society is accredited at the University of Economics in Prague) TranSust.Scan related results presented and discussed	University students	Austria Czech Republic	medium	IEEP + WIFO
04/2008	Presentation “Strategic Oil Dependence”, Madrid, by R. Gerlagh	Research community	All Countries	small	IVM
06/2008	Publication of a TranSust.Scan related paper on “CO2 Capture and Storage with Leakage in an Energy-Climate Model”, on Environmental Modeling and Assessment, forthcoming, 2008.	Research community	All Countries	n/a	ECN/IVM
6/2008	Presentation of TranSust.Scan related paper “CCS & Competitive-	Research	All Coun-	medium	IVM

	ness (in the Triple-20 Context)" in Brussels, by R. Gerlagh	community Decision-makers Stakeholders	tries		
08/2008	Publication of Discussion Paper "Climate Policy and the Problem of Competitiveness: BTA or IET?"	Research community	All Countries	medium	ZEW
2008	Publication of Discussion Paper "Sensitivity Analysis – A Systematic Approach"	Research community	All Countries	medium	ZEW
2008	Publication of Policy Article "Ökologisches Wirtschaften"	Research community	All Countries	large	ZEW
2008	Presentation at International Conference EAERE of TranSust.Scan related paper	Research community	All Countries	large	ZEW
2008	Presentation at International Conference IAEE of TranSust.Scan related paper	Research community	All Countries	large	ZEW
2008	Presentation at International Conference EcoMod of TranSust.Scan related paper	Research community	All Countries	large	ZEW
2008	Presentation at Venice EAERE Summer School of TranSust.Scan related paper	Research community	All Countries	Small	ZEW
12/2008	Publication of a TranSust.Scan related paper on "Economics of geological CO2 storage and leakage" on Climatic Change, forthcoming, 2009.	Research community	All Countries	n/a	ECN/IVM
12/2008	Publication of a TranSust.Scan related paper on "Sharing the burden of adaptation financing", as an IVM report 08/05	Research community	All Countries	n/a	IVM
12/2008	Presentation of a TranSust.Scan related paper on "Sharing the burden of adaptation financing" at a side-event of the UN Conference of Parties 14 in Poznan	Research community Decision-makers Stakeholders	All Countries	medium	IVM
1/2009	TranSust.Scan related paper Bosetti, V., C. Carraro, E. Massetti (2008) " Banking Permits: Economic Efficiency and Distributional Effects", published in the Journal of Policy Modeling	Research community	All Countries	n/a	FEEM
1/2009	TranSust.Scan related paper Ovando and Caparrós (2009) "Land use and carbon mitigation in Europe: A survey of the potentials of	Research community	All Countries	n/a	CSIC

	different alternatives", published in Energy Policy 37: 992–1003				
1/2009	Jilkova, J., Knapek, J., Bizek, V. (2009) Integration of policies: Potential for Cost Savings vs. Bureacratic Labyrinth Paper submitted to the Prague Conference on Political Economy TranSust.Scan related paper	Research Community	Central Europe	medium	IEEP