ASSESS

Assessment of the contribution of the TEN and other transport policy measures to the mid-term implementation of the White Paper on the European Transport Policy for 2010

FINAL REPORT
ANNEX V MODELLING SCENARIOS AND ASSUMPTIONS

European Commission
DG TREN
DM 28
1043 Brussels
Belgium

28 October 2005

TRANSPORT & MOBILITY LEUVEN
VITAL DECOSTERSTRAAT 67A BUS 0001
3000 LEUVEN
BELGIË
+32 (16) 31.77.30
http:\\www.tmleuven.be

and:

TNO, Netherlands
WSP, UK
TRT, Italy
DLR, Germany
University of Gdansk, Poland
ITS Leeds, UK
SWOV, Netherlands
CAU Kiel, Germany
Istanbul Technical University, Turkey

Preface

This is ANNEX V of the final report for *'Assessment of the contribution of the TEN and other transport policy measures to the mid-term implementation of the White Paper on the European Transport Policy for 2010'.*

Project title: ASSESS

Client: European Commission, Directorate-General for Transport and Energy, Unit B1.

Contract: TREN/04/ADM/S07.38796

Project contractor: Transport & Mobility Leuven

Authors:

Merijn Martens, TNO (the Netherlands)
Robert de Jong, TNO (the Netherlands)
Davide Fiorello, TRT (Italy)
Angelo Martino, TRT (Italy)
Griet De Ceuster, TML (Belgium)
Bart Van Herbruggen, TML (Belgium)

Version:
Final Version

Date:
28 October 2005 (with editing corrections 29 November 2005)

Reference:
Martens M., de Jong R., Fiorello D., Martino A., De Ceuster G., Van Herbruggen B. (2005), Modelling scenarios and assumptions, Annex V of ASSESS Final Report, DG TREN, European Commission.

Scope

Scope of the ASSESS project

The ASSESS study is about the ***"Assessment of the contribution of the TEN and other transport policy measures to the mid-term implementation of the White Paper on the European Transport Policy for 2010"***.

The European Commission's White Paper of 12.9.2001 "European transport policy for 2010: time to decide" aims to promote a sustainable transport policy. The White Paper proposes to achieve sustainability by gradually breaking the link between transport growth and economic growth, principally in three ways: changing the modal split in the long term, clearing infrastructure bottlenecks and placing safety and quality at the heart of the transport policy.

As foreseen, the White Paper on Transport undergoes in 2005 an overall ***assessment concerning the implementation of the measures it advocates and to check whether its targets*** - for example, on modal split or road safety - ***and objectives are being attained or whether adjustments are needed.***

ASSESS provides technical support to the Commission services for the above mid-term assessment of the White Paper.

The analysis accounts for the economic, social and environmental consequences of the proposed measures and their contribution to sustainable development objectives. It provides also a detailed analysis of those effects of enlargement likely to affect the structure and performance of the EU transport system.

The study takes a three pillar approach based on the use of analysis, indicators and models. National transport policies are reviewed for compatibility and coherence with the White Paper objectives. The models used allow a detailed analysis of the freight market, the passenger market and their infrastructure networks under a number of scenarios.

Scope of this Annex

In this paper four implementation scenarios of the White Paper on Transport are described. They form the basis for the economic, social and environmental impact assessment by means of models and expert knowledge (qualitative assessment) in other ASSESS reports.

Index

Tables

ANNEX V Modelling scenarios and assumptions

Authors:
Merijn Martens, TNO (the Netherlands)
Robert de Jong, TNO (the Netherlands)
Davide Fiorello, TRT (Italy)
Angelo Martino, TRT (Italy)
Griet De Ceuster, TML (Belgium)
Bart Van Herbruggen, TML (Belgium)

V.1. Description of the scenarios

V.1.1. Introduction

In this paper four implementation scenarios of the White Paper on Transport are described. The impact of these four scenarios on the economic, social and environmental objectives of the EC will be evaluated by means of models and expert knowledge (qualitative assessment).

The four implementation scenarios are:

(i) a 'do nothing' or null scenario (N-scenario): assumes that none of the White Paper measures has been implemented, neither at the European level nor in the member states;

(ii) a partial implementation (P-scenario) on the basis of the difficulties encountered: includes all follow-up activities already implemented or planned to be implemented before 2010 by the EC or by member states. This scenario has 2 variants: Partial A and Partial B. Note that the Partial B also has different assumptions on the autonomous transport evolution;

(iii) a full implementation of the White Paper (F-scenario): includes all measures introduced in the White Paper and mentioned the inception report;

(iv) an extended implementation scenario (E-scenario): a mix of the partial and the full implementation scenario.

The N-scenario acts as the reference case.

All the 4 scenarios are developed for 2010 (the time-horizon of the White Paper). Sometimes the implementation and the impact of measures takes time. Therefore, the four scenarios are also defined for 2020. For example, some of the TEN-projects have been started within the period 2000-2010 but they will be finalised in the period 2010-2020.

V.1.2. Principles behind the scenarios

N The 'do nothing' or null scenario includes none of the measures mentioned in the White Paper. This means:

- Measures that are part of the White Paper but already approved by EU-institutions before 2001, for example the first railway packages, are excluded from the 'do nothing' scenario (2010 and 2020)

- There is one exception. Measures or projects that were approved but also implemented before 2000 are included in the 'do nothing' scenario. This includes for example TEN projects that were finalised and functional before 2000 (such as the Øresund fixed link between Sweden and Denmark).

P The partial implementation scenario includes all follow-up activities already implemented or planned to be implemented before 2010 by the EC or by member states. This scenario is derived from the preliminary results of the policy review up to 2005 described in Annexes I to IV of the study. Most important elements are:

- All measures that have been given a follow up by means of a directive that is approved by the European institutions and that has to be implemented by the member states before 2010 (or 2020) are included in the partial implementation scenario 2010 (or 2020).
- Measures that have been given a follow up by means of a proposal that is still waiting for approval by the European institutions are only included in the partial implementation scenario 2010 (or 2020) when it can be expected that acceptation can be achieved before 2010 (or 2020). The expectation is based on the number of times that a proposal with regard to the particular measure is already rejected and the debate in various media on the issue.
- All TEN-projects that, following the estimation published in 2004, are planned to be finalised before 2010 (or 2020) are included in the partial implementation scenario 2010 (or 2020).

A second version of the partial scenario, named Partial B scenario, has been defined to provide a sensitivity test. The Partial B scenario includes the following differences with respect to Partial A scenario in terms of user pricing assumptions concerning the policy measures[1].

F The full implementation scenario includes all 78 measures introduced in the White Paper and mentioned in the inception report and all TEN-projects proposed by the White Paper and proposed in the TENs-update in 2004. This means:

- all measures proposed in the White Paper will be included in the full implementation scenario 2010 (and 2020)
- all TEN-projects that were in 2001 planned to be finalised before 2010 are included in the full implementation scenario 2010.
- All TEN-projects that were added in 2004 and that are planned to be finalised before 2010 are included in the full implementation scenario 2010.
- TEN-projects that have been initiated before 2010 but that are planned to be finalised after 2010 will be included in the full implementation scenario 2020 only[2].

E The extended scenario is an enhanced version of the partial implementation scenario. The extended scenario includes, besides all measures implemented or planned now, a number of measures that:

- are included in the White Paper but not included in the partial implementation scenario due to the current status of the implementation
- are included in the White Paper and also in a weak form in the partial implementation scenario
- are not mentioned in the White Paper but that may be needed to achieve (some of the) objectives set in the White Paper.

The extended scenario introduces two changes compared to the full scenario. It proposes to shift more efforts from legislation towards technological implementation (faster implementation of the RIS, SES-

[1] Partial B scenario is also different from Partial A concerning the underlying trend of freight logistics operations in the SCENES model, but this aspect does not concern the quantification of the pricing policy measures. See Annex VI for further details.
[2] Note that the original finalization date is used of projects that were already included in the TEN list before 2004. The revised finalization date as mentioned in the 2004 revision is used for the most likely scenario.

AME, more Galileo applications will enable the new legislation with regard to liberalisation of waterways and air to have an impact) and it proposes to put more effort on implementing pricing measures (road pricing for passengers, mark ups for freight pricing) while the white paper and therefore the full scenario only includes freight pricing and emphasizes the development of 'frameworks', harmonisation' etc..

V.1.3. General content of the scenarios

N In the do nothing scenario (null scenario) the situation in 2010 and 2020 with regard to transport policy is similar to the situation in 2000. This implies:

- no further improvement and strict application of existing social regulations in the area of road transport. No harmonisation of driving times. No harmonisation of weekend bans on lorries.
- no liberalisation of the European rail sector, not for freight[3] and also not for passengers, no technical harmonisation of rail safety, no improvement of the interoperability within the high speed rail network.
- no European management of the airspace and therefore continuing saturation of the skies, no introduction of market mechanisms for the allocation of airport slots, no airport charges to redistribute traffic over the day[4], no harmonised qualifications for air traffic controllers. Continued strong growth in number of air passengers due to low cost airline business model.
- no improvement of port handling and no improvement of inland waterways.
- Bottlenecks such as inappropriate gauges, bridge heights, operation of locks, lack of transhipment equipment, etc remain.
- No extra efforts on top of the small PACT-program to promote combined transport, no integrated ticketing and improvements in baggage handling.
- No realisation of any of the TEN projects except for those projects that were finalised before 2000
- No community action programme to halve the number of deaths on the roads
- No advancement in the community policy or legislation on transport charging for the use of infrastructure, no harmonisation of fuel taxes
- No promotion of clean urban transport

P The partial scenario (or partial scenario) includes all follow-up activities already implemented or planned to be implemented before 2010 by the EC or by member states. This implies:

- In the road sector the measures with regard to driver training, social harmonisation of legislation and the introduction of the digital tachograph has been implemented. However, the further harmonisation of driving times and weekend bans on lorries have not been implemented. There are also no minimum clauses in commercial road transport contracts concerning oil price risks. Partial A and Partial B differ for this measure
- The European freight rail sector is liberalised and the quality of freight services is improved. The liberalisation with regard to passenger transport is starting and will be completed in the (partial) scenario 2020 only. Rail safety has been improved by technically harmonisation, interoperability within the high speed rail network has been improved. A majority of the TEN-rail projects that were given priority in 2001 with a completion date by 2010 will be finished in 2010. Almost all project that were added in 2004 will not be ready. There are not much dedicated freight railways (such as the Betuwe line in the Netherlands) or with priority to freight.
- The award of public service contracts regulation will have been adopted and some more passenger services contracts will be granted through competition.

[3] Although the first rail package pre-dates the publication of the White Paper it reflects its policy and therefore it is excluded from the do-nothing scenario

[4] Although sometimes airport charges to redistribute traffic over the day are taken at national level, it is assumed that in the do-nothing scenario no advancements have been made.

- Airport charges to redistribute traffic over the day are implemented but they have marginal financial effects on the air carriers. Qualifications for air traffic controllers are harmonised. Safety measures are better enforced by means of a new European Aviation Safety Agency. The European management of the airspace and the introduction of slots on community airports is included in the partial scenario for 2010. Airport capacity expansion has not been realised. A joint transatlantic aviation agreement with the US has been signed with increased competition on transatlantic routes (even stronger growth in number of passengers due to liberalisation of single air transport market with the entrance of low cost airline business model).
- The motorways of seas included in the TENs will be ready in 2010. Ship and port security is improved and the European maritime safety agency is operational. Double-hull oil tankers are phased out in European waters and there is a oil pollution damage compensation fund. Improvement of inland waterways such as fixing inappropriate gauges, bridge heights, operation of locks etc and also greater harmonisation of boat master certificates will be finalised after 2010 and are therefore included in the partial scenario 2020. Port services, among others the cargo handling, are partially liberalised.
- There has been experiments to improve and promote combined transport. Integrated ticketing and improvements in baggage handling is improved in the air and rail sector.
- A large majority of the TEN projects are finalised in conformance to original planning.
- There is a community action programme on road safety. However, road safety remains the responsibility of the members states and efforts to harmonise legislation, penal sanctions etc. have not been effective yet.
- There is a community policy on transport charging for the use of infrastructure but its impacts are limited. The revision of the Eurovignette directive includes only some possibilities of differentiation of charges for some sensitive areas and for the most polluting vehicles. There is no harmonisation of fuel taxes. Partial A and Partial B differ for this measure.
- Clean urban transport is promoted by EU-funded research and experiments. The impact on a European scale is limited.

F The full scenario is the partial scenario (P) plus:

a) driving times are harmonised and the conditions under which weekend bans on lorries are possible in the EU are harmonised across the EU25. Clauses in commercial road transport contracts protect transporters from sudden fuel price rises.

b) The liberalisation with regard to passenger transport is realised on time and included in the full scenario 2010. A network of dedicated rail freight lines is developed.

c) With regard to the ten projects the full scenario is similar to the partial scenario. The TEN projects are finalised in conformance to original planning.

d) The European management of the airspace and the introduction of slots on community airports is included in the full implementation scenario for 2010. The EU has financed expansion of the airport capacity mostly in the new Member States

e) Kerosene taxation and en-route charging is implemented.

f) Improvement of inland waterways such as fixing inappropriate gauges, bridge heights, operation of locks etc and also greater harmonisation of boat master certificates are included in the full implementation scenario 2010. Port services, among others the cargo handling and pilotage services are liberalised.

g) Efforts to harmonise legislation, penal sanctions etc. within the road safety sector have been effective.

h) There is a more radical community policy and legislation on transport charging for the use of infrastructure. There are compulsory charges on the TENs as in the Commission's current proposal and the charges include the external costs. Fuel taxes are harmonised across the EU.

i) A majority of public service contracts is awarded subject to some form of competition.

E The extended scenario is the partial scenario (P) plus:

- Technology push: speeding up the European management of the airspace (SESAME-project) and speeding up the improvement of inland waterways, especially by speeding up and making it obligatory to develop the river information system (RIS).
- More effort on pricing: European road pricing system which better reflects external costs to the environment and society, not only in freight but also in passenger transport. Pricing is implemented by partial social marginal cost pricing plus marks ups for investments. Realise a Community policy and legislation on transport charging for the use of infrastructure for all modes (instead of only for road transport). Harmonisation of fuel taxes across the EU
- Faster liberalisation of international passenger rail transport. Faster liberalisation of port services, among others the cargo handling and pilotage services.
- Speeding up the TEN projects, especially the remaining larger Essen projects and some of those projects introduced in 2004.
- Kerosene taxation and en-route charging is implemented. VAT is applied to air tickets. Introduction of a more fare reaching market mechanism within the airport slot mechanism
- Higher taxation of energy products and exemptions for natural gas, hydrogen and biofuels (as foreseen by the current taxation directive). Support to clean car technologies under the research and technological development framework programme. Support to the market introduction of clean cars in captive fleets. Promotion of clean vehicles via public procurement. Improvements of passenger cars fuel efficiency beyond current commitments
- Faster advancement of Galileo applications as proposed in the recent green paper on energy.

V.1.4. Individual measures

In Table 1 the status of each measure with regard to the scenario 2010 is given.

First the status of the implementation in 2005 is given. A measure is realised when a directive or regulation is approved by the European institutions[5] within the period 2001-2005. Member states are obliged to translate a directive in national legislation within two or three years after approval of the directive by the European institutions. A regulation does not need implementation in national legislation and is on the moment of approval by the European institutions directly applicable in all member states.

A measure is partially realised when part of the measure is implemented by means of an approved directive or regulation in the period 2001-2005 while an other part is not yet approved (for example when part of the measure is still in the proposal phase. A measure is still in progress when there is a proposal of the European commission but this proposal is not yet approved by the European institutions. If the implementation is expected before 2010, then this is mentioned. If there is no proposal whatsoever, then it is concluded that no visible progress has been made. There might be progress within the Commission services, but this has not yet resulted in a formal proposal approved by the European commission.

On basis of this assessment of the current output, an estimate is made with regard to the partial scenario. Arguments are included in footnotes. For more detailed explanation we refer to the Annexes I to IV.

When a measure is not implemented in the partial scenario it is partially implemented in the extended scenario and fully implemented in the full scenario. When a measure is fully implemented in the partial scenario, then it looked whether extra measures are possible to further improve the measure.

[5] The EU Institutions in this context are the European Parliament, whose members are directly elected by the people and the Council, which represents the interests of the Member State governments. The EU institutions have the right to (dis)approve legislative proposals initiated by the Commission.

Table 1: Status of each measure in the scenarios

Policy		Measure	2005	Null 2010	Partial A+B 2010	Full 2010	Extended 2010
Improving quality in the road transport sector	1	Harmonise clauses in commercial road transport contracts	No progress	No	No	Yes	Yes
	2	Driving restrictions on heavy goods vehicles on designated roads	In progress	No, 3 countries only	Yes[6]	Yes	Yes
	3	Training of professional drivers	Realised	No	Yes	Yes	Yes
	4	Social harmonisation of road transport	Partially realised	No[7]	Yes[8]	Yes	Yes
	5	Introduction of the digital tachograph	Realised	No	Yes	Yes	Yes
Revitalizing the railways	6	First railway package: separated management of infrastructure and services, opening international services in TENs	Realised	No	Yes	Yes	Yes
	7	Second railway package: opening up the national and international freight market	Realised	No	Partial[9]	Yes	Yes
	8	Second railway package: ensuring a high level safety for the railway network	Realised	No	Yes	Yes	Yes
	9	Updating the interoperability directives on high-speed and conventional railway networks (ERTMS)	Realised	No	Yes	Yes	Yes
	10	European Railway Agency	Realised	No	Yes	Yes	Yes
	11	Third railway package: certification of train crews and trains on the Community rail network	In progress	No	Partial[10]	Yes	Partial
	12	Third railway package: gradual opening-up of international passenger services	In progress	No	Partial[11]	Yes	Extra[12]
	13	Third railway package: Quality of rail services and users' rights	In progress	No	Yes	Yes	Yes
	14	Third railway package: improving quality of the rail freight services	In progress	No	Partial	Yes	Yes
	15	Enter the dialogue with the rail industries in the context of a voluntary agreement to reduce adverse environmental impacts	Partially realised	No	Partial [13]	Yes	Yes
	16	Support the creation of new infrastructure, and in particular rail freight freeways	Partially realised	see TENs list	See TENs list	see TENs list	See TENs list
Controlling growth in air transport	17	Single European Sky	Partially realised	No	Yes	Yes	Extra[14]
	18	Technical requirements in the field of civil aviation and establishing a European Aviation Safety Agency	Realised	No	Yes	Yes	Yes
	19	Air transport insurance requirements	Realised	No	Yes	Yes	Yes

[6] The implementation is expected before 2010

[7] Except for the measures implemented before 2001

[8] Although this measure consist of a few different parts, it is expected that in 2010 this measure is completely implemented.

[9] Only the rail freight services are not fully implemented since it will taken time before market parties have adapted their behaviour to the opening up of the market

[10] On basis of the current time table, the measure will be fully implemented in 2015 (cross-border crews in 2010) and therefore it is only partially included in the most likely scenario 2010.

[11] A communication is already made to open up the services, but it is likely that the implementation and the expected changes in the services will not be before 2010

[12] faster liberalisation

[13] There are already signs of cooperation, however there is not yet a voluntary agreement to reduce adverse environmental impacts.

[14] Speeding up the SESAME project

Policy		Measure	2005	Null 2010	Partial A+B 2010	Full 2010	Extended 2010
	20	Harmonisation of airport charges	In progress	No	No[15]	Yes	Yes
	21	Introduction of market mechanism in slot allocation procedures on Community airports	No progress	No	Partial[16]	Yes	Yes
	22	Community framework for airport noise management	Partially realised	No	Partial[17]	Yes	Yes
	23	Protection against subsidisation and unfair pricing practices in the supply of air services from third countries	Realised	No	Yes	Yes	Yes
	24	Safety of third country aircraft	Realised	No	Yes	Yes	Yes
	25	Air service agreements with third countries	In progress	No	Yes	Yes	Yes
	26	Airport capacity expansion	In progress	No	No[18]	Yes	Partial
	77	Introduction of kerosene taxation	Not realised	No	No	Yes	Extra
	78	Introduction of differential en route air navigation charges	In progress	No	No[19]	Yes	Yes
Promoting transport by sea and inland waterway	27	Motorways of the seas	Realised	see TENs list	see TENs list	see TENs list	See TENs list
	28	Port services liberalisation	In progress	No	Partial [20]	Yes	Yes
	29	Simplify sea and inland waterway custom formalities and linking up the players in the logistic chain	Partially realised	No	Partial[21]	Yes	Yes
	30	Ship and port facility security	Realised	No	Yes[22]	Yes	Yes
	31	European Maritime Safety Agency	Realised	No	Yes	Yes	Yes
	32	Double-hull oil tankers	Realised	No	Yes	Yes	Yes
		Penal sanctions for ship source pollution	Partially realised	No	Yes	Yes	Yes
	33	Oil pollution damage compensation fund	Realised	No	Yes	Yes	Yes
	34	Transfer of ship register	Partially realised	No	Partial[23]	Yes	Yes
	35	Training of seafarers	Realised	No	Yes	Yes	Yes
	36	Eliminating bottlenecks in inland waterway transport	Realised	see TENs list	see TENs list	see TENs list	see TENs list

[15] There are now (2005) no proposals present, a new proposal is expected but it is not likely that this proposal will be implemented before 2010

[16] The technical objectives behind the slot allocation system have been realised, but it is not likely that market mechanism in the slot allocation system will be implemented before 2010

[17] The first part on noise charges is in preparation and will not likely be implemented before 2010, the second part on noise-related operating instruction is already implemented by approval of a Directive.

[18] The commission has published a draft set of guidelines on the financing of airports infrastructure and State aid for the start-up of new routes departing from regional airports. But much expansion of community airport capacity has not been achieved.

[19] It is not sure if the differential charges will be implemented before 2010. There is been made a proposal by Eurocontrol to develop a common charging system

[20] It is unsure that the second proposal will be approved since self handling and pilotage remains a sensitive issue.

[21] It is not likely that the one-stop offices are realised before 2010. The rest of the measure is executed.

[22] The security between ship and port is enhanced by a regulation. This contains especially the trans-shipment. This measure is extended by a proposal which enhances the security in Community ports. This proposal has to set the security standards on the port district. It is likely that this proposal is approved before 2010.

[23] There's no action on the tonnage-based taxation system, this system should be an incentive for reflagging ships. The framework for reflagging has been setup but it is not sure how many ships are indeed reflagging.

Policy		Measure	2005	Null 2010	Partial A+B 2010	Full 2010	Extended 2010
	37	River Information System	In progress	no	Partial[24]	yes	Extra[25]
	38	Greater harmonisation of boatmasters' certificates	Not realised	No	Partial[26]	Yes	Yes
	39	Social legislation inland waterway transport	Not realised	No	No	Yes	Partial/yes
	40	Port state controls	Realised	No	Yes	Yes	Yes
	41	Sulphur content of marine fuels	Realised	No	Yes	Yes	Yes
Turning intermodality into reality	42	Marco Polo Programme	Realised	No	Yes	Yes	Yes
	43	Intermodal Loading Units and freight integrators	In progress	No	Partial[27]	Yes	Yes
Building the Trans-European transport network	44	Trans European Network projects	Realised	see TENs list	See TENs list	See TENs list	See TENs list
	45	Funding of TENs	Realised	No	Yes	Yes	Yes
	46	Tunnel safety	Realised	No	Yes	Yes	Yes
	72	TEN infrastructure in the candidate countries	Realised	see TENs list	see TENs list	see TENs list	see TENs list
	73	Funding of infrastructure in the New EU Member States	Realised	No	Yes	Yes	Yes
Improving road safety	47	European Road Safety Action programme	Realised	No	Yes	Yes	Yes
	48	Harmonisation of road safety checks and penalties	In progress	No	Yes	Yes	Yes
	49	"Black Spots" on TENs	In progress	No	Yes	Yes	Yes
	50	Seat and head restraints	Partially realised	No	Yes[28]	Yes	Yes
	51	Tackling dangerous driving	Not realised	No	Yes	Yes	Yes
	52	Technical investigations of the causes of road accidents	In progress	No	Yes	Yes	Yes
	53	Harmonisation of driving licensing systems	Partially realised	No	Yes	Yes	Yes
	54	Speed limitation devices	Realised	No	Yes	Yes	Yes
	55	Intelligent transport systems and *e*-Safety	Not realised	No	No	Yes	Yes
	56	Pedestrian and cycling protection	In progress	No	Yes	Yes	Yes
Adopting a policy on effective charging for transport	57	Infrastructure charging covering all transport modes and internalising the external costs	Partially realised	No	Partial[29]	Yes	*Extra*[30]
	58	Uniform commercial road transport fuel taxation	In progress	No	No	Partial	Partial

[24] Some member states such as Austria and Nederland have advanced systems of RIS. In the most likely scenario the river information system will be voluntary (although if member states adopt a system it will have to be interoperable according to the RIS directive) and will therefore take more time to mature. Safe navigation applications will be operational by 2010 while logistic interfaces will be developed later. In the full and preferred scenario the river information system is enforced by EC legislation.

[25] Speeding up RIS and making RIS obligatory.

[26] After having consulted with business representatives it was decided that the envisaged harmonisation was not needed at the moment. At this stage the intention is not harmonisation but recognition of Community patent by the Rhine convention which will be achieved at most by 2010. In the longer term the EU boatmaster certificate is still an objective

[27] There are made proposals on the field of the ILU's, this proposal will be most likely adopted in 2005. But on the field of freight integrators there is less effort made. There's been performed a study to provide recommendations for the profession of freight integrator, it is now up to the Commission to come up with a plan.

[28] It is expected that in 2005 about 20% of the coaches have seat belts, since it is obliged to build seat belts in all new vehicles. The commission is working on a law that obliges people to use seat belts if they are in the vehicle. So chances are high that this will indeed happen and that in 2010 all passengers will use seat belts.

[29] A new proposed directive which sets out a framework on charging has been sent in 2005 to Parliament for second reading. This directive is however much less ambitious than the White Paper on transport.

[30] Also introduction of pricing for private cars

Policy		Measure	2005	Null 2010	Partial A+B 2010	Full 2010	Extended 2010
	59	Electronic road toll system (interoperability)	Realised	No	Yes	Yes	Yes
	60	Harmonising VAT deductions	Not realised	No	No	Partial	Partial
	61	Taxation of passenger cars according to environmental criteria	In progress	No	No	Yes	No
	62	Taxation of energy products and exemptions for hydrogen and biofuels	Realised	No	Yes	Yes	Extra[31]
	63	Introduction of a minimum share of biofuels consumption in road transport	Realised	No	Yes	Yes	Yes
Recognizing the rights and obligations of users	65	Compensation of air passengers	Realised	No	Yes	Yes	Yes
		Information for air passengers, assistance for persons with reduced mobility	Partially realised	No	Yes	Yes	Yes
	66	Extending protection of users' rights to other transport modes	In progress	No	Partial	Yes	Yes
	67	Intermodality for people	Not realised	No	Partial	Yes	Yes
	68	Public service requirements and the award of public service contracts in passenger transport by rail, road and inland waterway	In progress	No	Partial	Yes	Yes
Developing high-quality urban transport	69	Support for pioneering towns and cities (CIVITAS initiative)	Realised	No	Yes	Yes	Yes
	70	Promote the use of clean vehicles in urban public transport	Realised	No	Yes	Yes	Yes
	71	Promotion of good urban transport practices	Realised	No	Yes	Yes	Yes
Putting research and technology at the service of clean, efficient transport	64	European Research on new clean car technologies and ITS application to transport	Realised	No	Yes	Yes	Yes
Managing the effects of globalization	74	Develop administrative capacity in the candidate countries	Realised	No	Yes	Yes	Yes
	75	EU external relations in the transport sector	In progress	No	Yes	Yes	Yes
	76	Galileo programme	Realised	No	Partial [32]	Yes	Extra[33]

V.1.5. Individual TEN-projects

The table below gives an overview of the TEN projects in each scenario.

- The partial scenario (P) is based on the deadlines as they were estimated in the 2004 revision including some additions proposed by the Commission during the project.
- The full scenario (F) is based on the deadlines as they were estimated in 2001 or before (the original deadlines).
- The extended scenario (E) is a more rapid completion of the priority axes (particularly their cross-border sections) for which the Commission plans to nominate a Coordinator. These are the priority projects no: 1, 3, 6, 17 and 27. As a general rule, it is assumed that each section is successfully completed 2 years more rapidly than planned in the Guidelines for those countries that have a revised completion by 2010 (exceptions are the projects too close to 2005) and 5 years for those countries where completion date is beyond 2010 (an exception is the bridge over the Messina strait). The other projects would then be completed as planned in 2004.

[31] Higher reductions than in the full scenario.

[32] The technical side should be ready in 2010 but it is unlikely that all services using the system are operational in 2010.

[33] More services are ready than in the partial scenario but less than in the full implementation scenario.

Table 2: Status of the TEN projects in each scenario (f) = finished

TEN projects	Subprojects	Original deadline	2004 deadline	Null	Partial A+B		Full		Extended	
				2010-20	2010	2020	2010	2020	2010	2020
1. High-speed train/combined transport north–south	1. Berlin Bahnhof-Berlin/Ludwigsfelde		2008	no	yes	yes	yes	yes	yes	yes
	2. Berlin/Ludwigsfelde-Halle/Leipzig		2002	no	yes	yes	yes	yes	yes	yes
	3. Halle/Leipzig-Erfurt	2003	2015	no	no	yes	yes	yes	yes	yes
	4. Erfurt-Nurenburg	2007	2015	no	no	yes	yes	yes	yes	yes
	5. Nurenburg-Munich		2006	no	yes	yes	yes	yes	yes	yes
	6. Munich-Kufstein	2002	2015	no	no	yes	yes	yes	yes	yes
	7. Kufstein-Innsbruck	2010	2009-18	no	no	yes	yes	yes	no	yes
	8. Innsbruck-Fortezza (Brenner Base tunnel)	2012	2015	no	no	yes	no	yes	yes	yes
	9. Fortezza-Verona		2002 (f)	no	no	yes	yes	yes	yes	yes
	10. Verona-Bologna		2007	no	yes	yes	yes	yes	yes	yes
	11. Milan-Bologna		2006-08	no	yes	yes	yes	yes	yes	yes
	12. Bologna-Florence		2007	no	yes	yes	yes	yes	yes	yes
	13. Florence-Rome (re-electrification)		200	no	yes	yes	yes	yes	yes	yes
	14. Rome-Naples	2004	2007	no	yes	yes	yes	yes	yes	yes
	15. Rail/road bridge over the strait of Messina		2015	no	no	yes	no	yes	no	yes
2. High-speed train PBKAL (Paris-Brussels-Cologne-Amsterdam-London)	1. Belgian/German border Cologne		2007	no	yes	yes	yes	yes	yes	yes
	2. Cologne-Frankfurt		2004 (f)	no	yes	yes	yes	yes	yes	yes
	3. London-Channel tunnel rail link		2007	no	yes	yes	yes	yes	yes	yes
	4. Belgium		2006	no	yes	yes	yes	yes	yes	yes
	5. Netherlands		2007	no	yes	yes	yes	yes	yes	yes
	6. Paris-Lille-Calais-Channel tunnel		1994 (f)	yes	yes	yes	yes	yes	yes	yes
3. High-speed railway axis of south-west Europe	1. Spain, Atlantic branch	2007	2010-11	no	no	yes	yes	yes	yes	yes
	2. Spain,Mediterranean branch	2007	2008	no	yes	yes	yes	yes	yes	yes
	3. French Atlantic branch		2010	no	yes	yes	yes	yes	yes	yes
	4. French Mediterranean branch		2015	no	no	yes	no	yes	yes	yes
	5. Montpellier-Nîmes	2006	2008-09	no	yes	yes	yes	yes	yes	yes
	6. Madrid-Barcelona	2012	2010-11	no	no	yes	yes	yes	yes	yes
	7. Lisboa/Porto-Madrid		2005	no	yes	yes	yes	yes	yes	yes
	8. Dax-Bordeaux		2011	no	no	yes	no	yes	yes	yes
	9. Bordeaux-Tours		2020	no	no	yes	no	yes	no	yes
	10. Spain, Atlantic branch		2015	no	no	yes	no	yes	yes	yes
4. High-speed train east	1. Paris-Baudrecourt		2007	no	yes	yes	yes	yes	yes	yes
	2. Metz-Luxembourg		2007	no	yes	yes	yes	yes	yes	yes
	3. Saarbrucken-Mannheim		2007	no	yes	yes	yes	yes	yes	yes
5. Conventional rail/combined transport: Betuwe line	1. Port Railway line	2006	2007	no	yes	yes	yes	yes	yes	yes
	2. A15 line	2006	2007	no	yes	yes	yes	yes	yes	yes
6. High-speed train/combined transport, France-Italy	1. Lyon-Montmélian-Modane (St Jean de Maurienne)	2010	2015	no	no	yes	no	yes	yes	yes
	2. St Jean de Maurienne-Bruzolo	2013	2017	no	no	yes	no	yes	no	yes
	3. Bruzolo-Turin	2008	2011	no	no	yes	no	yes	yes	yes
	4. Turin-Venezia	2006-08	2010	no	yes	yes	yes	yes	yes	yes
	5. Venezia-south Ronchi-Trieste [...]-Divaca (2015)		2015	no	no	yes	yes	yes	yes	yes
	6. Koper-Divaca-Ljubljana (2015)		2015	no	no	yes	no	yes	yes	yes
	7. Ljubljana-Budapest (2015)		2015	no	no	yes	no	yes	yes	yes
7. Motorway axis Igoumenitsa/Patra-Athina-Sofia-Budapest	1. Via Egnatia	2005	2006-08	no	yes	yes	yes	yes	yes	yes
	2. Pathe	2005	2008	no	yes	yes	yes	yes	yes	yes
	3. Sofia-Kulata-Greek/Bulgarian border motorway, with Promahon-Kulata as cross-border section		2010	no	yes	yes	yes	yes	yes	yes
	4. Nadlac-Sibiu motorway (branch towards Bucuresti and Constanta)		2007	no	yes	yes	yes	yes	yes	yes
8. Multimodal link Portugal-Spain-Central Europe	1. Railway La Coruña-Lisboa-Sines	no date mentioned	2010	no	yes	yes	yes	yes	yes	yes
	2. Railway Lisboa-Valladolid	no date mentioned	2010	no	yes	yes	yes	yes	yes	yes
	3. Railway Lisboa-Faro	no date mentioned	2004 (f)	no	yes	yes	yes	yes	yes	yes

TEN projects	Subprojects	Original deadline	2004 deadline	Null	Partial A+B		Full		Extended	
				2010-20	2010	2020	2010	2020	2010	2020
	4. Lisboa-Valladolid motorway	no date mentioned	2010	no	yes	yes	yes	yes	yes	yes
	5. La Coruña-Lisboa motorway	no date mentioned	2003 (f)	no	yes	yes	yes	yes	yes	yes
	6. Sevilla-Lisboa motorway	no date mentioned	2001 (f)	yes	yes	yes	yes	yes	yes	yes
	7. New Lisboa airport	no date mentioned	2015	no	no	yes	no	yes	no	yes
9. Conventional rail link Cork-Dublin-Belfast-Larne,Stranraer	1. UK sections		2001 (f)	yes	yes	yes	yes	yes	yes	yes
	2. Republic of Ireland sections		2001 (f)	yes	yes	yes	yes	yes	yes	yes
10. Malpensa air-port,Milan			2001 (f)	yes	yes	yes	yes	yes	yes	yes
11. Øresund fixed rail/road link between Denmark and Sweden (completed)	1. Øresund fixed link		2000 (f)	yes	yes	yes	yes	yes	yes	yes
	2. Danish access routes		1999 (f)	yes	yes	yes	yes	yes	yes	yes
	3. Swedish access routes		2001 (f)	yes	yes	yes	yes	yes	yes	yes
12. Nordic triangle rail/road	1. Road and railway projects in Sweden		2010	no	yes	yes	yes	yes	yes	yes
	2. Helsinki-Turku motorway	2008	2010	no	yes	yes	yes	yes	yes	yes
	3. Railway Kerava-Lahti	2010	2006	no	yes	yes	yes	yes	yes	yes
	4. Helsinki-Vaalimaa motorway	2008	2015	no	no	yes	yes	yes	yes	yes
	5. Railway Helsinki-Vainikkala (Russian border)	2010	2014	no	no	yes	yes	yes	yes	yes
13. Ireland/United Kingdom/Benelux road link			2010	no	yes	yes	yes	yes	yes	yes
14. West coast main line (rail)	1. West coast main line		2007-08	no	yes	yes	yes	yes	yes	yes
15. Global navigation and positioning satellite system Galileo	1. Development and validation		2005	no	yes	yes	yes	yes	yes	yes
	2. Deployment	2007	2008	no	yes	yes	yes	yes	yes	yes
16. Freight railway axis Sines/Algeciras-Madrid-Paris	1. New high-capacity rail axis across the Pyrenees	2020	no date mentioned	no	no	no	no	yes	1. no	yes
	2. Railway Sines-Badajoz		2010	no	yes	yes	yes	yes	yes	yes
	3. Railway Algeciras-Bobadilla		2010	no	yes	yes	yes	yes	yes	yes
17. Railway axis Paris-Strasbourg-Stuttgart-Wien-Bratislava	1. Baudrecourt-Strasbourg-Stuttgart with the Kehl bridge as cross-border section		2015	no	no	yes	no	yes	yes	yes
	2. Stuttgart-Ulm		2012	no	no	yes	no	yes	yes	yes
	3. München-Salzburg		2015	no	no	yes	no	yes	yes	yes
	4. Salzburg-Wien		2012	no	no	yes	no	yes	yes	yes
	5. Wien-Bratislava		2010-12	no	no	yes	yes	yes	yes	yes
18. Rhine/Meuse-Main-Danube inland waterway axis	1. Rhine-Meuse, with the lock of Lanaye as cross border section		2019	no	no	yes	no	yes	no	yes
	2. Vilshofen Straubing	no date mentioned	2013	no	no	yes	no	yes	no	yes
	3. Wien-Bratislava, cross-border section		2015	no	no	yes	no	yes	no	yes
	4. Palkovicovo-Mohacs		2014	no	no	yes	no	yes	no	yes
	5. Bottlenecks in Romania and Bulgaria		2011	no	no	yes	no	yes	no	yes
19. High-speed rail interoperability on the Iberian peninsula	1. Madrid-Andalucía	project was not defined	2010-20	no	no	yes	yes	yes	yes	yes
	2. North-east	project was not defined	2010-20	no	no	yes	yes	yes	yes	yes
	3. Madrid-Levante and Mediterranean	project was not defined	2010-20	no	no	yes	yes	yes	yes	yes
	4. North/North-west corridor, including Vigo-Porto	project was not defined	2010-20	no	no	yes	yes	yes	yes	yes
	5. Extremadura	project was not defined	2010-20	no	no	yes	yes	yes	yes	yes
20. Fehmarn Belt: fixed link between Germany and Denmark	1. Fehmarn Belt fixed rail/road link	2013	2014-15	no	no	yes	no	yes	no	yes
	2. Railway for access in Denmark from Öresund		2015	no	no	yes	no	yes	no	yes

TEN projects	Subprojects	Original deadline	2004 deadline	Null	Partial A+B		Full		Extended	
				2010-20	2010	2020	2010	2020	2010	2020
	3. Railway for access in Germany from Hamburg		2015	no	no	yes	no	yes	no	yes
	4. Railway Hannover-Hamburg/Bremen		2015	no	no	yes	no	yes	no	yes
21. Motorways of the sea	1. Motorway of the Baltic Sea		2010	no	yes	yes	yes	yes	yes	yes
	2. Motorway of the sea of Western Europe		2010	no	yes	yes	yes	yes	yes	yes
	3. Motorway of the sea of south-east Europe		2010	no	yes	yes	yes	yes	yes	yes
	4. Motorway of the sea of south-west Europe		2010	no	yes	yes	yes	yes	yes	yes
22. Railway axis Athina-Sofia-Budapest-Wien-Praha-Nürnberg/Dresden	1. Railway line Greek/Bulgarian border-Kulata-Sofia-Vidin/Calafat		2015	no	no	yes	no	yes	no	yes
	2. Railway line Curtici-Brasov		2010-13	no	no	yes	yes	yes	yes	yes
	3. Railway line Budapest-Wien		2010-19	no	no	yes	yes	yes	yes	yes
	4. Railway line Breclav-Praha-Nürnberg		2010-16	no	no	yes	yes	yes	yes	yes
	5. Railway axis Prague-Linz		2016	no	no	yes	no	yes	no	yes
23. Railway axis Gdansk-Warszawa-Brno/Bratislava-Wien	1. Railway line Gdansk-Warszawa-Katowice		2015	no	no	yes	no	yes	no	yes
	2. Railway line Katowice-Brno-Breclav		2010	no	yes	yes	yes	yes	yes	yes
	3. Railway line Katowice-Zilina-Nove Mesto n.V		2010-15	no	no	yes	yes	yes	yes	yes
24. Railway axis Lyon/Genova-Basel-Duisburg-Rotterdam/Antwerpen	1. Lyon-Mulhouse-Mülheim		2018	no	no	yes	no	yes	no	yes
	2. Genova-Milano/Novara-Swiss border		2013	no	no	yes	no	yes	no	yes
	3. Basel-Karlsruhe		2015	no	no	yes	no	yes	no	yes
	4. Frankfurt-Mannheim		2012	no	no	yes	no	yes	no	yes
	5. Duisburg-Emmerich		2009-15	no	no	yes	yes	yes	yes	yes
	6. "Iron Rhine" Rheidt-Antwerpen		2010-15	no	yes	yes	yes	yes	yes	yes
25. Motorway axis Gdansk-Brno/Bratislava-Wien	1. Gdansk-Katowice motorway		2010	no	yes	yes	yes	yes	yes	yes
	2. Katowice-Brno/Zilina motorway		2010	no	yes	yes	yes	yes	yes	yes
	3. Brno-Wien motorway		2009-13	no	no	yes	yes	yes	yes	yes
26. Railway/road axis Ireland/UK/continental Europe	1. Road/railway corridor linking Dublin with the North and South		2010	no	yes	yes	yes	yes	yes	yes
	2. Road/railway corridor Hull-Liverpool		2015-20	no	no	yes	no	yes	no	yes
	3. Railway line Felixstowe-Nuneaton		2011-14	no	no	yes	no	yes	no	yes
	4. Railway line Crewe-Holyhead		2008-12	no	no	yes	yes	yes	yes	yes
27. "Rail Baltica" railway axis Warszawa-Kaunas-Riga–Tallinn	1. Warszawa – Kaunas		2010-17	no	no	yes	yes	yes	no	yes
	2. Kaunas - Riga		2014-17	no	no	yes	no	yes	no	yes
	3. Riga - Talinn		2016-17	no	no	yes	no	yes	no	yes
28. Eurocaprail on the Bruxelles-Luxembourg-Strasbourg railway axis	1. Bruxelles-Luxembourg-Strasbourg		2012	no	no	yes	no	yes	no	yes
29. Railway axis on the Ionian/Adriatic intermodal corridor.	1. Kozani-Kalambaka-Igoumenitsa		2012	no	no	yes	no	yes	no	yes
	2. Ioannina-Antirrio-Rio-Kalamata		2014	no	no	yes	no	yes	no	yes
30. Inland waterways Seine-Scheldt	1. Navigability improvements Deulemont-Gent		2012-16	no	no	yes	no	no	no	no
	2. Compiègne-Cambrai		2012-16	no	no	yes	no	no	no	no

V.2. Modelling approach and assumptions

A large part of the assessment of the White Paper is done with modelling.

We have **7 models** available for this:

- SCENES, a network transport forecast model (WSP and TRT)
- TREMOVE, a transport and environmental model (TML)
- A road safety model (SWOV)
- A noise model (TNO)
- A logistics modelling tool (TNO)
- CGEurope, a regional economic model (CAU)
- Quantitative macro-economic analysis (TRT)

A description of the modelling tasks and results can be found in Annexes VI through XI.

These models are used to provide data for the assessment of the 4 scenario's described in the previous chapter. The model output will feed directly into the indicator assessment. Next to this, the model assumptions and results will be reported as separate documents, which will added to the final report.

The main interesting and recommended measures will not only be tested as packages but also tested as individual measures, so as to be able to widen the scope of choices to be assessed in the way to the extended scenario and to the final recommendations. This can be done for some five measures chosen either on the most significant in terms of impact or political acceptance (e.g. infrastructure charging) or on the most uncertain in terms of quantification.

The model scope is EU25, except where mentioned elsewhere. Model years are usually 2000, 2005, 2010 and 2020, again except where this is not possible within the scope of the model. Missing data/years are provided with intra- or extrapolation, e.g. for 1993, 1998 and 2001.

The 7 models that will be used will be made, as much as possible, consistent. For a large part, this is already the case. TREMOVE uses the same transport baseline as SCENES. CGEurope uses the cost data from SCENES and will bring its own transport flows as much as possible in line.

The SCENES-TREMOVE models are linked. TREMOVE uses the transport volume from SCENES, and breaks it down to further detail on e.g. costs (vehicle costs).

The other models use both the SCENES-TREMOVE output as is, which will mainly be the Access database for TREMOVE which includes the complete demand module volumes and costs, and in some cases network data from SCENES (speeds and volumes for noise and safety assessment, maybe others).

Each model uses its own assumptions – where relevant these assumptions were taken equal (e.g. SCENES and TREMOVE use the same energy price forecasts). These macro-economic assumptions can be found in the relevant annexes as:

- ANNEX VI – SCENES;
- ANNEX VII – TREMOVE;
- ANNEX VIII – CGE;
- ANNEX IX – SLAM;

where TREMOVE, CGE and SLAM make an intrinsic use of the same assumptions from SCENES, as these models use SCENES output as input.

V.3. Scenario modelling assumptions

This chapter reports the assumptions for translating the scenarios defined in the previous chapters into quantitative inputs for using the SCENES and the TREMOVE models for scenarios simulation.

The content of the chapter is as follows: the first section concerns methodological aspects, the second sections reports the assumptions used for the quantification and the third section summarises the four scenarios.

V.3.1. Quantification of input for modelling scenarios: methodological remarks

This note deals with the quantification of the four scenarios developed in section V.1 and included in the interim report concerning the implementation of the White Paper measures.

The note is focused on the policy measures. All the scenarios will share common assumptions concerning the exogenous trends (about population, GDP growth, etc.) which are not considered here.

The four scenarios defined in section V.1 consider the whole set of 78 measures that are part of the White Paper. This note deals with the modelling of scenarios by means of the SCENES and the TREMOVE models. Given the features of the two tools the 78 measures can be grouped into three classes:

a) Measures that can be simulated directly;
b) Measures that can be simulated indirectly;
c) Measures that cannot be simulated by SCENES and TREMOVE.

Measures in group (b) require assumptions to be modelled. The assumptions concern the model variables that should be affected by the application of the measures and the size of the change. This exercise can be very complex when each single measure is examined. In order to simplify the task, the quantification of the scenarios described in this note concerns packages of measures.

Each package includes one or more measures focused on the same aspects (e.g. rail market, pricing, etc.) and measures belonging to the same package give rise an effect on the same variable(s). Furthermore, with one exception, measures focused on the same aspects and that give rise an effect on the same variables but which are not envisaged in the same scenario (e.g. one is envisaged in the extended scenario while the other is not) are part of different packages.

18 different packages have been defined. Table 3 reports the composition of each measures package (measures codes are those reported in the INDIC[34] report).

The group (c) of measures that cannot be modelled by SCENES and TREMOVE[35] includes 35 measures out of 78. The list of such measures, still according to the INDIC classification, is reported in Table 4.

[34] European Commission – DG TREN, 2004, *INDIC Identification of Indicators to assess the Implementation of the White Paper on European Transport Policy – Final report*.

[35] These measures will be addressed in other Annexes.

Table 3: Measures packages used for the quantification of scenarios

Simulation package		Measure
A - Driving restrictions, checks and penalties	2	Driving restrictions on heavy goods vehicles on designated roads
	48	Harmonisation of road safety checks and penalties
B - Working conditions of truck drivers	3	Training of professional drivers
	4	Social harmonisation of road transport
	5	Introduction of the digital tachograph
C - Improving quality or rail freight services	8	Ensuring a high level safety for the railway network
	11	Third railway package: certification of train crews and trains on the Community rail network
	14	Third railway package: improving quality of the rail freight services
D - Opening rail freight market	6	First railway package: separated functions of management of infrastructure and service operation and opened access to international services
	7	Second railway package: opened national services and brought forward opening of international services in all networks
E - Opening rail passenger market	9	Updating the interoperability directives on high-speed and conventional railway networks (ERTMS)
	12	Third railway package: gradual opening-up of international passenger services
F - Reducing environmental impacts	15	Enter the dialogue with the rail industries in the context of a voluntary agreement to reduce adverse environmental impacts
	63	Introduction of a minimum share of biofuels consumption in road transport
	70	Promote the use of clean vehicles in urban public transport
	41	Sulphur content of marine fuels
G - Single European Sky	17	Single European Sky
H - Improving social and economic efficiency of air transport	19	Air transport insurance requirements
	20	Airport charges
	65	Compensation of air passengers
I - Managing airports capacity	21	Slot on Community airports
	26	Airport capacity expansion
J - Liberalisation of port services and improvement of navigation logistics	29	Port services liberalisation
	27	Simplify sea and inland waterway custom formalities and linking up the players in the logistic chain
K - Oil pollution damage compensation fund	33	Oil pollution damage compensation fund
L - River Information System	37	River Information System
M - Social legislation for inland waterway transport	39	Social legislation inland waterway transport
N - Improving freight intermodality	42	Marco Polo Programme
	43	Intermodal Loading Units and freight integrators
	76	Galileo programme
O - Revising Transport pricing and taxing	57	Infrastructure charging
	58	Uniform commercial road transport fuel taxation
	60	Harmonising VAT deductions
	61	Taxation of passenger cars according to environmental criteria
P - Taxation of energy products	62	Taxation of energy products and exemptions for hydrogen and biofuels
	77	Introduction of kerosene taxation
	78	Introduction of differential en route air navigation charges
Q - Improving intermodality for passengers	67	Intermodality for people
	76	Galileo programme
R - Infrastructures	16	Support the creation of new infrastructure, and in particular rail freight services
	28	Motorways of the seas
	36	Eliminating bottlenecks in inland waterway transport
	44	Trans European Network projects
	72	TEN infrastructure in the candidate countries

Table 4: Measures that cannot be modelled with SCENES/TREMOVE

Policy package		Measure
1 - Improving quality in the road sector	1	Harmonise clauses in commercial road transport contracts
2 - Revitalizing the railways	10	European Railway Agency
	13	Third railway package: Quality of rail services and users' rights
3 - Striking a balance between growth in air transport and the environment	18	Technical requirements in the field of civil aviation and establishing a European Aviation Safety Agency
	22	Community framework for airport noise management
	23	Protection against subsidisation and unfair pricing practices in the supply of air services from third countries
	24	Safety of third country aircraft
	25	Air service agreements with third countries
4 - Promoting transport by sea and inland waterway	30	Ship and port facility security
	31	European Maritime Safety Agency
	32a	Double-hull oil tankers
	32b	Penal sanctions for ship source pollution
	34	Transfer of ship register
	35	Training of seafares
	38	Greater harmonisation of boatmasters' certificates
	40	Port state controls
6 - Building the Trans-European transport network	45	Funding of TENs
	46	Tunnel safety
	73	Funding of infrastructure in the New EU Member States
	74	Develop administrative capacity in the candidate countries
7 - Improving road safety	47	European Road Safety Action programme
	49	"Black Spots" on TENs
	50	Seat and head restraints
	51	Tackling dangerous driving
	52	Technical investigations of the causes of road accidents
	53	Harmonisation of driving licensing systems
	54	Speed limitation devices
	55	Intelligent transport systems and e-Safety
	56	Pedestrian and cycling protection
8 - Adopting a policy on effective charging for transport	59	Electronic road toll system (interoperability)
9 - Recognizing the rights and obligations of users	66	Extending protection of users' rights to other transport modes
	68	Public service requirements and the award of public service contracts in passenger transport by rail, road and inland waterway
10 - Developing high-quality urban transport	69	Support for pioneering towns and cities (CIVITAS initiative)
	71	Promotion of good urban transport practices
11 - Putting research and techno-logy at the service of clean, efficient transport	64	European Research on new clean car technologies and ITS application to transport
12 - Managing the effects of globalization	75	EU external relations in the transport sector

V.3.2. Key differences modelling scenarios 2010 and 2020

Not all measures can be modelled. To enable the modelling, the next table details the 2010 scenarios for those measures that are relevant for the models that will be used in ASSESS. The measures are labelled in modelling packages.

The 2020 scenarios are with regard to policy initiatives similar to the 2010 scenarios. The difference is found in the extent to which measures have impact on the transport system. For some measures it takes time to impact the transport system. For example in case of liberalisation it takes time before the market has been rearranged and produced new services at lower costs or in case of voluntary road pricing directives it takes time before member states implement the measure. Other measure has a direct impact. For example in case of social legislation, safety measures or non-voluntary tax exemptions. These measures are implemented and have their full impact on the moment they are compelled.

Table 5: Key elements modelling scenarios 2010 and 2020

Impact measures on transport system for 2010 are given.
2020+ = Impact of measure on transport system in 2020 is higher than in 2010 because the measure takes time to impact the transport system. In all other cases, the 2020 impact is similar in 2020 and 2010

Simulation package	**Measure**		**Null**	**Partial A+B**	**Full**	**Extended**
A - Driving restrictions, checks and penalties	2	Driving restrictions on heavy goods vehicles on designated roads	No	Yes (with different impact on costs for Partial A and B)	Conform partial scenario	Conform partial scenario
	48	Harmonisation of road safety checks and penalties				
B - Working conditions of truck drivers	3	Training of professional drivers	No	Yes	Conform partial scenario	Conform partial scenario
	4	Social harmonisation of road transport				
	5	Introduction of the digital tachograph				
C - Improving quality or rail freight services	8	Ensuring a high level safety for the railway network	No	Yes	Yes **2020+**	Yes **2020+**
	11	Third railway package: certification of train crews and trains on the Community rail network				
	14	Third railway package: improving quality of the rail freight services				
D - Opening rail freight market	6	First railway package: separated functions of management of infrastructure and service operation and opened access to international services	No	Yes, but improvement of services takes time **2020+**	Yes plus improved improved rail freight services **2020+**	Conform full scenario **2020+**
	7	Second railway package: opened national services and brought forward opening of international services in all networks				
E - Opening rail passenger market	9	Updating the interoperability directives on high-speed and conventional railway networks (ERTMS)	No	Yes, for the HSL network **2020+**	Yes for all international services **2020+**	Conform full scenario plus extra efforts **2020+**
	12	Third railway package: gradual opening-up of international passenger services				
F - Reducing environmental impacts	15	Enter the dialogue with the rail industries in the context of a voluntary agreement to reduce adverse environmental impacts	No	Yes **2020+**	Conform partial scenario **2020+**	Conform partial scenario **2020+**
	63	Introduction of a minimum share of biofuels consumption in road transport				
	70	Promote the use of clean vehicles in urban public transport				
	41	Sulphur content of marine fuels				

Simulation package	Measure		Null	Partial A+B	Full	Extended
G - Single European Sky	17	Single European Sky	No	Yes, in terms of legislation, first results in implementation **2020+**	Yes, in terms of legislation, limited industrial implementation **2020+**	Yes, in terms of legislation plus industrial implementation (SESAME project) **2020+**
H - Improving social and economic efficiency of air transport	19	Air transport insurance requirements	No	Yes, compensation and insurance requirements obliged	Conform partial scenario	Conform partial scenario
	20	Airport charges				
	65	Compensation of air passengers				
I - Managing airports capacity	21	Slot on Community airports	No market mechanism	Improvement of technical functioning of the system, First steps towards a market mechanism	Yes, strong market mechanism	Yes, strong market mechanism
	26	Airport capacity expansion	No market mechanism	Improvement of technical functioning of the system, First steps towards a market mechanism **2020+**	Yes, strong market mechanism **2020+**	Yes, strong market mechanism **2020+**
J - Liberalisation of port services and improvement of navigation logistics	29	Port services liberalisation	No, self-handling is not allowed.	Partial, self-handling by land based personnel of self-handler under strict conditions **2020+**	Yes, self handling is allowed **2020+**	Conform full scenario **2020+**
	27	Simplify sea and inland waterway custom formalities and linking up the players in the logistic chain				
K - Oil pollution damage compensation fund	33	Oil pollution damage compensation fund	No	Yes	Conform partial scenario	Conform partial scenario
L - River Information System	37	River Information System	No	Partial **2020+**	Yes **2020+**	Conform full scenario but faster implementation **2020+**
M - Social legislation for inland waterway transport	39	Social legislation inland waterway transport	No	Partial	Yes	Partial
N - Improving freight intermodality	42	Marco Polo Programme	No	Partial	Full	Conform full scenario
	43	Intermodal Loading Units and freight integrators				
	76	Galileo programme	No	Yes, limited number of services available **2020+**	Yes, full range of services available **2020+**	Yes, average amount of services available **2020+**
O - Revising transport pricing and taxing	57	Infrastructure charging *Freight*	No	Partial, based on average costs and little internalisation **2020+** Different impact in A and B.	Yes, social average costs pricing with internalisation of external costs **2020+**	Yes, social marginal cost pricing with internalisation of external costs and mark ups for investment **2020+**
		Infrastructure charging *Passenger*	No	No	General principle of user and polluter pays to be applied through subsidiarity by MS **2020+**	Partial, based on average or marginal social costs and internalisation of external costs, for car and air only **2020+**

Simulation package	Measure		Null	Partial A+B	Full	Extended
	58	Uniform commercial road transport fuel taxation *Freight*	No	No	Yes	Yes
		Uniform commercial road transport fuel taxation *Passenger*			No	No
	60	Harmonising VAT deductions *Freight*			Yes	Yes
		Harmonising VAT deductions *Passenger*			No	No
	61	Taxation of passenger cars according to environmental criteria			Yes	Yes
P - Taxation of energy products	62	Taxation of energy products and exemptions for hydrogen and biofuels	No	Yes	Yes	Yes, higher exemptions for hydrogen, natural gas and biofuels
	77	Introduction of kerosene taxation	No	No	Yes, all flights	Yes, intra-community flights
	78	Introduction of differential en route air navigation charges				
Q - Improving intermodality for passengers	67	Intermodality for people	No	No	Yes	Conform full scenario
	76	Galileo programme				
R - Infrastructures	16	Support the creation of new infrastructure, and in particular rail freight services	No	No	Rail network with exclusive rights for freight	Priority to freight on core network
	28	Motorways of the seas	No	Yes, moderate investments in selected corridors **2020+**	Yes, high investments in selected corridors **2020+**	Yes, high investments in additional corridors **2020+**
	36	Eliminating bottlenecks in inland waterway transport	No	No	Yes **2020+**	Yes **2020+**
	44	Trans European Network projects	*See Table 2*			
	72	TEN infrastructure in the candidate countries				

V.3.3. Quantification of measure packages

In the following, the assumptions and the references used to quantify the packages are presented. If not explicitly stated otherwise, the quantification of each package concerns the full effect of its implementation. However, some measures require time before their effects are fully visible. Furthermore, the scenarios defined in qualitative terms in section V.1 consist not only of a different mix of packages but, mainly, of different levels of application of each package. For this reason the size of the effect of each package can be different in each scenario and at each time threshold (2010 and 2020). In section V.3.4 the quantitative assumptions are summarised separately for each scenario and for 2010 and 2020 (see Table 12).

In the modelling exercise there will be the opportunity to verify the magnitude of the assumptions reported below, by comparing the overall cost and speed changes on different modes. Some modifications could therefore be made to ensure the overall input changes are in line with the expectations.

V.3.3.1. Package A: Driving restrictions, checks and penalties

Driving restrictions are of minor relevance at the scale of the EU. According to the assumptions made in the SUMMA[36] project, harmonisation of check and penalties would increase truck costs by 5%.

For Partial B, the harmonisation of checks and penalties are assumed to have no impact on truck costs.

V.3.3.2. Package B: Working conditions of truck drivers

The effect of measures in this package is to increase transport cost of road freight. The increment is higher for those countries where a large share of drivers own their vehicle (as self-employed drivers tend to drive for more hours). According to an Italian study[37], EU15 countries where the average size of hauliers is lower than the average (suggesting that self-employed are over-represented) are: Spain, Italy, Finland and Sweden. At the same time, working conditions of drivers from 10 new EU countries are generally poorer than in EU15 so the effect of the measures should be stronger.

Assuming an average reduction of driving time from an average of 60 to 48 hours (20% less), considering that weight of driver costs on total operating costs, social harmonisation of road transport could increase road freight transport costs by 7-8% in countries with a higher share of self-employed drivers (FIN, ITA, SPA, SWE) and new EU countries and by 3-4% in other countries.

Digital tachograph, required to enforce the rule, and training should be of minor relevance and can add no more than 1-2%.

In total, this leads to 5% and 10% of road freight costs increase, depending on the country.

V.3.3.3. Package C: Improving quality of rail freight services

Improving quality means especially reducing delays, therefore reducing travel time. According to Rail Freight Group[38], the vast majority of shuttle trains are on time so improvement should concern mainly conventional freight rail. It can be realistic that conventional rail improves time by 10%, while for unitised trains the reduction could be lower (6%). Additionally, time at borders could be reduced, especially at borders between EU15 and new EU countries.

V.3.3.4. Package D: Opening rail freight market

The opening of rail freight market and the separate management of infrastructure and service operation should reduce transport costs as the effect of new competitors entering in the market. Such effect is difficult to quantify. Cost saving achieved by franchising in the passenger sector are up to 20%. The estimation proposed in SUMMA specifically for freight (3% reduction) is a safer assumption. The SUMMA assumption is therefore adopted with reference to the Second Railway Package, while an additional reduction of 2% is assumed as effect of First Railway Package. In the scenarios other than the Full scenario in 2020, the reductions are lower or higher.

[36] SUMMA, Deliverable 5: Analysis and assessment of policies - Report on performance of policies (draft version , April 2005)
[37] Centro Studi Fondazione Caracciolo, 2003, *La mobilità delle cose.*
[38] Berkeley T., 2001, *Developing a thriving rail freight industry*

An open market should also lead to better services, in particular lower transport times. According to SUMMA the effect could be a 6% reduction. It can be assumed that the effect is higher for conventional rail (where current speed is quite low) than for unitised rail.

V.3.3.5. Package E: Opening rail passenger market

The study "Market Opening in Network Industries"[39] reports that rail passenger tariffs have been stable or have increased in countries where liberalisation has been wider. On the other side, a modelling exercise from Steer Davies Gleave[40] forecasts tariffs decrements (even substantial). Relying on historical evidence but taking into account the effect expected, a slightly reduction of costs (2%) can be assumed. SUMMA suggests also an overall 3% reduction of travel time as effect of liberalisation of services and introduction of the ERTMS. In the scenarios other than the Full scenario in 2020, the reductions are lower or higher.

Market opening for rail passenger markets will take place only for international lines and the domestic routings included in these itineraries, therefore the cost reduction will concern only High Speed Train services.

V.3.3.6. Package F: Reducing environmental impacts

The dialogue with the rail industries should lead to reduced noise and polluting emissions. For the latter[41], the dialogue is assumed to result in (compared to the null scenario):

- a halving of the fleet of diesel trains by 2020 in the favour of electric trains
- the use of low sulphur fuels (40 ppm) for diesel trains
- a 10% reduction of diesel train emission factors for NO_x, particulates and volatile organic components, as a result of increased use of particulate traps and catalysts

Concerning the promotion of biofuels, it is assumed[42] that by 2010 biofuel will have replaced 5.75%[43] of the total road petrol and diesel consumption and 8% by 2020.
The promotion of clean vehicles in urban public transport addresses the accelerated renewal of fleet. It is assumed that by the year 2010 all buses in the fleet are at least EURO I and by the year 2020 at least EURO III.

Finally, the recently finalised legislation to reduce sulphur content in marine fuels will reduce SO_2 unitary emissions from all ships in the Baltic Sea (May 2006), North Sea and Channel (Fall 2008), and from passenger vessels (May 2006) throughout the EU by 44%. Unitary emissions from ships at berth will be reduced by 96% from 2010 on. Also PM emission reductions of 18% will be achieved by this policy in the above mentioned seas and for the above mentioned ship types. In ports reduction will be 62.5%.

---

[39] European Commission – DG Internal Market, 2004, *Market Opening in Network Industries*

[40] Steer Davies Gleave, 2004, *EU passenger rail liberalisation: extended impact assessment.* Final report prepared for European Commission – DG TREN.

[41] No assumptions are made for quantifying effects on noise as this element cannot be modelled by the SCENES and TREMOVE models

[42] The introduction of biofuels in the road transport sector is assessed by way of extra simulation scenarios in the TREMOVE model. This means that no biofuel is modelled in the four initial scenarios, but additional TREMOVE simulation will be used to assess the impact of the introduction of biofuels.

[43] 5.75% in 2010 is proposed in *COM(2001)547 - Directive on the promotion of the use of biofuels in transport.* Studies reveal that a wide variety of blended and pure biofuels could be introduced in the transport sector. As a consequence it is not possible to specify the exact composition of the blends and fuels that will be supplied to the future transport sector. Therefore it will be not specified whether all road vehicles will use a blended fuel with a 5.75% biofuel content or whether some vehicles will use unblended petrol and diesel and others will use blends with higher biofuel contents, etc. What is specified in the scenarios is that, overall, 5,75% of the petrol and diesel consumption will be replaced by biofuel.

V.3.3.7. Package G: Single European Sky

The EC Green Paper[44] on energy reports that, the from the implementation of Single European Sky, a 6-12% reduction of fuel consumption is expected due to shorter flight routes. Therefore, detour factors[45] are assumed to decrease depending on the degree of implementation of this measure.

Given such an expectation, an effect on travel times between origins and destinations can also be considered. Considering that flight time is not the total air travel time, the effect on the latter is lower. Assuming a 2 hours flight, taxing, check-in and terminal operations can add about 45 minutes so flight time is about 75% of total time. If we assume that 10% of flight time is saved, total air travel time is reduced by of 4%. The effect on tariffs is quantified in a reduction of 1.5% in the Full scenario for 2020. Other scenarios have reductions that are higher or lower, according to the implementation level.

V.3.3.8. Package H: Improving social and economic efficiency of air transport

The reform of airport charges should have the effect of differentiating charges according to peak/off-peak, occupancy of capacity, etc., although it is generally not believed that this differentiation can gives rise to a significant increment of tariffs. If it is assumed that airport charges are designed to better manage airport capacity, traffic should be distributed in a more balanced way among airports, reducing delays and so reducing travel time, even though demand transferred to more peripheral airports could actually increase door-to-door travel time. A 2% reduction is assumed.

Insurance requirements and compensation for air passengers should slightly increase fares. Unfortunately, there is no documentation available to anchor a reliable estimation and a 2% growth is assumed.

V.3.3.9. Package I: Managing airports capacity

A new allocation of slots is aimed at improving efficiency in airport capacity allocation and then improving competition According to NERA[46], the net effect should be of lowering fares due to additional services and to replacement of full service carriers with low cost carriers. Currently, low cost companies have a small share in many major airports[47]. Assuming that a new allocation of slots allows low cost companies to expand their market share travel costs are reduced. A 5% of overall reduction in 2020 in the Full scenario in addition to the Null trend seems reasonable. Regarding air capacity expansion, some literature[48] suggests that expanding capacity does not reduce travel time. Assuming a slightly more optimistic view, travel time can be reduced slightly.

V.3.3.10. Package J: Liberalisation of port services and improvement of navigation logistics

Liberalisation of services is realistic for major ports only where more subjects can compete. In such cases both cost reductions and lower times for port operations can be expected. On minor ports, including also inland ports, the effects of liberalisation should be much lower and confined to the cost side. We could not find sources to appraise the size of the effect. It is assumed that port costs can be reduced by 5-15% and that in major ports also a 3% reduction of port operations time is feasible.

---

[44] European Commission, 2005, *Green paper on Energy Efficiency or Doing More With Less*

[45] The detour factor represents the difference between the actual aircraft route length and the crow-fly distance between origin and destination.

[46] NERA, 2004, *Study to assess the effects of different slot allocation schemes*. Final report prepared for European Commission – DG TREN.

[47] The Economist, 8th July 2004, *Turbolent skies*, chart 2.

[48] The paper found is a preliminary version the authors ask is not quoted.

Additional gains on the time side are expected from measure 27 on the linking up of players in the logistic chain. It is assumed that the effect is of the same size (3%).

V.3.3.11. Package K: Oil pollution damage compensation fund

As tanker users already pay insurances covering oil pollution damages, the additional cost of a compensation fund would be probably off-set by a reduction of insurance fees. So, the effect on costs should be very limited (1%).

V.3.3.12. Package L: River Information System

A 5% reduction of inland navigation travel time is assumed for the Extended scenario, although no documentation is available on this theme.

V.3.3.13. Package M: Social legislation for inland waterway transport

According to INDIC, "in the Netherlands more than 15% of the dry cargo fleet and 10% of the tanker fleet is regularly active more than 80 hours per week". Assuming that these figures are representative of the whole market and that the target of the measure is reducing maximum working time to 48 hours per week, the share of activities exceeding this limit should face an increment of labour costs of about 80%. Labour costs represent a variable share of total costs, ranging from 10% of large push convoys to 55% of smaller barges. Statistics of goods moved according to vessel size have not been found. Assuming 30% as a representative average, the effect of increasing labour costs would be translated into an average increment of 3% of total costs in the Full scenario.

V.3.3.14. Package N: Improving freight intermodality

One measure within this package is the Marco Polo program. Marco Polo is a large program covering a wide range of interventions; overall quantification is very difficult. For measure concerning loading units, SUMMA suggests a 5% reduction of handling costs. Additionally, an impact on road load factors is envisaged in INDIC. In order to take into account that such an effect would be higher for countries where haulage market is more fragmented and more room for improvements exist, the same classification of countries adopted for package B is considered: a 5% reduction is assumed in FIN, ITA, SPA, SWE and New EU10, a 2% reduction in the other countries. Finally, Marco Polo should also benefit transport time and costs of unitised rail even if not dramatically (-2% for time and –1% for costs are assumed; of course these reductions sum with the other reductions assumed as effect of other measures in this and other packages).

Measure 43 on Intermodal Loading Units and freight integrators should also have an effect on unitised rail services, both in terms of time (at terminals and on track) and in terms of cost (again, at terminal and for the transport service). Effects can be of the same size of those assumed for the Marco Polo project.

For the Galileo program, SUMMA suggests a 3% reduction of truck times.

V.3.3.15. Package O: Revising transport pricing and taxing

<u>Measure 57 - Infrastructure charging</u>

The objective of infrastructure charging is bridging the gap that currently exists between short-run private costs (users' costs) and social costs. External costs should therefore be added to private costs in terms of

toll per pass-km or ton-km. However, pricing for passenger modes is not a White Paper measure, so only pricing for freight modes are considered.

For the quantification, marginal cost values developed in the TIPMAC project[49] can be considered as a reference (see Table 6). The TIPMAC research project (Fifth Framework Research Programme) combined transport modelling with macroeconomic modelling to identify the indirect macroeconomic impacts of transport investment and pricing in the EU. A specific activity within the project was to review literature and studies on quantification of social marginal costs of transports in order to define a reference set of values for implementing such scenarios in the models. The approach followed in the estimation of Social Marginal costs was to proceed with a top down methodology, starting from existing estimates of average marginal costs for some European countries and mode, and extrapolating values where no estimates were available. Several sources were reviewed to build the database; UNITE[50] and RECORDIT[51] projects were especially selected. The available estimates were first elaborated (e.g. values were actualised and expressed in Euro) to extract reference values and then generalised for all the countries. For countries where no estimates were available, the weighted average among the European countries whose values were known was taken as reference; for countries with no available evidence cross-countries adjustment factors were applied. For further details readers are referred to the paragraph 3.5 of Deliverable D1 of the TIPMAC project. More details are provided in Appendix 1.

Table 6: Social pricing by country and freight / passenger mode of transport

Country	Freight				
	HGV (Eurocent/vkm)	MediumTruck (Eurocent/vkm)	Rail (Eurocent/tkm)	IWW (Eurocent/tkm)	Ship (Eurocent/tkm)
AT	25.2	20.43	0.31	0.35	
BE	15.3	12.42	0.35	0.38	2.01
CH	20.3	16.41	0.30	0.37	
DE	19.0	15.39	0.35	0.31	1.20
DK	19.9	16.17	0.28		0.58
EL	25.7	20.85	0.19		2.30
ES	18.5	15.03	0.22		0.60
FI	26.0	21.09	0.15	0.12	0.25
FR	19.7	15.96	0.46	0.38	2.56
IE	39.8	32.19	0.22		0.37
IT	31.9	25.83	0.34	0.31	1.73
LU	26.6	21.57	0.35	0.38	
NL	20.5	16.62	0.32	0.34	0.38
PT	25.2	20.43	0.18		0.72
SE	13.2	10.71	0.17	0.15	0.70
UK	24.0	19.44	0.25	0.23	0.43
Others	25.2	20.43	0.28	0.26	1.21
Country	Passengers				
	Car (Eurocent/vkm)	Bus/Coach (Eurocent/pkm)	Train (Eurocent/pkm)	Ferry (Eurocent/pkm)	Air (Eurocent/pkm)
AT	8.9	3.13	2.07		3.93
BE	13.3	3.21	1.83	2.14	4.07
CH	13.8	3.21	1.90	2.51	4.57
DE	10.1	2.79	1.72	2.07	4.03
DK	11.0	2.06	1.77	2.18	3.88
EL	10.5	2.15	1.00	1.23	2.40
ES	8.3	2.08	1.18	1.44	2.76
FI	14.9	1.39	0.76	1.80	3.39
FR	9.9	3.39	1.68	2.02	3.93
IE	12.6	1.64	1.36	1.74	3.18

[49] TRT Trasporti e Territorio, 2003, *TIPMAC Deliverable D1 - Common assumptions and scenarios*

[50] ITS Leeds UK, UNITE –Unification of Accounts and Marginal Costs for Transport Efficiency, 2002

[51] RECORDIT - Real Cost Reduction of Door-to-door Intermodal Transport – Deliverable 4, 2001

IT	16.6	2.86	1.62	1.99	4.27
LU	12.5	3.56	1.83	2.14	3.84
NL	8.7	2.76	1.69	2.01	6.44
PT	6.4	1.67	1.01	1.26	2.49
SE	5.9	1.57	1.9	1.89	3.32
UK	11.5	2.42	1.48	1.80	3.64
Others	8.9	2.49	1.56	1.90	3.73

Source: TIPMAC Deliverable D1 - Common assumptions and scenarios
Note: pricing of passenger modes of transport is NOT a White Paper measure. Values in the table are of reference for the extended scenario only.

In Partial B, SMCP is replaced by assumptions based on current charging regimes and Eurovignette for freight transport (the assumptions concerning for passenger travel are not changed). Therefore, the quantification of the Partial B scenario pricing measures consisted of pricing measures that are built up from existing motorway tolls for 2010 and 2020. In particular, the following assumptions have been used.

For 2010.

- Germany and Austria will apply the current motorway tolls (for Germany it is also assumed that tolling is extended down to 3.5t trucks);
- Existing tolls in Italy, France, Spain, Portugal, Greece and Slovenia will remain constant in real terms;
- The current level of Eurovignette charges[52] is applied in Belgium, the Netherlands, Luxembourg, Denmark, Sweden, Czech Republic, Poland, Slovakia, Lithuania and Hungary;
- for all other Member States no new tolls/charges are assumed.

For 2020

- all countries moved from vignettes to distance-based tolls for motorways. This move will imply toll levels that amount to 50% of the 2010 German distance-based charges (constant in real terms) except where national tolls are already higher in 2010 (in which case the 2010 tolls are used, so that tolls are never reduced).

The table below reports in detail the assumed level of distance-based tolls for 2010 and 2020.

Table 7: Road freight tolls in the Partial-B scenarios

Country	2010 scenario	2020 scenario	Trucks 3.5t-12t		Trucks > 12t		Articulated vehicles > 25t	
			2010	2020	2010	2020	2010	2020
AT	National tolls	National tolls	0.130^	0.130^	0.182^	0.182^	0.273^	0.273^
BE	Eurovignette	Vignette(**)	0.012	0.055	0.012	0.060	0.012	0.060
DE	German Maut	German Maut	0.110	0.110	0.120	0.120	0.12	0.120
DK	Eurovignette	Vignette(**)	0.012	0.055	0.012	0.060	0.012	0.060
ES	Existing tolls	Existing tolls	0.119	0.119	0.156	0.156	0.156	0.156
FI			0	0.055	0	0.060	0	0.060
FR	Existing tolls	Existing tolls	0.130	0.130	0.176	0.176	0.176	0.176
GR	Existing tolls	Vignette(**)	0.031	0.055	0.037	0.060	0.037	0.060
IE			0	0.055	0	0.060	0	0.060
IT	Existing tolls	Existing tolls	0.082	0.082	0.131	0.131	0.156	0.156
LU	Eurovignette	Vignette(**)	0.012	0.055	0.012	0.060	0.012	0.060
NL	Eurovignette	Vignette(**)	0.012	0.055	0.012	0.060	0.012	0.060
PT	Existing tolls	Existing tolls	0.112	0.112	0.123	0.123	0.150	0.150
SE	Eurovignette	Vignette(**)	0.012	0.055	0.012	0.060	0.012	0.060
UK		Vignette(**)	0	0.055	0	0.060	0	0.060

[52] directive 99/62; see http://europa.eu.int/comm/transport/road/policy/roadcharging/tolls/index_en.htm

CH	National tolls	National tolls	0.066	0.066	0.197	0.197	0.246	0.246
CZ	Vignette(*)	Vignette(**)	0.012	0.055	0.012	0.060	0.012	0.060
EE		Vignette(**)	0	0.055	0	0.060	0	0.060
HU	Vignette(*)	Vignette(**)	0.012	0.055	0.012	0.060	0.012	0.060
LT	Vignette(*)	Vignette(**)	0.012	0.055	0.012	0.060	0.012	0.060
LV		Vignette(**)	0	0.055	0	0.060	0	0.060
PL	Vignette(*)	Vignette(**)	0.012	0.055	0.012	0.060	0.012	0.060
SI	Existing tolls	Existing tolls	0.185	0.185	0.185	0.185	0.185	0.185
SK	Vignette(*)	Vignette(**)	0.012	0.055	0.012	0.060	0.012	0.060
CY		Vignette(**)	0	0.055	0	0.060	0	0.060
MT		Vignette(**)	0	0.055	0	0.060	0	0.060

^ Basic toll, higher tolls exist on some alpine segments in the model

Vignette(*) in 2010: the Eurovignette charge has been used for tolling in CZ,PL,SK,LT,HU

Vignette(**) in 2020: assumed toll is a Eurovignette-link minimum charge equal to the larger of 2010 tolls or 50% of the present German Maut

CH: tolls based on 0.0252CHF/tonne-km at 0.65CHF/€ and SCENES average loading factors for tonnes loaded per truck

Measure 58 - Uniform commercial road transport fuel taxation

INDIC reports that the main objective of measure concerning uniform commercial road transport fuel taxation is to have a common level of excise not lower than 0.410 €/litre by the year 2010 for "commercial diesel" (i.e. for duty vehicles and buses), 0.330 for non-commercial diesel and 0.359 for gasoline. The target for commercial diesel would represent an increment for most of the countries, the target for non-commercial diesel is in line with the current average, whereas for gasoline the minimum value indicated is lower than the current excise adopted in many countries. However, it is reasonable to suppose that the common level for gasoline can be fixed to a value which is not lower than the current average, so a target value of 0.450 €/litre is assumed for gasoline instead of 0.359. Nothing is said in INDIC about the year 2020, so the same target can be applied to both the year 2010 and the year 2020.

Table 8 reports the changes of costs for the model on a country basis.

Table 8: Variation of excises on gasoline and gas oil. (Euro per 1000 Litres)

Country	Commercial diesel		Non-commercial diesel		Gasoline		model costs change (€/veh-km)		
	Current excise	Var. to target	Current excise	Var. to target	Current excise	Var. to target	Car	LDV	HDV
AT	310	100	310	20	425	25	**-0.003**	**0.013**	**0.027**
BE	330	80	330	0	536	-86	**0.015**	**0.028**	**0.055**
CY	244	166	244	86	298	152	**0.007**	**0.017**	**0.034**
CZ	309	101	309	21	368	82	**-0.009**	**0.007**	**0.013**
DE	470	-60	470	-140	655	-205	**-0.019**	**-0.010**	**-0.020**
DK	370	40	370	-40	547	-97	**0.015**	**0.028**	**0.055**
EE	245	165	245	85	288	162	**0.005**	**0.019**	**0.039**
EL	245	165	245	85	296	154	**0.015**	**0.028**	**0.055**
ES	294	116	294	36	396	54	**-0.012**	**-0.001**	**-0.002**
FI	347	63	347	-17	597	-147	**0.004**	**0.013**	**0.026**
FR	417	-7	417	-87	589	-139	**0.000**	**0.007**	**0.014**
HU	332	78	332	-2	398	52	**-0.010**	**0.001**	**0.002**
IE	368	42	368	-38	443	7	**0.017**	**0.031**	**0.061**
IT	403	7	403	-73	559	-109	**0.015**	**0.027**	**0.055**
LT	246	164	246	84	288	162	**0.004**	**0.026**	**0.052**
LU	253	157	253	77	442	8	**0.012**	**0.027**	**0.054**
LV	227	183	227	103	267	183	**-0.018**	**0.005**	**0.010**

MT	248	162	248	82	313	137	**0.002**	**0.017**	**0.033**
NL	380	30	380	-50	665	-215	**0.012**	**0.030**	**0.059**
PL	232	178	232	98	324	126	**-0.004**	**0.017**	**0.034**
PT	308	102	308	22	523	-73	**0.004**	**0.009**	**0.017**
SE	365	45	365	-35	525	-75	**0.009**	**0.019**	**0.037**
SI	298	112	298	32	354	96	**-0.013**	**0.011**	**0.021**
SK	359	51	359	-29	384	66	**-0.007**	**0.008**	**0.015**
UK	705	-295	705	-375	705	-255	**-0.028**	**-0.049**	**-0.098**

Sources: elaboration on EU Energy and Transport in Figures, TREMOVE and INDIC data

In the table, variation of cost per km is computed assuming composition of car fleet forecasted in the year 2010 by TREMOVE[53] and average consumption of fuel. For countries not covered by TREMOVE, "similar" countries have been used (e.g. Cyprus equal to Greece, Slovakia equal to Czech Republic). The "bus" mode of transport is not considered, as there is not a direct relationship between fuel cost and fares.

Measure 60 - Harmonising VAT deductions

INDIC reports that the main objective of Harmonising VAT deductions is the harmonization of VAT rates on the purchase of means of transport and on the various transport services across Member States. The current situation is variegated. As far as transport services are concerned, the two main elements are that air services are usually exempt from VAT for international trips and VAT for domestic transport is usually the same across modes, but is different by country.

A quantification of the effect of measure on VAT applied to transport services can be obtained by identifying a reference target VAT. The European Commission recommends a standard rate of VAT of 15%. Currently most of Members States apply to transport services the reduced rate. So a target of 7% VAT looks reasonable. Current rates are known from the European Commission[54], so the size of change can be computed (Table 9).

Table 9: Variation of transport cost due to VAT harmonisation

Country	Current VAT				Target VAT	Model costs change			
	Road	Rail	Air 1	IWW	(All services)	Road	Rail	Air	IWW
AT	10%	10%	0%	10%	7%	**-3%**	**-3%**	**7%**	**-3%**
BE	6%	6%	0%	6%	7%	**1%**	**1%**	**7%**	**1%**
CY	15%	15%	0%	15%	7%	**-8%**	**-8%**	**7%**	**-8%**
CZ	5%	5%	0%	5%	7%	**2%**	**2%**	**7%**	**2%**
DE	16%	16%	0%	16%	7%	**-9%**	**-9%**	**7%**	**-9%**
DK	0%	0%	0%	0%	7%	**7%**	**7%**	**7%**	**7%**
EE	18%	18%	0%	18%	7%	**-11%**	**-11%**	**7%**	**-11%**
EL	8%	8%	0%	8%	7%	**-1%**	**-1%**	**7%**	**-1%**
ES	7%	7%	0%	7%	7%	**0%**	**0%**	**7%**	**0%**
FI	8%	8%	0%	8%	7%	**-1%**	**-1%**	**7%**	**-1%**
FR	5.5%	5.5%	0%	5.5%	7%	**2%**	**2%**	**7%**	**2%**
HU	15%	15%	0%	15%	7%	**-8%**	**-8%**	**7%**	**-8%**
IE	0%	0%	0%	0%	7%	**7%**	**7%**	**7%**	**7%**
IT	20%	10%	0%	10%	7%	**-13%**	**-3%**	**7%**	**-3%**
LT	5%	5%	0%	5%	7%	**2%**	**2%**	**7%**	**2%**
LU	18%	18%	0%	18%	7%	**-11%**	**-11%**	**7%**	**-11%**

[53] See www.tremove.org

[54] European Commission, *VAT rates applied in the Member States of the European Community*, 2004.

LV	5%	5%	0%	5%	7%	**2%**	**2%**	**7%**	**2%**
MT	5%	5%	0%	5%	7%	**2%**	**2%**	**7%**	**2%**
NL	6%	6%	0%	6%	7%	**1%**	**1%**	**7%**	**1%**
PL	7%	7%	0%	7%	7%	**0%**	**0%**	**7%**	**0%**
PT	5%	5%	0%	5%	7%	**2%**	**2%**	**7%**	**2%**
SE	6%	6%	0%	6%	7%	**1%**	**1%**	**7%**	**1%**
SI	8.5%	8.5%	0%	8.5%	7%	**-2%**	**-2%**	**7%**	**-2%**
SK	19%	19%	0%	19%	7%	**-12%**	**-12%**	**7%**	**-12%**
UK	7.5%	7.5%	0%	7.5%	7%	**0%**	**0%**	**7%**	**0%**

1: International services

Sources: elaboration on INDIC data (Final report page 226) and European Commission, VAT rates applied in the Member States of the European Community, 2004.

Regarding VAT on the car purchase, again different rates are currently applied in the Member States, even if the differences are not so high. It is assumed that a common VAT rate of 19% – correspondent to the average of current rates – is applied in all countries[55]. Table 10 reports current rates and the variations assumed.

Table 10: Variation of VAT on car purchase in the Member States

Country	Current VAT	target	change
BE	21	19	-2
CZ	19	19	0
DK	25	19	-6
DE	16	19	3
EE	18	19	1
EL	18	19	1
ES	16	19	3
FR	19.6	19	-0.6
IE	20	19	-1
IT	20	19	-1
CY	15	19	4
LV	18	19	1
LT	18	19	1
LU	15	19	4
HU	25	19	-6
MT	18	19	1
NL	19	19	0
AT	20	19	-1
PL	22	19	-3
PT	17	19	2
SI	20	19	-1
SK	19	19	0
FI	22	19	-3
SE	25	19	-6
UK	17.5	19	1.5

Source: elaboration on European Commission, *VAT rates applied in the Member States of the European Community*, 2004.

Measure 61 - Taxation of passenger cars according to environmental criteria

According to INDIC, taxation of passenger cars according to environmental criteria should mainly consist in abolishing Registration Tax (RT), transferring the revenue to either Annual Circulation Tax (ACT) or fuel tax and including a CO_2 element in either Annual Circulation Tax or fuel tax. However, this is not a

[55] For modelling scenarios, the same VAT rate will be assumed also for repair and maintenance of road vehicles

mainstream measure in the White Paper and its implementation would require unanimity voting in tax matters that currently looks implausible. So the measure is considered not feasible up to 2010.

V.3.3.16. Package P: Taxation of energy products

According to INDIC, for gasoline and diesel this measure makes reference to excise included in package O, so they are not considered here. Here excises should concern Kerosene (0.330 €/litre at 2010), LPG (0.125 €/litre) and natural gas (0.0026 €/litre).

Kerosene tax should also affect air transport and it is assumed here that the effect could be of about 3% on air cost.

It is assumed that biofuel (as an additive in blends or pure) is exempted from taxes to the extent needed to keep its consumer price equal to that of unblended diesel or petrol. A resource cost of 0.5 euro per litre biofuel is assumed[56]. Resource costs of blended fuels are calculated by combining the resource costs of their components. The excise tax level for the biofuel component is determined such that addition of biofuel does not affect the price of the (blended) fuel at the pump. I.e. the tax exemption covers the difference between the resource costs of the main component of the fuel versus the resource cost of the biofuel additive.

V.3.3.17. Package Q: Improving intermodality for passengers

For this package, SUMMA suggests that waiting and access time at terminals can be reduced by 5% and car travel time by 3%.

V.3.3.18. Package R: Infrastructures

For infrastructure, the four scenarios already define the level of implementation of each TEN project as reported in Table 2 on page 18

V.3.4. Summary: definition and quantification of modelling scenarios

The four scenarios have been defined in section V.1 in terms of measures. Since here measures packages have been defined and only measures that can be modelled are considered, the four modelling scenarios can be defined.

Table 11 shows how the packages are implemented in the different scenarios (Partial scenario, Full scenario, Extended scenario). In Table 11, "0" means that the package is not applied, the more symbols "+" appear the higher is the level of application of the package. The content of Table 11 has been defined as result of section V.1 on definition of scenarios.

[56] 0.5 euro is indicated as estimate for biodiesel resource costs in *COM(2001)547 - Directive on the promotion of the use of biofuels in transport.*

Table 11: Definition of modelling scenarios

Modelling package	Null	Partial A+B		Full		Extended	
	2010 and 2020	2010	2020	2010	2020	2010	2020
A (measures 2, 48)	REF	+	+ and 0/+	+	+	+	+
B (measures 3, 4, 5)	REF	+	+	+	+	+	+
C (measures 8, 11, 14)	REF	+	++	+	++	+	++
D (measures 6, 7)	REF	+	++	++	++	++	++
E1 (measure 9)	REF	+	++	++	+++	++	+++
E2 (measure 12)	REF	+	++	++	+++	+++	++++
F (measures 15, 63, 70, 14)	REF	+	++	+	++	+	++
G (measure 17)	REF	+	++	++	+++	+++	++++
H (measures 19, 20, 65)	REF	+	+	+	+	+	+
I (measures 21, 26)	REF	+	+	+++	++++	++	+++
J1 (measure 27)	REF	+	++	++	+++	++	+++
J2 (measure 29)	REF	+	+	++	++	++	++
K (measure 33)	REF	+	+	+	+	+	+
L (measure 37)	REF	+	++	++	+++	+++	++++
M (measure 39)	REF	+	+	++	++	+	+
N1 (measure 42)	REF	+	+	++	++	++	++
N2 (measure 43)	REF	+	++	++	+++	++	+++
N3 (measure 76)	REF	+	++	+++	++++	++	+++
O1 (measure 57) (freight)	REF	+	++	++	+++	+++	++++
O1 (measure 57) (passengers)	REF	0	0	0	0	0	++
O2 (measure 58) (freight)	REF	0	0	+	+	+	+
O2 (measure 58) (passengers)	REF	0	0	0	0	0	0
O3 (measure 60) (freight)	REF	0	0	++	++	++	++
O3 (measure 60) (passengers)	REF	0	0	0	0	0	0
O4 (measure 61)	REF	0	0	0	0	0	0
P1 (measure 62)	REF	+	+	+	+	++	++
P2 (measures 77 and 78)	REF	0	0	++	++	+	+
Q (measures 67, 76)	REF	0	0	+	+	+	+
R (measures 16, 28, 36, 44, 72)	REF	++	++	+++	+++	+++	+++

The following Table 12 uses the assumptions on the level of implementation of each package summarised in Table 11 and the quantification of the effects of each package discussed in section V.3.2 to provide the reader with the quantitative assumptions concerning each package for each scenario in both 2010 and 2020. Table 12 is therefore the reference table for modelling scenarios. The numbers are increases and decreases compared to the null (do nothing) scenario.

Table 12: Quantification of measures packages for scenarios modelling with SCENES/TREMOVE

Simulation package Measure			Variable & scope	Partial A+B		Full		Extended		Source
				2010	2020	2010	2020	2010	2020	
A - Driving restrictions, checks and penalties										
	2 and 48	Driving restrictions on heavy goods vehicles on designated roads Harmonisation of road safety checks and penalties	Road freight cost	A: 5% B: 0%	A: 5% B: 0%	5%	5%	5%	5%	SUMMA
B - Working conditions of truck drivers										
	3 and 4 and	Training of professional drivers Social harmonisation of road transport	Road freight cost *FIN, ITA, SPA, SWE and New EU10*	10%	10%	10%	10%	10%	10%	Own estimation
			Road freight cost	5%	5%	5%	5%	5%	5%	

Simulation package Measure			Variable & scope	Partial A+B		Full		Extended		Source
				2010	2020	2010	2020	2010	2020	
	5	Introduction of the digital tachograph	*Other countries*							
C - Improving quality of rail freight service										
	8 and 11	Ensuring a high level safety for the railway network Third railway package: certification of train crews and trains on the Community rail network	Rail freight time *Bulk and general cargo*	-5%	-10%	-5%	-10%	-5%	-10%	Own estimation on Rail Freight Group data
			Rail freight time *Unitised*	-3%	-6%	-3%	-6%	-3%	-6%	
	14	Third railway package: improving quality of the rail freight services	Rail time at borders *Within EU15*	-5%	-10%	-5%	-10%	-5%	-10%	
			Rail time at borders *Between EU15 and New EU10*	-10%	-20%	-10%	-20%	-10%	-20%	
D - Opening rail freight market										
	6	First railway package: separated functions of management of infrastructure and service operation and opened access to international services	Rail freight cost	0%	-1%	-0.50%	-2%	-1%	-3%	SUMMA + own estimation
			Rail freight time	-0.50%	-1%	-1%	-2%	-2%	-4%	
	7	Second railway package: opened national services and brought forward opening of international services in all networks	Rail freight cost	-1%	-2%	-2%	-3%	-3%	-5%	
			Rail freight time *Bulk and general cargo*	-1%	-3%	-3%	-6%	-5%	-10%	
			Rail freight time *Unitised*	-0.50%	-1%	-2%	-1%	-2%	-4%	
E1 – Interoperability of rail passenger										
	9	Updating the interoperability directives on high-speed and conventional railway networks (ERTMS)	Rail passenger time	-1%	-2%	-1.5%	-3%	-1.5%	-3%	SUMMA + own estimation on European Commission data
E2 - Opening rail passenger market										
	12	Third railway package: gradual opening-up of international passenger services	Rail passenger cost *High Speed Train*	-0.50%	-1%	-1%	-2%	-1%	-2%	SUMMA + own estimation on European Commission data
F - Reducing environmental impacts										
	15	Enter the dialogue with the rail industries in the context of a voluntary agreement to reduce adverse environmental impacts[57]	Diesel PM, NOx, VOC emission factor	0%	0%	-10%	-10%	-10%	-10%	Own assumption + INDIC and EC data
			Diesel S content	ref. level	ref. level	40 ppm	40 ppm	40 ppm	40 ppm	
			Diesel train fleet	0%	0%	-25%	-50%	-25%	-50%	
	63	Introduction of a minimum share of biofuels consumption in road transport	% of biofuel replacing conventional fuels	5.75%	8%	5.75%	8%	5.75%	8%	
	70	Promote the use of clean vehicles in urban public transport	Minimum standard allowed in bus fleet	Euro I	Euro III	Euro I	Euro III	Euro I	Euro III	
	41	Sulphur content of marine fuels	North Europe countries/ports	44/96%	44/96%	44/96%	44/96%	44/96%	44/96%	
G - Single European Sky										
	17	Single European Sky	Route length	1.5%	2.5%	2.5%	5%	5%	10%	DG-TREN + Own assumption
			Air travel time	-1%	-2%	-2%	-4%	-4%	-8%	
			Air travel cost	-0.50%	-1%	-0.75%	-1.50%	-1%	-2%	

[57] This measure also concerns noise, but this element cannot be modelled by the SCENES and TREMOVE models

Simulation package Measure			Variable & scope	Partial A+B		Full		Extended		Source
				2010	2020	2010	2020	2010	2020	
H - Improving social and economic efficiency of air transport										
	19	Air transport insurance requirements	Air travel time	-2%	-2%	-2%	-2%	-2%	-2%	Own assumption
	20 and 65	Airport charges Compensation of air passengers	Air travel cost	2%	2%	2%	2%	2%	2%	
I - Managing airports capacity										
	21	Slot on Community airports	Air travel cost	-1%	-1%	-3%	-5%	-2%	-3%	Own estimation on NERA and The Economist data
	26	Airport capacity expansion	Air travel time	-0.50%	-0.50%	-1%	-2%	-0.75%	-1%	
J1 - Liberalisation of port services										
	29	Port services liberalisation	Ship port time *Major seaports*	-1%	-2%	-2%	-3%	-2%	-3%	Own assumption
			Ship port cost *Major seaports*	-5%	-10%	-8%	-15%	-8%	-15%	
			Ship port cost *Minor seaports*	-1%	-3%	-2%	-5%	-2%	-5%	
			IWW port cost	-2%	-5%	-5%	-10%	-5%	-10%	
J2 - Improvement of navigation logistics										
	27	Simplify sea and inland waterway custom formalities and linking up the players in the logistic chain	Ship port time	-1%	-1%	-2%	-2%	-2%	-2%	Own assumption
			IWW port time	-1%	-1%	-3%	-3%	-3%	-3%	
K - Oil pollution damage compensation fund										
	33	Oil pollution damage compensation fund	Ship cost *Liquid bulk*	1%	1%	1%	1%	1%	1%	Own assumption
L - River Information System										
	37	River Information System	IWW time	-1%	-2%	-2%	-3%	-3%	-5%	Own assumption
M - Social legislation for inland waterway transport										
	39	Social legislation inland waterway transport	IWW cost	1%	1%	3%	3%	1%	1%	Own estimation on DG TREN – Inland Waterways Observatory data
N1 - Improving freight intermodality										
	42	Marco Polo Programme	Terminal time	-2%	-2%	-5%	-5%	-5%	-5%	SUMMA + own estimation on INDIC data
			Terminal cost	-1%	-1%	-3%	-3%	-3%	-3%	
			Rail freight time *Unitised*	-1%	-1%	-2%	-2%	-2%	-2%	
			Rail freight cost *Unitised*	-0.5%	-0.5%	-1%	-1%	-1%	-1%	
			Road freight load factor *FIN, ITA, SPA, SWE and new EU10*	2%	2%	5%	5%	5%	5%	
			Road freight load factor *Other countries*	1%	1%	2%	2%	2%	2%	
N2 - Improving freight intermodality										
	43	Intermodal Loading Units and freight integrators	Terminal time	-1%	-2%	-2%	-3%	-3%	-5%	SUMMA + own estimation on INDIC data
			Terminal cost	-0.50%	-1%	-1%	-2%	-2%	-3%	
			Rail freight time *Unitised*	-0.50%	-1%	-1%	-2%	-2%	-3%	
			Rail freight cost *Unitised*	0%	-0.5%	0%	-0.5%	-0.5%	-1%	

Simulation package Measure			Variable & scope	Partial A+B		Full		Extended		Source
				2010	2020	2010	2020	2010	2020	
N3 - Improving freight intermodality										
	76	Galileo programme	Road freight time	-0.50%	-1%	-2%	-3%	-1%	-2%	SUMMA + own estimation on INDIC data
O1 - Revising Transport pricing and taxing										
	57	Infrastructure charging	Freight modes cost	*The following percentages of values in Table 6 are applied in the various scenarios:*						TIPMAC project
				10%	20%	20%	50%	50%	100%	
			Passenger modes cost *Car and air*	*Not applied*					*25% of values in Table 6 are applied*	
O2 - Revising Transport pricing and taxing										
	58	Uniform commercial road transport fuel taxation	Car cost	0%		*0%*				Own estimation on INDIC and TREMOVE data
			Road freight cost	0%		*See Table 8 for values.*				
O3 - Revising Transport pricing and taxing										
	60	Harmonising VAT deductions	Road freight cost	0%		*See Table 9 for values.*				Own estimation on INDIC and European Commission data
			Rail freight cost							
			Rail passenger cost							
			IWW cost							
			Ship cost							
			Air cost							
			VAT on car purchase	0%		*0%*				
			Bus/coach cost							
O4 - Revising Transport pricing and taxing										
	61	Taxation of passenger cars according to environmental criteria	not applied	0%	0%	0%	0%	0%	0%	
	62	Taxation of energy products and exemptions for hydrogen and biofuels	Kerosene excise	0.2 €/l	0.2 €/l	0.2 €/l	0.2 €/l	0.33 €/l	0.33 €/l	INDIC
			LPG excise	0.05 €/l	0.05 €/l	0.05 €/l	0.05 €/l	0.125 €/l	0.125 €/l	
			Natural gas excise	0	0	0	0	0.0026€/l	0.0026€/l	
P - Taxation of energy products										
	77	Introduction of kerosene taxation	Air cost	0%	0%	3%	3%	1%	1%	
	78	Introduction of differential en route air navigation charges								
Q - Improving intermodality for passengers										
	67	Intermodality for people	Passenger terminals time	0%	0%	-2%	-2%	-5%	-5%	SUMMA
	76	Galileo programme	Car time	0%	0%	-2%	-2%	-3%	-3%	
R - Infrastructures										
	16	Support the creation of new infrastructure, and in particular rail freight services		*See Table 2*						TEN
	28	Motorways of the seas								
	36	Eliminating bottlenecks in inland waterway transport								
	44	Trans European Network projects								
	72	TEN infrastructure in the candidate countries								

Table 13 summarises the effect of the packages in the three scenarios at 2010 and 2020 on the main variables. This table is built using values in Table 12, however, in such a table many packages include different

values across demand segments, countries, etc.. In those cases, the minimum and maximum changes are indicated in the table. Furthermore, the percentage changes due to those packages quantified in absolute terms (e.g. SMCP) have been computed with reference to average costs/tariffs, even though such costs and tariffs are very variable. The table reports the interval within the specific changes applied in each country fall. Percentage values obtained from a measure quantified in absolute terms are indicated in *italics* in the table.

Therefore, readers should be aware that in each specific country a different change is applied and that some values in Table 13 cannot be found as such in Table 12, even if they are computed from figures reported in Table 12.

Finally, measures affecting emission factors, vehicle fleets and infrastructures are not included in the tables as these are directly implemented in the models. This means that effects on times, costs, etc. derived from the TEN projects (e.g. fastest connections, congestion relief) are not considered in the table.

In brief, Table 13 serves only for a quick glance on the overall effects of scenarios on the main variables, but the reference for the implementation of scenarios is Table 12.

Table 13: Effects of scenarios on main variables (indicative average values)

Variable	**Package**		**Null**	**Partial A+B**		**Full**		**Extended**	
			2010-2020	**2010**	**2020**	**2010**	**2020**	**2010**	**2020**
Road Freight cost	A		0%	A: 5% B: 0%	A: 5% B: 0%	5%	5%	5%	5%
	B[1]	Min	0%	5%	5%	5%	5%	5%	5%
		Max	0%	10%	10%	10%	10%	10%	10%
	O1[2]	Min	0%	1%	3%	3%	7%	7%	13%
		Max	0%	4%	8%	8%	19%	19%	38%
	O2[3]	Min	0%	0%	0%	-13%	-13%	-13%	-13%
		Max	0%	0%	0%	7%	7%	7%	7%
	Total	**Min**	**0%**	**11%**	**13%**	**0%**	**7%**	**7%**	**13%**
		Max	**0%**	**19%**	**23%**	**30%**	**41%**	**41%**	**61%**
		Average[5]	**0%**	**15%**	**17%**	**14%**	**21%**	**21%**	**33%**
Road Freight time	**N3**		**0%**	**-1%**	**-1%**	**-2%**	**-3%**	**-1%**	**-2%**
Rail Freight cost	D		0%	-1%	-3%	-3%	-5%	-4%	-8%
	N1		0%	-1%	-1%	-1%	-1%	-1%	-1%
	N2		0%	0%	-1%	0%	-1%	-1%	-1%
	O1[2]	Min	0%	0%	0%	0%	1%	1%	2%
		Max	0%	0%	1%	1%	2%	2%	5%
	O3[4]	Min	0%	0%	0%	-12%	-12%	-12%	-12%
		Max	0%	0%	0%	7%	7%	7%	7%
	Total	**Min**	**0%**	**-1%**	**-4%**	**-15%**	**-18%**	**-17%**	**-21%**
		Max	**0%**	**-1%**	**-3%**	**4%**	**3%**	**4%**	**2%**
		Average[5]	**0%**	**-1%**	**-3.5%**	**-6%**	**-8%**	**-7%**	**-10%**
Rail Freight time	C		0%	-4%	-8%	-4%	-8%	-4%	-8%
	D		0%	-1%	-3%	-3%	-6%	-6%	-11%
	N1		0%	-1%	-1%	-2%	-2%	-2%	-2%
	N2		0%	-1%	-1%	-1%	-2%	-2%	-3%
	Total		**0%**	**-7%**	**-13%**	**-10%**	**-18%**	**-14%**	**-24%**
Rail border time	**C**		**0%**	**-8%**	**-15%**	**-8%**	**-15%**	**-8%**	**-15%**

Ship cost (excludes port handling)	K[6]		0%	1%	1%	1%	1%	1%	1%
	O1[2]	Min	0%	1%	1%	1%	3%	3%	6%
		Max	0%	6%	13%	13%	31%	31%	63%
	Total	**Min**	**0%**	**2%**	**2%**	**2%**	**4%**	**4%**	**7%**
		Max	**0%**	**7%**	**14%**	**14%**	**32%**	**32%**	**64%**
		Average[5]	**0%**	**4%**	**8%**	**8%**	**16%**	**16%**	**32%**
IWW cost	M		0%	1%	1%	3%	3%	1%	1%
	O1[2]	Min	0%	0%	0%	0%	1%	1%	1%
		Max	0%	1%	1%	1%	3%	3%	6%
	O3[4]	Min	0%	0%	0%	-12%	-12%	-12%	-12%
		Max	0%	0%	0%	7%	7%	7%	7%
	Total	**Min**	**0%**	**1%**	**1%**	**-9%**	**-8%**	**-10%**	**-10%**
		Max	**0%**	**2%**	**2%**	**11%**	**13%**	**11%**	**14%**
		Average[5]	**0%**	**1.5%**	**1.5%**	**0.5%**	**2.0%**	**0%**	**2.4%**
IWW time	**L**		**0%**	**-1%**	**-2%**	**-2%**	**-3%**	**-3%**	**-5%**
Freight Terminal cost	J1		0%	-3%	-6%	-5%	-10%	-5%	-10%
	N1		0%	-1%	-1%	-3%	-3%	-3%	-3%
	N2		0%	-1%	-1%	-1%	-2%	-2%	-3%
	Total		**0%**	**-4%**	**-8%**	**-9%**	**-15%**	**-10%**	**-16%**
Freight Terminal time	J1		0%	-1%	-2%	-2%	-3%	-2%	-3%
	J2		0%	-1%	-1%	-3%	-3%	-3%	-3%
	N1		0%	-2%	-2%	-5%	-5%	-5%	-5%
	N2		0%	-1%	-2%	-2%	-3%	-3%	-5%
	Total		**0%**	**-13%**	**-22%**	**-19%**	**-29%**	**-20%**	**-31%**
Road load factor	**N1**		**0%**	**2%**	**2%**	**4%**	**4%**	**4%**	**4%**
Car cost	O1[2]	Min	0%	0%	0%	0%	0%	0%	18%
		Max	0%	0%	0%	0%	0%	0%	50%
	O2[3]	Min	0%	0%	0%	0%	0%	0%	0%
		Max	0%	0%	0%	0%	0%	0%	0%
	O4		0%	0%	0%	0%	0%	0%	0%
	Total	**Min**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**18%**
		Max	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**50%**
		Average[5]	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**37%**
Car Time	**Q**		**0%**	**0%**	**0%**	**-2%**	**-2%**	**-3%**	**-3%**
Bus cost	O1[2]	Min	0%	0%	0%	0%	0%	0%	0%
		Max	0%	0%	0%	0%	0%	0%	0%
	O3[4]	Min	0%	0%	0%	0%	0%	0%	0%
		Max	0%	0%	0%	0%	0%	0%	0%
	Total	**Min**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
		Max	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
		Average[5]	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
Rail pass cost	E2		0%	-1%	-1%	-1%	-2%	-1%	-2%
	O1[2]	Min	0%	0%	0%	0%	0%	0%	0%
		Max	0%	0%	0%	0%	0%	0%	0%
	O3[4]	Min	0%	0%	0%	0%	0%	0%	0%
		Max	0%	0%	0%	0%	0%	0%	0%
	Total	**Min**	**0%**	**-1%**	**-1%**	**-1%**	**-2%**	**-1%**	**-2%**
		Max	**0%**	**-1%**	**-1%**	**-1%**	**-2%**	**-1%**	**-2%**
		Average[5]	**0%**	**-1%**	**-1%**	**-1%**	**-2%**	**-1%**	**-2%**
Rail pass time	**E1**		**0%**	**-1%**	**-2%**	**-2%**	**-3%**	**-2%**	**-3%**

Air cost	G		0%	-1%	-1%	-1%	-2%	-1%	-2%
	H		0%	2%	2%	2%	2%	2%	2%
	I		0%	-1%	-1%	-3%	-5%	-2%	-3%
	O1[2]	Min	0%	0%	0%	0%	0%	0%	6%
		Max	0%	0%	0%	0%	0%	0%	16%
	O3[4]		0%	0%	0%	0%	0%	0%	0%
	P2		0%	0%	0%	3%	3%	1%	1%
	Total	**Min**	**0%**	**0%**	**0%**	**1%**	**-2%**	**0%**	**4%**
		Max	**0%**	**0%**	**0%**	**1%**	**-2%**	**0%**	**14%**
		Average[5]	**0%**	**0%**	**0%**	**1%**	**-2%**	**0%**	**8%**
Air time	G		0%	-1%	-2%	-2%	-4%	-4%	-8%
	H		0%	-2%	-2%	-2%	-2%	-2%	-2%
	I		0%	-1%	-1%	-1%	-2%	-1%	-1%
	Total		**0%**	**-4%**	**-5%**	**-5%**	**-8%**	**-7%**	**-11%**
PassTerminal / Border time	**C**		**0%**	**0%**	**0%**	**-2%**	**-2%**	**-5%**	**-5%**

1 The maximum change is assumed for FI, IT, ES, SE and new 10 EU countries, the minimum change for other countries.
2 Measure O1 is quantified in terms of absolute values that are different by country. The percentage changes in the table provide an indicative range for the size of the effects and have been computed using an average reference cost. The minimum change is computed by applying the lowest absolute change to the average reference cost while the maximum change is computed by applying the highest absolute change to the average reference cost. The absolute values by country are reported in section V.3.2.
3 Measure O2 is quantified in terms of absolute values that are different by country. The percentage changes in the table provide an indicative range for the size of the effects and have been computed using an average reference cost. The minimum change is computed by applying the lowest absolute change to the average reference cost while the maximum change is computed by applying the highest absolute change to the average reference cost. The absolute values are reported in section V.3.2.
4 The effects of measure O3 are different by country. The values in the table are the lower and the upper bound of the range of changes. The values by country are reported in section V.3.2.
5 "Average" values quoted are an estimate of the EU weighted average using costs and volumes from the 2020 Null scenario and represent the change in cost of a journey having average unit cost per tonne-km/passenger-km in the null scenario.
6 Measure K is applied only to fuel tankers.

Appendix: Estimation of social marginal costs for the TIPMAC database

This appendix addresses the issue of the estimation and application of marginal costs in the ASSESS project.

More specifically, the text

- describes how the TIPMAC marginal costs, which have been used in ASSESS, were estimated in the TIPMAC project;
- Highlights the methodological and theoretical choices underlying the TIPMAC cost values.

1 Introduction

The TIPMAC research project (Fifth Framework Research Programme) combined transport modelling with macroeconomic modelling to identify the indirect macroeconomic impacts of transport investment and pricing in the EU. TIPMAC implemented two parallel analyses, each one using a different suite of models, to assess the impacts of a common set of scenarios. One analysis was implemented by linking the SCENES transport network model with the E3ME macro-econometric model. The ASTRA System Dynamics Model was further developed and implemented in parallel.

In two scenarios developed in TIPMAC, the amount of resources needed to fund the TEN-T investments had to be collected through Social Marginal Cost Pricing (SMCP). Therefore, a specific activity within the project was to review literature and studies on quantification of social marginal costs of transports in order to define a reference set of values for implementing such scenarios in the models. The approach followed in the estimation of SMCP for the TIPMAC modelling exercise was to proceed with a top down methodology, starting from *existing* estimates of average marginal costs for some European countries and mode, and extrapolating values where no estimates were available. In the following, the sources and the methodology adopted are briefly recalled. For further details readers are referred to the Deliverable D1 of the TIPMAC project[58] (paragraph 3.5).

2 Data sources

Sources listed here below were reviewed to build the database; UNITE and RECORDIT projects were especially selected as the latter was judged to rely on the most appropriate, from TIPMAC point of view, methodological approach in term of marginal costs definition. Over a total of 802 values gathered from different studies, 237 were extracted from RECORDIT (29%). Data concerns cases of urban traffic, inter-urban traffic or average conditions. The study provides as well some recommendations on how to extend estimates to other countries, essentially based on GDP pro-capita. Values extracted from UNITE have been also reviewed, although only in few cases an explicit value could be extracted.

[58] TRT Trasporti e Territorio, December 2003, *TIPMAC Deliverable D1 - Common assumptions and scenarios*

Sources of marginal cost pricing estimates used in TIPMAC

"RECORDIT - Real Cost Reduction of Door-to-door Intermodal Transport – Deliverable 4"; 2001.
"UNITE –Unification of Accounts and Marginal Costs for Transport Efficiency"
"External Costs of Transport"; INFRAS-IWW; 2000.
"ExternE – Externalities of Energy, Vol. 7: Methodology 1998 update"; European Commission; 1999.
"A study on the cost of transport in the European Union in order to estimate and assess the marginal costs of the use of transport"; TRL, IWW, UFSIA, PTV AG, NEA; 2001.
"Revenues from Efficient Pricing: Evidence from the Member States"; edited by Dr. Rana Roy; London 2000

3 Methodology

The methodology adopted to produce estimated reference values for every country, cost item and mode, was based on four main steps. The available estimates were elaborated to extract reference values (steps 1, 2 and 3) and to generalise results for all the countries (step 4).

1. Estimates were refined from nominal monetary components: each value was brought to 1998 level price and converted in EURO.
2. If estimates were expressed in veh-km, data was adapted to the unit cost per t-km (or p-km) by applying the proper load factor as provided by the SCENES project.
3. Estimates available from RECORDIT were taken as first choice values. UNITE was used as second choice, other studies were adopted only when data required was not covered by RECORDIT and UNITE; if two or more estimates (of the same hierarchical level, e.g. two estimates of UNITE) were available, their average was taken as reference value.
4. In order to extend the calculated reference values of different cost items to countries where no estimates were available, the European (partial) weighted average was taken as reference. Values for countries with no available evidence were obtained by applying the cross-countries adjustment factors as hereafter defined.

Such adjustment factors are ratios between countries and are different according to the cost item considered; these take into accounts elements like average income, accident rates and population densities.
A further expansion brought up to the definition of marginal cost pricing in urban and inter-urban condition, basing on available data (i.e. were data was available, under different conditions, it was used to apply the same proportionality to the other values).

Estimates were obtained for the following items: infrastructure damage; air pollution; global warming; accidents; noise. The relevance of each component is different for each country, for instance in Finland accidents and infrastructures explain about 70% of total social marginal costs and pollution and global warming are responsible for only about 20%. Instead, in Belgium or The Netherlands, pollution is more important.

4 TIPMAC SMC "philosophy"

With respect to the TIPMAC database some elements should be highlighted.

1. The aim of the TIPMAC exercise described above was to provide a complete set of marginal costs values suitable in the strategic models used by the project to assess the full economic impact of transport policies. Marginal cost depends upon a large numbers of variables: traffic flows, types of vehicle, urbanisation features, population densities, socio-economic characteristics etc.,

that were too many to be modelled in the TIPMAC database. Therefore the aim was redefined to assess "average yet representative" value of marginal cost for the specific transport modes. The results were the best available proxy for Marginal Social Costs of transport at national scale, based on average transport conditions in each country. Therefore, in strict economic terms this cannot be considered Social Marginal Costs.

2. The TIPMAC database included congestion costs estimates only for road modes. At a given level of infrastructure supply, "congestion costs" can be broadly defined as the social surplus losses related to insufficient infrastructure capacity. The theory for road congestion is quite straightforward, and efficient charges can easily be calculated. For regulated-access modes, the scarcity of infrastructure does not generate surplus losses, if and only if the traffic that has to be excluded by access regulation is excluded in a surplus-maximising way, i.e. via market-clearing access charges. For rail and air infrastructure, this is for sure not the case ("grandfathers' rights" are the dominating exclusion tools). Otherwise, it remains implicit the wrong assumption that the actual allocation of scarce capacity of rail tracks and airports is perfectly efficient. In order to avoid being biased against road modes, as well as to avoid partial double counting, because models used for the simulation already calculate users reaction to congestion, it was decided that congestion costs should not accounted for in the final reference values.
3. The values for Marginal Social Costs of congestion estimated in the TIPMAC database were quite negligible. Part of the congestion costs are already internalised by road users, another part is efficient (when w.t.p. exceeds the costs even of congested traffic)**.** For these reason, at least in principle low marginal congestion costs are compatible with high estimate of total congestion costs calculated on average transport costs. Social *marginal* costs are always different from *average* costs, not only for congestion, as they represent the costs per additional vehicle or transport unit, while average costs are the total external costs divided by total vehicle or transport unit.
4. In principle the implementation of Social Marginal Costs Pricing policies consists in adding them to the existing cost per unit (e.g. to the social value of the resources consumed pass-km). However, existing cost includes various taxes and subsidies. The principle of Social Marginal Cost Pricing is not to levy additional taxes on transport, but can be thought as the "optimal" quantification of taxes on the basis of social costs. At the same time, as subsidies are strongly motivated with the need of supporting modes which give rise to a lower level of externalities, once such externalities are paid by SMCP, subsidies could not be justified anymore. According to this approach the implementation of SMCP should be accompanied by a contemporary suppression of existing taxes and subsidies. Subsidies exist in the EU countries with special reference to local transport services and to rail transport and their abolition would probably lead to a significant rise of fares and/or renouncing to minor services. The amount of subsidies is very difficult to estimate and to allocate among different services, so additional costs for bus, passenger and freight rail cannot be quantified[59]. By subtracting current taxes (mainly fuel excises) levied on road transport mode only will therefore implicitly favour the non road modes: a full application of SMCP would require also the abolition of subsidies.[60]

[59] Subsidies often cover a significant share of production costs, so the rise of fares could be quite relevant.

[60] As it was partially done in the Tipmac project, where it was decided that fixed taxes, annual vehicle fees, tolls and subsidies should have been removed by SMCP introduction. "With regard of subsidies, only rail subsidies were considered to be relevant. Subsidies estimates are provided by UIC and are shown in Tab. 3.17. SCENES, due to the non-linear nature of the rail tariff structure, is not fitted to suppress rail subsidies. So only ASTRA suppresses rail subsidies in 2nd and 4th scenario. In the model, subsidies affect transport tariffs and costs according to fixed relations between level of subsidies and fares or level of subsidies and fuel price." Tipmac D1, Version 2.1 December 2003