



iTREN-2030

Integrated transport and energy baseline until 2030

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Results from the iTREN-2030 workshops

Deliverable D1



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Integrated transport and energy baseline until 2030

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1 Introduction

1.1 Background iTREN-2030

During the 1990ies the transport policy focus laid on issues like facilitating intermodal transport, achieving modal-shift, implementing the Trans-European Transport Networks (TEN-T), introducing transport pricing and reducing environmental impacts of transport. In particular, the sharp oil price jumps, brought further priority issues on the agenda of transport policy making:

- the security of energy supply for mobility of goods and services;
- the transition from a purely fossil fuel based transport system to a transport system based on a diversity of fuels.

These newly emerging policy issues require a substantial extension of the available toolbox, which is used in Europe for scenario analysis and transport policy assessment. In particular, this is necessary in order to capture the implications of alternative technologies and new energy carriers entering the transport markets and affecting both the energy system, the transport system and the economic system. iTREN-2030 is contributing to the extension of the European policy assessment toolbox providing improved tools as well as a consistent energy and transport baseline scenario for the EU until 2030.

iTREN-2030 improves and applies four European models to generate the baseline scenario:

- ASTRA an integrated and strategic transport-**economy** assessment model,
- POLES a global **energy** model describing the supply- and demand-side of the world energy markets from a technology bottom-up perspective,
- TRANS-TOOLS a European **transport** model focusing on the medium- to long-distance transport flows on the European transport networks, and
- REMOVE an **environmental** assessment model providing vehicle fleet, fuel consumption and emission indicators for the European transport system.

1.2 Objective of work package 1 (WP1)

Within the iTREN-2030 project, the overall objective of WP1 is:

- to identify user needs amongst stakeholders;
- to establish project linkages;

- to inform stakeholders on progress, approach and first results;
- to get feedback from stakeholders on methodology, assumptions, scenarios and results.

1.3 Stakeholder process and workshops

This objective is achieved by organising four workshops and a final conference with stakeholders in Brussels.

- First workshop: *User needs and required features from the iTREN-2030 project*, organised on 27th of November in Brussels.
- Second workshop: *Assumptions and key trends for the iTREN-2030 baseline scenario*, organised on 3rd of April 2008 in Brussels.
- Third workshop: *Scenarios and policies for the iTREN-2030 baseline: Energy, transport, technology and emissions policies*, organised on the 19th of November 2008.
- Fourth workshop: *Integrated scenario on transport and energy until 2030 and potential impact of the economic crisis on transport*, organised on the 22nd of April 2009.
- Final Conference iTREN-2030, organized on the 21st of October 2009.

These workshops and final conference have been attended by participants from the European Commission (in particular DGs TREN, ENV, ECFIN and JRC), National Ministries and National Agencies of different member states, representatives of the automotive industry, energy industry, NGOs, banks, research and consultancy organisations.

1.4 Content of this deliverable

In this Deliverable D1 the main results of the workshops and the final conference are described. In the chapters 2 to 5 for each of the four workshops the goal of the workshop is described, a summary of the main comments and suggestions made by the stakeholders is given and an overview of the way these comments and suggestions have been taken into account in the iTREN-2030 project is included. In chapter 6 an overall summary of the workshops is included and it is described how the stakeholder comments have been taken into account in the project. Finally, in chapter 7 an overview of the final conference is given.

2 First workshop: User needs and required features from the iTREN-2030 project

Goal of the workshop

The objectives of the first workshop of the iTREN-2030 project were:

- To present the background, objective, methodology and expected results from the iTREN-2030 project;
- to get a better understanding of planned EC policies and the relation with the iTREN-2030 project;
- to get a better understanding of the current use of scenarios and modeling in the fields of transport, environment, energy and economy in different Member States;
- to get a better understanding of the user needs and required features from the iTREN-2030 project at the EC and at the Member States.

The morning session of the workshop dealt with the first three objectives. These topics have been presented by the iTREN-2030 consortium, the European Commission and four Member States:

- iTREN-2030 project and model overview.
- European transport and energy policy agenda.
- Experiences in EU member states.

In the afternoon session, the last objective – the user needs and required features from the iTREN-2030 project – has been discussed in a number of separate working groups. The aim of the working group discussions (each with a limited number of about 15 participants) was to get as much interaction with all participants as possible. Finally, a feedback plenary session summarized the results from the break-out groups.

Summary of main comments and suggestions made by the stakeholders

About 45 persons attended the workshop representing different levels of policy making ranging from the European Commission (in particular DGs TREN, ENV and JRC) to National Ministries and National Agencies of different member states as well as representatives of the automotive industry, banks, research and consultancy.

The main results of the workshop can be summarized as:

1. Novelty of sophisticated integrated energy-transport-technology assessment:

From the viewpoint of the European Commission the iTREN-2030 project is the first project that combines policy assessment of the four fields energy, transport and both their technologies, economy and environment in an equally sophisticated manner on the Euro-

pean level. In that sense the project was seen by the audience as a novelty being ambitious and very much needed.

2. Different potential use of iTREN-2030 in different countries:

Different member states have built-up varying levels of capabilities for policy assessment in the transport-energy-economy field. Countries already having advanced models of their own would rather be interested in **comparing the results** of iTREN-2030 scenarios with results obtained from their own model-based analysis. Countries not disposing of these type of advanced models, yet, would have the interest to **apply the methodology** themselves for their countries to develop and assess potential future scenarios and derive policies in particular for strategies to mitigate climate impacts.

3. Interest of the automotive industry:

The automotive industry is also interested to obtain the results of the iTREN-2030 baseline and scenarios on the potential developments in the energy-transport-technology fields. This could support their strategic decision-making, although they would also apply their own analytic tools. Further, they would like to be involved continuously in the course of the project.

4. Prerequisite for usability: validation and transparency:

Both the policy-makers from the Member States and the participants from the automotive industry stated that the prerequisite for them to make use of iTREN-2030 is that the results of the project are thoroughly validated using data or results of other studies and that validation and assumptions will be made transparent to the users. Ideally, assumptions should be harmonized between iTREN-2030 and other analyses that intend to make use of the results of the project. This raised the demand for intensified communication with the potential users.

5. Consistency between iTREN-2030 databases and national statistics:

Differences in analytic results of national analyses and iTREN-2030 may also occur because of differences in the databases on which both approaches are built. iTREN-2030 is based on Eurostat data and on outcomes of previous projects, which both may differ from national statistics. An effort should be made to explain where and why the applied statistics of iTREN-2030 differ from national statistics and why these differences mainly due to differing definitions are occurring. Here it was also suggested that Eurostat makes an effort to

harmonize the data definitions better with national statistics, such that modeling attempts on European level are not anymore facing the problem of discrepancy with national statistics.

6. Considering trend breaks:

The probability of significant trend breaks to happen until the time horizon 2030 was considered by the participants to be very high. Reasons for such trend breaks could come from ambitious climate policy, high oil prices due to growing demand facing supply limitations or technology breakthrough in the vehicle drive train technologies. Though the models could not forecast such break in trends it should be considered to run some scenario tests that reflect such break in trends to get an idea in which way the model system should be improved to handle break in trends. Even though break in trends may occur within the horizon of the year 2030 the bulk of changes would appear later, which raises the need for forecast going beyond 2030 to a horizon like 2050. It was agreed that this should be approached in future extensions of the model suite.

Overall the workshop was seen as being very successful because it managed to stimulate the discussions between the project team and the various stakeholders from the European Commission, the Member States and the private sector. Further, the project team received a number of very valuable comments that will influence its future work, thus making the results more accessible and useful for potential users.

As next steps the iTREN-2030 project team both will follow its original work-program, taking into account the suggestions provided in the workshop. iTREN will update the applied models TRANSTOOLS, TREMOVE, POLES and ASTRA and create a coherent baseline scenario until 2030 that covers the energy-transport-technology-economy fields in an integrated manner. Due to the success of this workshop and the request for additional communication it is planned to host an additional workshop on the topic of assumptions and major trends in iTREN-2030 in comparison with national scenario assessments. Stakeholders from the member states in the energy, transport, technology and economic field are invited to present their scenario assumptions at this occasion. This workshop should contribute to increase **transparency** of the iTREN-2030 approach and provide insights and advice on the **consistency** of assumptions with national scenarios.

More background material on the workshop including the presentations is included on the iTREN-2030 website:

<http://www.isi.fraunhofer.de/projects/itren-2030/workshop-nov-2007.htm>.

Actions taken by the iTREN-2030 project based on comments and suggestions made by the stakeholders

Novelty of sophisticated policy assessment

Although it is an ambitious goal, the project is seen by the stakeholders as a novelty of sophisticated policy assessment combining the four fields energy, transport, economy and environment on the European level.

It is the goal of the iTREN-2030 project to link the four models in the mentioned fields and to develop and run a number of scenarios. The added value of the project concerns the linking of the models and the ability to run scenarios with the four models producing consistent results in the fields of energy, transport, economy and environment. This added value will be demonstrated in the scenario results.

Different potential use of iTREN-2030 in different countries

In the process of identifying user needs amongst the stakeholders, it became clear that the iTREN-2030 results will be used in different ways by different countries. Countries already having advanced models will use the iTREN-2030 results for comparison. Countries with less advanced tools will use the results or apply the methodology for their country.

In the first place, the iTREN-2030 project will be developed as a policy tool for the European Commission. In the iTREN-2030 project comparisons have been made with project results from other European studies or with statistics in Member States. The methodology is described in a transparent way, supporting the possibility to apply the iTREN-2030 methodology or results in specific Member States.

Strong interest in iTREN-2030 scenario development and results

Stakeholders from the automotive industry expressed their interest in the iTREN-2030 scenario development and results. Especially concerning the potential developments in the energy-transport-technology fields. This can be useful input for their strategic decision-making.

In the iTREN-2030 project, the automotive industry (and all other stakeholders) have been involved extensively in the course of the project.

Validation and transparency of methodology and results

Stakeholders are very much interested in using the results, but only if the assumptions and the methodology are transparent and if the results are validated against data or results of other studies.

This comment was agreed upon by most of the stakeholders. Since originally, two workshops were planned – one at the start and one near the end of the project – this raised the demand for intensified communication with the potential users. Therefore, in the iTREN-2030 project a number of actions have been taken:

- Descriptions of the four models have been put on the iTREN-2030 website, see <http://www.isi.fraunhofer.de/projects/itren-2030/models.htm>.
- Instead of the originally planned 2 workshops, in total 4 workshops with stakeholders have been organized to discuss assumptions, methodology, scenarios and results.
- Comparisons of the iTREN-2030 results with results of other projects have been made for validation. Comparisons have been made between the reference scenario and the integrated scenarios within the iTREN-2030 project, between iTREN-2030 and TEN-CONNECT results and between iTREN-2030 and TRANSVISIONS results).

Consistency between iTREN-2030 data and national statistics

iTREN-2030 is based on Eurostat data and on outcomes of previous projects, which both may differ from national statistics. The stakeholders stated that an effort should be made to explain where and why difference occur between data used in iTREN-2030 and national statistics.

To cover this comment, the topic of the additional second workshop was about assumptions and major trends in iTREN-2030 in comparison with national scenario assessments. The aim of this workshop was to contribute to the transparency of the iTREN-2030 approach and to provide insights and advice on the consistency of data and assumptions with national scenarios.

Trend breaks

Until the time horizon 2030, there is a high probability that trend breaks will happen such as ambitious climate policy, high oil prices or technology breakthrough. Although the models are not able to forecast such trend breaks, the stakeholders asked the iTREN-2030 project:

- To show the impact of such trend breaks;
- to indicate how the model system should be improved to handle break in trends;
- to extend the time horizon in the iTREN-2030 project to 2050 in order to take trend breaks fully into account.

In the iTREN-2030 project, trend breaks like high oil price, ambitious climate policy, introduction of electric vehicles and the economic crisis are taken into account in the scenarios and the models are run to reflect the impact of these trend breaks. These trend breaks are introduced exogenously in the models, in most cases it is not possible to introduce these developments endogenously.

Concerning the extension of the time horizon to 2050 it was agreed to approach this in future developments of the model suite. It should be noted that two of the models, ASTRA and POLES, are already applied for analysis until 2050 and thus can already simulate for this time horizon (see Schade/Fiorello et al. 2008a).

3 Second workshop: Assumptions and key trends for the iTREN-2030 baseline scenario

Goal of the workshop

The first workshop discussed the user needs and the required features from the iTREN-2030 project. From the workshop, it emerged that transparency in the process of developing the project baseline and the involvement of stakeholders and country experts for discussing the key assumptions used in the models is recommended in order to improve the acceptability and the usefulness of the iTREN-2030 integrated tools and results. Therefore, the objectives of the second workshop of the iTREN-2030 project were:

- To discuss the reliability and improve the information used for the validation of the models;
- to present the assumptions adopted in the definition of the iTREN-2030 baseline;
- to present the way how models incorporate assumptions and simulate future trends;
- to compare the model assumptions with the expectations of stakeholders, country representatives and the European Commission.

The workshop was divided into four sessions, each one dedicated to one aspect:

- Session 1: Economic growth and international trade.
- Session 2: Passenger and freight mobility trends.
- Session 3: Energy supply and alternative energy sources.
- Session 4: Environmental issues and vehicle fleet development.

The sessions were conceived to be started by a presentation of the iTREN-2030 project proposing a set of expected trends, which then were commented by an expert panel. An input note was provided to the panelist summarising the expected trends of iTREN-2030 (Schade/Fiorello et al. 2008b).

Summary of main comments and suggestions made by the stakeholders

The second workshop of the iTREN-2030 project held on April 3rd 2008 in Brussels was attended by more than 50 persons, including many representatives from different directorates of the European Commission, experts from the banking sector, the automobile industry and the energy sector as well as scientists from different disciplines.

The three most relevant comments raised by several roundtable speakers and participants concerned:

1. A clear definition of **meaning and content of scenarios** in iTREN-2030 is required. Since the purpose of iTREN-2030 is to prepare an integrated baseline for energy and transport a number of suggestions were made. In particular, two suggestions seemed to be relevant:
 - "Frozen policy 2008" scenario including policies that would be decided by the European Parliament and the EU Council by mid 2008, but excluding any other policies even though plans could be anticipated. We would call this a **Reference** Scenario.
 - "Major likely policies until 2030" scenario including policies that are highly relevant for the energy and transport system and that are likely to be taken in the next two decades. We would call this a **Baseline** Scenario.
2. Even a **Baseline** Scenario will have to **include radical changes**. Thus mere trend extrapolation seems not to be adequate. Radical changes could concern the availability of oil facing scarcity problems in the next decades. The expectation about when scarcity emerges ranges from in a few years up to not until the project's time horizon of 2030. Another field of radical changes would concern transport technologies, where e.g. the market introduction of battery electric vehicles seems quite possible having also significant impacts on the transport-energy system.
3. **Transparency** is a key issue to create acceptance and understanding of the iTREN-2030 baseline. Three major issues were raised:
 - the differentiation what is exogenous and what is endogenous to the iTREN-2030 models;
 - the specification of the exogenous assumptions;
 - the definition of policies that are considered in the Baseline Scenarios.

Looking at the four different fields tackled in the workshop (1) economy and trade, (2) transport, (3) energy, (4) emissions and vehicles further specific comments arose.

Concerning the economy the iTREN-2030 team put some emphasis on the economic risks of the US and Chinese economy that could be negatively affected by resource scarcity and financial risks (e.g. US government deficit, Chinese currency linked to US\$), which in turn would also affect the EU economy. The comments at the workshop argued that these risks seem to be limited while the issues of human capital building in a world of migration and ageing as well as the impacts of agglomeration economies seems to be of higher importance.

Concerning transport it was pointed out that behavioural changes (e.g. reurbanization and car-sharing) as part of the radical changes could strongly adapt transport demand. There was dissent about a number of issues, in particular about the elasticity of transport to further increases of transport cost (e.g. due to oil scarcity) with some arguing that transport has proven to be quite inelastic while others foresee that thresholds are or will be reached beyond which transport demand becomes elastic. Further disagreement concerned the growth of rail transport i.e. if it would reveal higher growth rates than the other modes, as expected by the modelling approach.

Concerning the energy system, of course the most debated issues were the oil price and the expected year of peak-oil production where the expectation of sustained high oil prices was not questioned but the issue of physical scarcity in the next years was put on the table. The problem was also raised how a baseline scenario should handle the setting of targets by policy-makers (e.g. the renewables targets for 2020) without the specification of the corresponding policy measures, since the models would require an actual specification of measures to be able to consider the changes caused by the policy.

Concerning emissions and vehicle fleets the most important drivers of changes seem to be technical progress (e.g. gradual and step changes like electric vehicles) and the further development of climate policy, for which again the targets are better specified than the policy measures. Overall, in the next years the well-to-tank emissions will increase in importance compared with the tank-to-wheel emissions.

Further general comments included (1) that the one Baseline Scenario is not sufficient to guide decision-makers, but that sensitivities and development paths would also provide required information, (2) that the implementation of policies has to be consistent across all fields e.g. either based on policy measures for all fields or on targets, or either based on frozen policy 2008 of all fields or on likely policies until 2030, and (3) that the effectiveness of policy measures would be another parameter shaping the results in reality and thus should be considered with the scenario design and the models.

More background material on the workshop including the presentations is included on the iTREN-2030 website:

<http://www.isi.fraunhofer.de/projects/itren-2030/workshop-apr-2008.htm>.

Actions taken by the iTREN-2030 project based on comments and suggestions made by the stakeholders

Definition of meaning and content of scenarios in iTREN-2030 needs to be clear

After a discussion on the meaning and content of scenarios in iTREN-2030, the stakeholders made the suggestion to apply the following two scenarios in the model:

- "Frozen policy 2008" scenario including policies that would be decided by the European Parliament and the EU Council by mid 2008, but excluding any other policies even though plans could be anticipated. We would call this a **Reference** Scenario.
- "Major likely policies until 2030" scenario including policies that are highly relevant for the energy and transport system and that are likely to be taken in the next two decades. We would call this a **Baseline** Scenario. Later on this was called Integrated Scenario.

In the iTREN-2030 project these scenarios have been elaborated and they have been run with the iTREN-2030 modelling suite.

Radical changes in the Baseline Scenario

It was stated that even in a baseline scenario, radical changes are expected to take place. A consequence of this is that mere trend extrapolation do not seem to be adequate.

In the iTREN-2030 project, trend breaks like high oil price, ambitious climate policy, introduction of electric vehicles and the economic crisis haven been taken into account in the scenarios and the models are run to reflect the impact of these trend breaks.

Key issue to create acceptance and understanding of the iTREN-2030 baseline: transparency

The stakeholders indicated that transparency is a key issue to create acceptance and understanding of the iTREN-2030 baseline. Three major issues were raised:

- the differentiation what is exogenous and what is endogenous to the iTREN-2030 models;
- the specification of the exogenous assumptions;
- the definition of policies that are considered in the Baseline Scenarios.

In the iTREN-2030 project, these topics have been covered in a third additional workshop on scenarios and policies for the iTREN-2030 baseline.

Sensitivity analyses needed to get more insight in the impact of (combined) developments

To guide policy-makers in their decision process, one scenario is not enough. Sensitivity analyses can provide a good insight in the impact of (combined) developments.

In the iTREN-2030 project both a reference and an integrated baseline scenario have been developed and run. By comparing the results of these two scenarios one gets an idea about the impact of the additional developments in the integrated scenario. Besides, in the iTREN-2030 project some policy packages have been developed and test runs have been made in order to develop the integrated baseline scenario (separate results have not been presented).

The main goal of the iTREN-2030 project was to link the models and test the approach by running 1 or 2 scenarios. More extensive scenario development and testing (sensitivity analysis) can be done with the results of the iTREN-2030 project once it is finished.

Consistent implementation of policies across all fields

The implementation of policies has to be consistent across all fields e.g. either based on policy measures for all fields or on targets, or either based on frozen policy 2008 of all fields or on likely policies until 2030.

In the iTREN-2030 project it is important that the models are linked in a consistent way and that scenario developments (autonomous developments and policies) are translated into consistent input in the four models. Much effort has been put on modifying inputs

and checking consistency. Furthermore, this consistency has been one of the topics of the third additional workshop on scenarios and policies for the iTREN-2030 baseline.

For scenario development the effectiveness of policy measures should be taken into account

It was stated that in order to create realistic scenario, effectiveness of policy measures should be taken into account.

In the iTREN-2030 project, for the selection process of policies to be included in the scenarios the following criteria have been applied: **relevance** of impact and **likeliness** of implementation.

4 Third workshop: Scenarios and policies for the iTREN-2030 baseline: Energy, transport, technology and emissions policies

Goal of the workshop

From the first two workshops, it emerged that transparency in the process of developing the project baseline is the key for acceptability of the baseline scenario and that design and purpose of the scenario needs further clarification. Therefore, the objectives of this third workshop of the iTREN-2030 project was:

- To explain and discuss the design and purpose of the iTREN-2030 scenarios;
- to elaborate on and clarify the list of transport, technology and energy policies that should become part of a European Baseline Scenario;
- to present and discuss draft scenario results for the energy, technology and emission domains (the transport demand domain will be focus of the next workshop).

The workshop was divided into three sessions:

- Session 1: Scenario design in iTREN-2030.
- Session 2: Relevant and likely policies in a European Transport and Energy Baseline Scenario.
- Session 3: Draft scenario results of a European Baseline Scenario with a focus on the second session.

An input note was provided making a proposal how the scenarios should be defined and which policies would be included in the reference scenario and in the integrated scenario (Schade/Doll et al. 2008).

Summary of main comments and suggestions made by the stakeholders

The third workshop of the iTREN-2030 project hold on November 19th 2008 in Brussels was attended by more than 60 persons, including many representatives from different directorates of the European Commission, experts from the airline industry, the automobile industry, the oil industry, the energy utilities and a number of NGOs as well as scientists from different disciplines.

The three most important comments from the stakeholders at the workshop can be summarized as:

1. On scenarios:

Since the European Commission has developed already a Baseline Scenario for the energy field based on PRIMES model computations and is developing a Baseline Scenario for the transport field based on TRANSTOOLS model computations in the TEN-Connect study, there is no room for a parallel baseline scenario from the iTREN-2030 project. Thus the recommendation was for a reframing of the scenarios keeping the **Reference Scenario** as the frozen-policy-2008 scenario and the likely policy scenario as the **Integrated Scenario**, as the most outstanding element of the iTREN-2030 scenario is the consistent integration of energy and transport into one scenario analysis.

2. On policies:

The iTREN-2030 project suggested two main criteria to decide, which policies would have to be considered for a realistic integrated energy and transport scenario until 2030: **relevance** of impacts and **likeliness** of implementation. In general, these two criteria were agreed to be sufficient and decisive to select policies for the scenarios. Based on this criteria the iTREN-2030 Consortium presented lists of policies to feed into policy tests of the project and finally to assemble the Integrated Scenario. A crucial issue was the sensitivity of the topic to suggest highly likely policies by the European policy-makers. In several cases, policies are currently debated in the political process or are elaborated on in preparatory phases before the first draft is feeding into such a process. During these phases European Commission officials find it difficult to provide clear advice on possible policies without endangering the ongoing policy-making process. Thus the more the iTREN-2030 Consortium acknowledges the general encouragement of the workshop to consider policies that would be more ambitious than originally suggested by the Consortium. This considered in some cases the earlier introduction of a policy, while in other cases the strengthening of a policy in the period 2020 to 2030 was recommended.

One particular issue on policy-making was raised by the car manufacturers: changes in energy supply, transport policy and climate policy are expected to be significant in the next two decades and thus will affect their investment decisions. In other words, policy-making clearly affects industry decisions. Thus it is of utmost importance that policy-making is fast and clear, such that (higher) certainty for investments over a time horizon of 7 to 15 years can be achieved, which would be the time horizon of one or two new generations of cars.

3. On validation:

The issue of validation of the iTREN-2030 modelling suite was raised once again. A validation in the sense of writing a scientific paper with all equations and enabling rebuilding the model by other groups is not feasible due to the size of the models. A validation by applying the models to past policies raises the problem to identify the counterfactual i.e. what would have been the past development without the policy. An element of validation is that the four models applied in iTREN-2030 are to different degrees calibrated to historic developments, though one should note that in periods with significant changes and trend-breaks a focus on calibration to the past would be misleading. Thus besides calibration the suitable way for validation seems to be to run sensitivity test and to interact with scientists and stakeholders on the assumptions and results of these tests. The iTREN-2030 project will implement this approach with the policy tests that are run to generate the results for the two scenarios and by discussing the results in the next workshop and the Final Conference. As final remark one should note that as Popper said validation is only feasible in case of falsification, such that as long as the models generate plausible results a comprehensive validation will not be possible.

A number of issues have been raised at the workshop that are not in the scope of the iTREN-2030 project, because these would require a change of the approach. First, iTREN-2030 is a project providing tools and advice for strategic assessment. That means, neither short-term reactions i.e. the turbulences on financial markets in the next days or weeks and their short-term impacts are not assessable nor are the details of a specific policy focusing e.g. on infrastructure charging of one particular mode the issue.

Instead, strategic assessment means to provide capabilities for integrated assessment of policy bundles in the energy and transport field for the medium-term to long-term horizon until 2030. This incorporates to assess both the direct effects in the energy and transport system and the indirect effects on environment and the economic system as well as to consider the feedback effects that occur between the different systems.

More background material on the workshop including the presentations is included on the iTREN-2030 website:

<http://www.isi.fraunhofer.de/projects/itren-2030/workshop-nov-2008.htm>.

Actions taken by the iTREN-2030 project based on comments and suggestions made by the stakeholders*Focus on added value of the iTREN-2030 project: consistent integration of energy and transport into one scenario analysis*

The EC has already a baseline scenarios for energy (based on PRIMES) and transport (based on TRANS-TOOLS). There is no room for a new baseline scenario from iTREN-2030.

In the iTREN-2030 project the focus is not to develop a new baseline scenario for the EC, but to show the added value of the consistent integration of energy and transport into one scenario analysis.

Highly likely policies

The stakeholders agreed with the criteria for policy selection in the integrated energy and transport scenario until 2030. These criteria are relevance of impact and likeliness of implementation. Furthermore, an issue was the sensitivity of the topic to suggest highly likely policies by the European policy makers leading to an earlier introduction of policies or strengthening policies in the period 2020 - 2030.

In the iTREN-2030 project the integrated baseline scenario is a more conservative scenario not covering extreme developments. Although the scenario can be seen as conservative, it includes most of the highly likely policies.

Validation of the iTREN-2030 modelling suite

As raised in earlier workshops, the issue of validation of the iTREN-2030 modelling suite was discussed again.

In the iTREN-2030 project, validation has taken place by amongst others running sensitivity tests (intermediate results) and discussing the outcomes of these tests with scientists and stakeholders in the fourth workshop and the final conference.

5 Fourth workshop: Integrated scenario on transport and energy until 2030 and potential impact of the economic crisis on transport

Goal of the workshop

The focus of the fourth workshop was twofold: first, to discuss the transport demand forecast of iTREN-2030, and second to shed light on the emerging but urgent question if and how the current economic crisis would affect such an integrated transport and energy scenario.

Thus the three objectives of the workshop were:

- To present and discuss first draft scenario results for the transport domain generated by the TRANSTOOLS model;
- to go in more detail for the integrated scenario results for the energy-transport-technology domains quantified by the ASTRA-POLES-TREMOVE models;
- to discuss the potential impact that the current economic crisis will have on transport and the results of the integrated transport and energy scenario.

The workshop was divided into three sessions:

- Session 1: Transport scenario until 2030.
- Session 2: Integrated scenario until 2030.
- Session 3: Potential impact of the current economic crisis on the scenarios.

Summary of main comments and suggestions made by the stakeholders

The fourth workshop of the iTREN-2030 project hold on April 22nd 2009 in Brussels was attended by about 70 persons, including many representatives from different directorates of the European Commission, experts and representatives from the railway industry, the automobile industry, the oil industry and energy utilities as well as scientists from different disciplines.

The three most important discussion points raising comments from the stakeholders at the workshop can be summarized as:

1. On policy selection for the Integrated Scenario:

The Integrated Scenario will be one of the major outcomes of iTREN-2030. It includes transport and energy policies that will be relevant and will likely be implemented until 2030 as well as it makes reference to framework conditions imposed by climate policy and resource scarcity. In general, it was felt that the selection of policies presented at the workshop should be more ambitious. In particular, the focus mainly on technology and policies that foster improvement of technology was questioned and the suggestion was to consider better the opportunities brought about by behavioural change. With that respect iTREN-2030 will have to explore better policies that incentivise such behavioural change.

A number of representatives of different modes suggested to also consider strategic studies published by their associations. iTREN-2030 confirmed their willingness to take into account in the scenario design and model specifications any studies and findings supplied to the project via the coordinator. However, iTREN-2030 emphasized that it acts as a research project independent from the stakeholders or the European Commission and thus drawing its conclusions based on its own scientific analysis.

2. On scenario design:

Higher vehicle efficiency and the introduction of alternative fuels (e.g. electricity, biofuels) may deteriorate the tax base of European governments as fossil fuel taxes represent a significant share of government tax revenues. This means, iTREN-2030 should consider explicitly the implications of the policies on tax revenues and should take into account the option to design a revenue neutral scenario. Different options can be considered to achieve revenue neutrality. Amongst these would be to raise the taxes on alternative fuels (e.g. electricity) to compensate the loss of fossil fuel revenues, to shift to a system putting more weight on transport user charging as well as to use part of the revenues from greenhouse gas emission trading for compensating the losses of fuel taxes.

It is remarked that the oil price projection is at the lower end of the range of available studies. The projection is derived by iTREN-2030 with the assumption of lower demand growth until 2030 and the expectation of successful investments into new oil wells or unconventional sources. The project will verify if such increased investment into fossil fuel exploration can also hold under a scenario of prevailing economic crisis.

3. On the economic crisis and transport:

iTREN-2030 presented a sensitivity analysis for the impacts of the economic crisis on transport and in the longer run. This revealed a significant and rather permanent reduction of transport activity compared with the Reference Scenario. In the panel discussion on the impacts of the crisis the majority of participants seemed to agree to the expectation of a permanent change of transport activity, which would also reflect the emergence of structural changes e.g. of trade and logistics patterns induced by the crisis.

Following this expectation the majority of stakeholders would suggest to consider the crisis as an element in the Integrated Scenario. So far, the Integrated Scenario was conceived without the crisis, such that this would imply to adapt the scenario accordingly. The iTREN-2030 project will decide together with the EC, if such an adaptation of the scenario will be feasible within the remaining framework of the project.

More background material on the workshop including the presentations is included on the iTREN-2030 website:

<http://www.isi.fraunhofer.de/projects/itren-2030/workshop-apr-2009.htm>.

Actions taken by the iTREN-2030 project based on comments and suggestions made by the stakeholders

Introduction of behavioural change in the scenarios

In general, it was felt that the selection of policies presented at the workshop should be more ambitious. The focus should be broader than only on technology and policies that foster improvement of technology. Instead, it was suggested to consider also the opportunities brought about by behavioural change.

In the iTREN-2030 project behavioural change is introduced exogenously and it is only partially considered, for instance in car choice modelling.

Impact of the policies on tax revenues

Higher vehicle efficiency and the introduction of alternative fuels (e.g. electricity, biofuels) may deteriorate the tax base of European governments as fossil fuel taxes represent a significant share of government tax revenues. This means, iTREN-2030 should consider explicitly the implications of the policies on tax revenues and should take into account the option to design a revenue neutral scenario. Different options can be considered to achieve revenue neutrality.

In the iTREN-2030 project, insight is given in the impact of the scenarios on the tax revenues. A revenue neutral scenario has not been developed.

Impact economic crisis

In the panel discussion on the impact of the crisis the majority of participants seemed to agree to the expectation of a permanent change of transport activity, which would also reflect the emergence of structural changes e.g. of trade and logistics patterns induced by the crisis.

In the iTREN-2030 project, the economic crisis is taken into account in the integrated scenario.

6 Summary of the workshops

Objective WP1

Within the iTREN-2030 project, the overall objective of WP1 was:

- to identify user needs amongst stakeholders;
- to inform stakeholders on progress, approach and first results;
- to get feedback from stakeholders on methodology, scenarios and results.

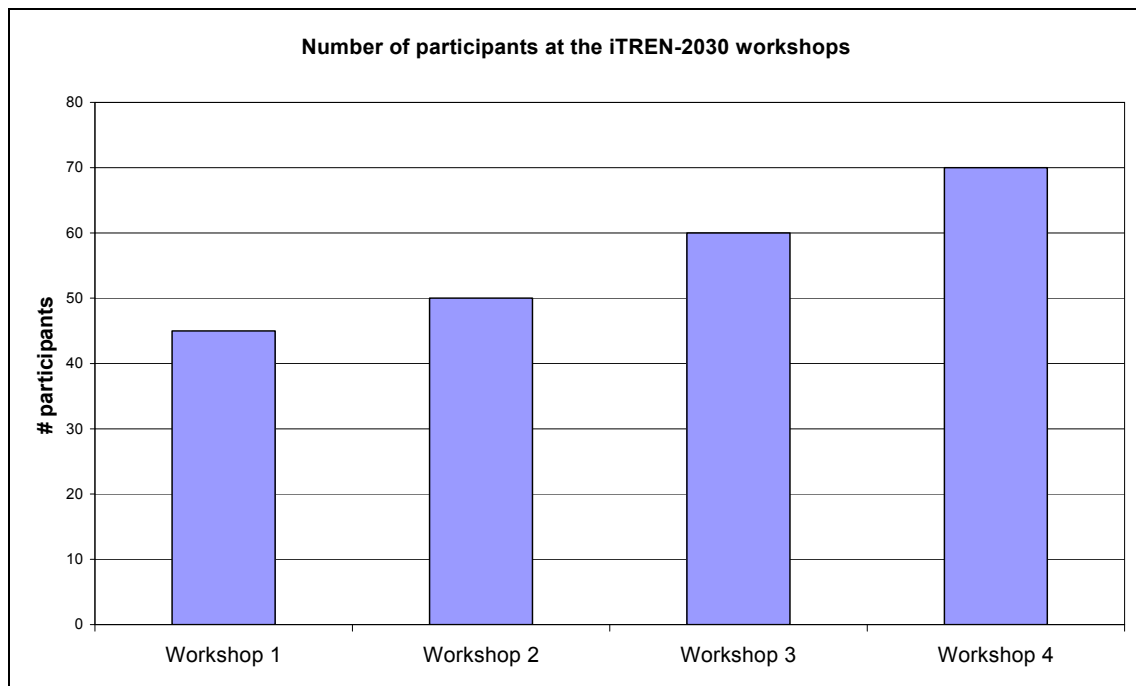
Workshops

This objective has been achieved by organising four workshops with stakeholders in Brussels.

- First workshop: *User needs and required features from the iTREN-2030 project*, organised on 27th of November in Brussels;
 - iTREN-2030 project and model overview;
 - European transport and energy policy agenda;
 - Experiences in EU member states.
- Second workshop: *Assumptions and key trends for the iTREN-2030 baseline scenario*, organised on 3rd of April 2008 in Brussels;
 - Economic growth and international trade;
 - Passenger and freight mobility trends;
 - Energy supply and alternative energy sources;
 - Environmental issues and vehicle fleet development.
- Third workshop: *Scenarios and policies for the iTREN-2030 baseline: Energy, transport, technology and emissions policies*, organised on the 19th of November 2008;
 - Scenario design in iTREN-2030;
 - Relevant and likely policies in a European Transport and Energy Baseline Scenario;
 - Draft scenario results of a European Baseline Scenario with a focus on the second session.
- Fourth workshop: *Integrated scenario on transport and energy until 2030 and potential impact of the economic crisis on transport*, organised on 22nd of April 2009.
 - Transport scenario until 2030;
 - Integrated scenario until 2030;
 - Potential impact of the current economic crisis on the scenarios.

These workshops have been attended by participants from the European Commission (in particular DGs TREN, ENV, ECFIN and JRC), National Ministries and National Agencies of different member states, representatives of the automotive industry, banks, research and consultancy organisations. In the following figure an overview is given of the number of stakeholders that attended the workshops. This figure shows an increasing interest in the iTREN-2030 scenarios and results by the stakeholders along the course of the project.

Figure 1 Number of participants at the iTREN-2030 workshops



Main comments and suggestions made by stakeholders

The most important comments and suggestions made by the stakeholders on several occasions were:

- There is a strong need for combined policy assessment of the four fields energy, transport and both their technologies, economy and environment in an equally sophisticated manner on the European level.
- The iTREN-2030 results will be used in different ways. By the European Commission as a policy decision support tool, by Member States with advanced modelling tools to make comparisons and by Member States with less advanced modelling tools use the methodology and results.

- The focus of the project should not be to develop a new baseline scenario for the European Commission, but the focus should lie on linking the models in a consistent way, developing and running scenarios and showing the added value of the integrated approach.
- The stakeholders expressed a high interest in being informed and being involved in the scenario development and analysis of scenario results in the iTREN-2030 project.
- For usability, acceptance and understanding of the iTREN-2030 modelling suite and its results, the key issues are consistency, transparency and validation.
- In an integrated baseline scenario with a time horizon 2030, trend breaks and radical changes are expected. These trend breaks and radical changes should be included in the integrated baseline scenario.
- A number of requests have been made for specific analyses such as development of a tax revenue neutral scenario, developments in the period 2030 – 2050 and a wide range of sensitivity analyses.

Actions taken in the iTREN-2030 project

In the iTREN-2030 project most of the comments and suggestions made by the stakeholders have been taken into account which has led to the following actions:

- Originally two workshops were planned. One right at the start of the project to investigate user needs and one near the end of the project to get feedback on scenarios and intermediate results. Because of the strong interest of the stakeholders to be informed and involved in the scenario development and analysis of results, it has been decided to organise two additional workshops. Instead of two workshops, four workshops have been organised (and a final conference) in the iTREN-2030 project.
- Because the stakeholders expressed the importance of consistency, transparency and validation of the iTREN-2030 methodology and results, the two additional workshops have been addressed to these topics. The goal of the second workshop was to discuss the key assumptions and trends in the scenarios (reliability of data, validation of models, assumptions and trends in scenarios and comparison with expectations of stakeholders from the European Commission, Member States and other organisations). The goal of the third workshop was to discuss the scenarios

and policies in the integrated scenario (design and purpose of scenarios, policies to be included in the integrated scenario and discussion of first draft scenario results).

- Besides, reports of all the four models have been put on the iTREN-2030 website with descriptions of these models giving the stakeholders the possibility to get more detailed information on the models;
- In the iTREN-2030 project several trend breaks and radical changes have been taken into account in the integrated baseline scenario. It concerns the following developments: increasing oil price, ambitious climate policy, introduction of electric vehicles and the economic crisis. Most of these developments have been introduced exogenously (endogenously is not possible) and the impact of these developments are included in the final scenario results of the integrated scenario.
- A number of the specific requests such as the development of a tax revenue neutral scenario and the elaboration of a wide range of sensitivity analysis has not been taken into account. The focus of the iTREN-2030 project was to link the four models in a consistent way and to show the added value of this integrated approach by running 1 or 2 scenarios. After the completion of the iTREN-2030 project and now that it has been shown where it delivers added-value and where it is not required, it is possible to use the iTREN-2030 modelling suite in the appropriate ways to make additional analyses and sensitivity analyses.

7 Final conference of iTREN-2030 project

Goal of the final conference

The aim of the final conference was to give an overview of the project, to summarise the approach and to present the outcomes of the Integrated Scenario.

The final conference was divided into three sessions:

- Session 1: iTREN-2030 project, methodology and stakeholder contribution.
- Session 2: Integrated scenario for Energy and Transport in Europe until 2030.
- Session 3: Responses and recommendations.

Summary of main comments and suggestions made by the stakeholders

The final conference of the iTREN-2030 project hold on October 21st 2009 in Brussels was attended by about 65 persons, amongst them many people who also attended one or more of the iTREN-2030 workshops. An input note was provided briefly describing the main working steps taken by the project and explaining the rationale of the integrated scenario (Schade/Fiorello/Meijeren 2009).

Growth of rail freight transport

The growth figure of rail freight transport is higher than the trend. The question was raised what is behind this development. In the iTREN-2030 project this TEN-CONNECT result was also noticed and an analysis showed that this development is not caused by strong growth of rail dedicated commodities or modal-shift effects, but by a strong growth of long distance transport within and in relation with the Eastern European countries. Since short term developments show a decrease of the share of rail transport in Eastern Europe, it is still the question whether the TEN-CONNECT result is plausible.

Documentation TRANS-TOOLS v2 and Poles

In the discussion of the previous point it was mentioned that the TRANS-TOOLS version 2 developed in the TEN-CONNECT project is not well documented. Regarding this point, the EC stated that the documentation of TRANS-TOOLS version 2 will be arranged soon. One of the stakeholders also mentioned that for Primes only results are available, but background and important assumptions leading to these results are not available (not documented at all). Therefore, it was asked how well documented the Poles model is. For the Poles model already a number of documents are available. Besides, the model is used at the EC (JRC) providing the EC good insight in the way it works.

Documentation on model recommendations

It was asked in what iTREN-2030 deliverable model recommendations will be included. Since this is not foreseen in one of the drafted deliverables, this will be included in the Final Report, which is deliverable D6.

Background introduction trend breaks as exogenous developments

For a number of trend breaks such as the introduction of electric vehicles it was discussed on what grounds the introduction is taken into account (Is it a proven technology? Is it a hype?). Several stakeholders did not agree with each other. Nevertheless, background and assumptions on these exogenous developments should be made very clear in the iTREN-2030 deliverables.

Separate impact of economic crisis and specific policies

The integrated scenario differs from the reference scenario in a way that in the integrated scenario the economic crisis and a number of additional policies are included. Several times, the question was raised whether it is possible to show the impact of only the economic crisis and of specific policies or combinations of policies (policy packages). An analysis of the impact of several policy packages is something that still has to be done in the iTREN-2030 project.

Different methodology/approach in reference and integrated scenario

As described in the previous point, the integrated scenario differs from the reference scenario in a way that in the integrated baseline scenario the economic crisis and a number of additional policies are included. However, also the applied methodology is different (such as using ASTRA/TREMOVE for modal-split instead of using the TRANS-TOOLS results). Therefore some of the differences between the integrated scenario results and the reference scenario results are not (only) caused by the economic crisis and/or the additional policies, but they are caused by differences in the applied methodology. In deliverable D5 it should be made very clear what the explanations are for the differences in scenario results.

Recommendations iTREN-2030 project

In the last presentation from the iTREN-2030 consortium the project recommendations were described.

On methodology:

- The methodology of linking the four models of different disciplines is:
 - feasible though time consuming;
 - generates added-value for the integrated analysis of energy and transport systems and initiatives in these fields.
- In particular the strategic component of the modeling suite (ASTRA-POLES-TREMOVE) could be successfully integrated and applied in iTREN-2030. The TRANS-TOOLS model is applied only for the reference scenario such that detailed transport network analysis is excluded from the integrated scenario. The full integration of TRANS-TOOLS requires model improvements e.g. accessible energy/transport policy levers, shorter running times, improved networks.

On scenario and policy analysis:

- Scenarios until 2030 will have to consider break-in trends compared with the last 20 years.
- This concerns in particular the linked energy-transport system converting from a nearly 100% fossil based system into a fossil-renewable-electric system.
- Energy efficiency and climate efficiency will be main drivers of shaping the new energy-transport system.
- Technologies that significantly improve both energy and climate efficiency are those causing the technology break-in-trends.

On Scenario and policy analysis:

- The policies and trend-breaks implemented in the integrated scenario seem not to be sufficient to fulfil the long-term climate targets of the EU.
- The impact of the economic crisis provides additional time to solve the problems and foster the break-in-trends (in integrated scenario it is expected that the levels of emissions and energy demand will be on the pre-crisis level again after about 4 years).

- It can be expected that behavioural change will occur due to:
 - Growing awareness of transport users of fossil fuel scarcity and climate change.
 - Energy and transport policies that provide incentives to behave more energy and climate efficient.
 - This requires dedicated and continuous support from the policy side.

Added value of the integrated approach

The EC states that the added value of using the models in an integrated way instead of using only the separate models should be made very clear. This will be done in the deliverables D4 and D5.

Continuation after the iTREN-2030 project

It was mentioned that the iTREN-2030 project is a useful project leading to the availability of a modeling suite making it possible to make integrated scenario analysis in several fields. On the other hand, stakeholders were wondering what happens with the iTREN-2030 modelling suite and project results after the project is finished. JRC made clear in a presentation that the iTREN-2030 results will be used by them for the development of a new baseline scenario for the White Paper.

More background material on the final conference including the presentations is included on the iTREN-2030 website:

<http://www.isi.fraunhofer.de/projects/itren-2030/final-conference-2009.htm>

8 Conclusions

In the iTREN-2030 project an extensive stakeholder process has been organized in order to:

- Identify user needs amongst stakeholders.
- Inform stakeholders on progress, approach and first results.
- Get feedback from stakeholders on methodology, scenarios and results.

This has been achieved by organizing four workshops and a final conference. The first workshop was addressed to the identification of the user needs. The other workshops and the final conference have been used to inform the stakeholders and to get feedback on the methodology and intermediate results.

One of the main feedbacks from the stakeholders was that for usability, acceptance and understanding of the iTREN-2030 modelling suite and its results, the key issues are transparency, consistency and validation. This comment was raised by several stakeholders on several occasions. Because of this returning comment, in the iTREN-2030 project a number of actions have been taken to make the methodology and the results transparent and consistent and to validate the methodology and results:

- Two additional workshops with stakeholders have been organized to discuss key assumptions and policies in the scenarios.
- Documentation of the four models have been put on the iTREN-2030 website.
- Before the later workshops, notes have been distributed to all participants in order to give them the opportunity to be prepared for the workshop. At the workshops stakeholders have been informed, results have been validated and the stakeholders have been invited to give their feedback.

Discussions with the stakeholders led to new insights and modified assumptions mainly related to expected trend breaks and radical changes such as increasing oil price, ambitious climate policy, introduction of electric vehicles and the economic crisis.

Overall, it can be concluded that the stakeholder process stimulated the iTREN-2030 project to make the methodology and results as transparent and consistent as possible and to validate the methodology and results against many other sources. This has led to an improved understanding of the iTREN-2030 results which is beneficial for the usability and acceptance of the iTREN-2030 project results by several stakeholders.

9 References

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