



**DIRECTORATE GENERAL FOR INTERNAL POLICIES**  
**POLICY DEPARTMENT B: STRUCTURAL AND COHESION POLICIES**

**TRANSPORT AND TOURISM**

# **UPDATE ON INVESTMENTS IN LARGE TEN-T PROJECTS**

**STUDY**

**PROVISIONAL VERSION**

This document was commissioned by the European Parliament's Committee on Transport and Tourism.

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**Abstract**

This study updates the TEN-T investment study completed in early 2013 and adds five new case studies to the analysis, three of which deal with mega projects that are still in the planning or early implementation phase: Lyon-Turin, Iron-Rhine and S21/Stuttgart-Ulm. Findings confirm that not all stakeholders have learned past lessons on successfully developing projects. There is a particular need for early and transparent public participation and a clear project definition prior to the project decision. New findings suggest that measuring wider economic benefits and European added value are necessary to justify the socio-economic benefits of multibillion euro cross-border projects.

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## LIST OF ABBREVIATIONS

<b>AECOM</b>	Consultation Company, Headquarters Los Angeles
<b>ASTRA</b>	Assessment of Transport Strategies, System Dynamics Model
<b>BBT</b>	Brenner Base Tunnel
<b>BBT SE</b>	Brenner Base Tunnel Company
<b>BCR</b>	Benefit-cost ratio
<b>BIM</b>	Building Information Modelling (Implementation Tool)
<b>BUDG</b>	Budget Committee of the EP
<b>CBA</b>	Cost-benefit analysis
<b>CEF</b>	Connecting Europe Facility
<b>CF</b>	Cohesion Fund
<b>CGEDD</b>	Conseil Général de l'Ecologie et du Développement Durable, France
<b>CGSP</b>	Commissariat général à la stratégie et à la prospective, France
<b>CIA</b>	Climate Impact Assessment
<b>CoR</b>	Committee of the Regions
<b>COWI</b>	Consultation Company, Headquarters Copenhagen
<b>CSF</b>	Common Strategic Framework
<b>CSIL</b>	Centre for Industrial Studies, Research Institute, Milan
<b>CSNE</b>	Canal Seine Nord Europe
<b>CTP</b>	Common Transport Policy
<b>DEGES</b>	Planning Company, Berlin
<b>DG</b>	Directorate-General of the EC
<b>DG MOVE</b>	Directorate-General Mobility and Transport



- DG REGIO** Directorate-General Regional and Urban Policy
- EC** European Commission
- ECA** European Court of Auditors
- EEIG** European Economic Interest Grouping
- EERP** European Economic Recovery Plan
- EIA** Environmental Impact Assessment
- EIB** European Investment Bank
- EIF** European Investment Fund
- EIRR** Economic internal rate of return
- EP** European Parliament
- ERDF** European Regional Development Fund
- ERTMS** European Rail Traffic Management System
- EVA-TREN** Improved decision-aid methods and tools to support evaluation of investment for transport and energy networks in Europe (research project)
- FIRR** Financial internal rate of return
- FS** Ferrovie dello Stato Italiane (Italian railway company)
- GDP** Gross domestic product
- GHG** Greenhouse Gas Emissions
- GVA** Gross value added
- HSR** High-speed rail
- IASON** Integrated Appraisal of Spatial Economic and Network Effects of Transport Investments and Policies (research project)
- IFM** Infra Maturity Tool (NETLIPSE project)
- IGF** Inspection Générale des Finances, France

- IHS** Institut für höher Studien, Vienna
- INEA** Innovation and Networks Executive Agency
- INFRAS** Consulting Company, Zurich, Bern
- IO** Input Output
- IPAT** Infrastructure Project Assessment Tool (NETLIPSE project)
- IRR** Internal Rate of Return
- ITS** Supporting Telecommunication Systems
- IWW** Institut für Wirtschaftspolitik und Wirtschaftsforschung, Karlsruhe  
Institute of Technology
- JV** Joint Venture
- LTF** Lyon Turin Ferroviaire
- MAP** Multi-annual programme
- MEP** Member of the European Parliament
- MFF** Multi-annual Financial Framework of the EU
- MoS** Motorways of the Sea
- NEAT** Neue Eisenbahn-Alpen-Transversale (also NRLA)
- NPV** Net present value
- NRLA** New Railway Link through the Alps
- NUTS** Nomenclature of Territorial Units for Statistics (Eurostat)
- OFT** Office Fédéral des Transports, Switzerland
- OMEGA** Centre for Research on Large Transport Investment Projects. Bartlett  
School. University College. London
- PP** Priority projects of TEN-T
- PPP** Public-private partnership
- REGI** Regional Development Committee of the EP

- SCGE** Spatial Computed General Equilibrium Models
- SDM** System Dynamics Modelling
- SDR** Social Rate of Discount
- SEA** Strategic Environmental Assessment
- SEITT** State Company for Land Transport Infrastructure
- SNCF** Société Nationale des Chemins de Fer
- TAV** Treno Alta Velocita
- TEN** Trans-European Networks (communication, energy, transport)
- TEN-STAC** Scenarios, Traffic Forecasts and Analysis of Corridors on the Trans-European Network (research and consultancy project)
- TEN-T** Trans-European Transport Networks
- TEN-T EA** TEN-T Executive Agency (has now become INEA)
- TINA** Transport Infrastructure Needs Assessment
- TIPMAC** Transport Infrastructure and Policy: A Macroeconomic Analysis for the EU (research project)
- TRAN** Transport and Tourism Committee of the EP
- UIC** International Union of Railways
- VDE** Verkehrsprojekte Deutsche Einheit
- VOT** Value of time
- WCML** West Coast Main Line

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## EXECUTIVE SUMMARY

### Aim

The purpose of this study is to update the previous study of April 2013 on "TEN-T Large Projects - Investments and Costs". This dealt with the process of assessing and selecting large transport projects for EU co-funding. The literature and the European Court of Auditors had identified several operational problems in such assessments and the 2013 study presented conclusions and recommendations on how such operational problems could be avoided. This 2014 update describes the advancements of the policy process achieved at the European level during the revision of the TEN-T guidelines by the time they were agreed at the end of 2013. Furthermore, five new case studies on mega projects have been carried out, and some selected case studies of the 2013 report have been updated to take into account recent developments in their planning or construction. In total twelve case studies are presented in this study.

### Background

The development of Trans-European Networks (TEN) is a premier issue of European economic and social policy that dates back to the Treaty of Rome (1957) - which included the adoption of a Common Transport Policy (CTP). TEN serve the goals of economic development, regional competitiveness, regional and social cohesion and environmental sustainability. With the establishment of the European Regional Development Fund (ERDF, 1975) European funding was made available for TEN, with funding options expanded in 1982 through a specific line of the EU budget dedicated to transport infrastructure of European interest. However, the implementation of this infrastructure was very slow, even after 1982. Therefore, the Treaty of Maastricht (1992) included an obligation for the European Commission and the European Parliament to prepare guidelines for the development of TEN and to update them periodically. TEN include communications, energy and transport (TEN-T) infrastructure networks. The first TEN-T guidelines were published in 1996, followed by revisions in 2004 and 2011/13, the latter setting the policy and financial framework for the current 2014-2020 programming period.

The first TEN-T network concept was developed top-down by the European Commission and enhanced by a high-level expert group led by Henning Christophersen, a former Vice-President of the European Commission. The "Christophersen Group" proposed 14 projects which were approved by the European Council of Essen in 1994 and formed the backbone of the TEN-T guidelines in 1996 (the "Essen Projects"). The budget for the implementation of these projects was roughly EUR 96 billion and it was decided that EU co-financing should provide up to 10% of this (with a budget limit of EUR 1.42 billion), together with financial assistance by the European Investment Bank (EIB) and the European Investment Fund (EIF). The cohesion countries could receive additional funding from the Structural Development Funds (ERDF) and the Cohesion Funds (CF).

The revision of the TEN-T guidelines proposed by the European Commission in 2011 intended to overcome fundamental shortcomings of TEN-T planning and implementation. TEN-T projects should fit both into the strategic European transport network, being the core network developed by an analytical top-down approach, and into the Strategic Transport Plans to be set up by each Member State. Projects had to demonstrate European added value, so that cross-border projects receive particular support. Additionally, the European Parliament was advocating a binding socio-economic Cost-Benefit Analysis (CBA) and a

binding Climate Impact Assessment (CIA). This has now become part of the new TEN-T guidelines of 2013 (EU REG 1315/2013).

## Methodology

The methodology of this study comprises three major elements: (1) consideration of our previous study (Schade et al. 2013) and the feedback received; (2) literature research and (3) case studies of large TEN-T projects. The relevant scientific literature can be divided into two groups:

- Literature on transport modelling and forecasting, transport project assessment and new assessment approaches.
- Literature on governance of decision-making on large transport infrastructure projects, focusing particularly on European policy-making and taking into account the experience of national infrastructure projects.

The case studies considered for revision out of the original 10 in the first study were those which showed significant changes since 2012. Five further mega-projects were also included in the case study analysis, making a total of 12 case studies included in this report.

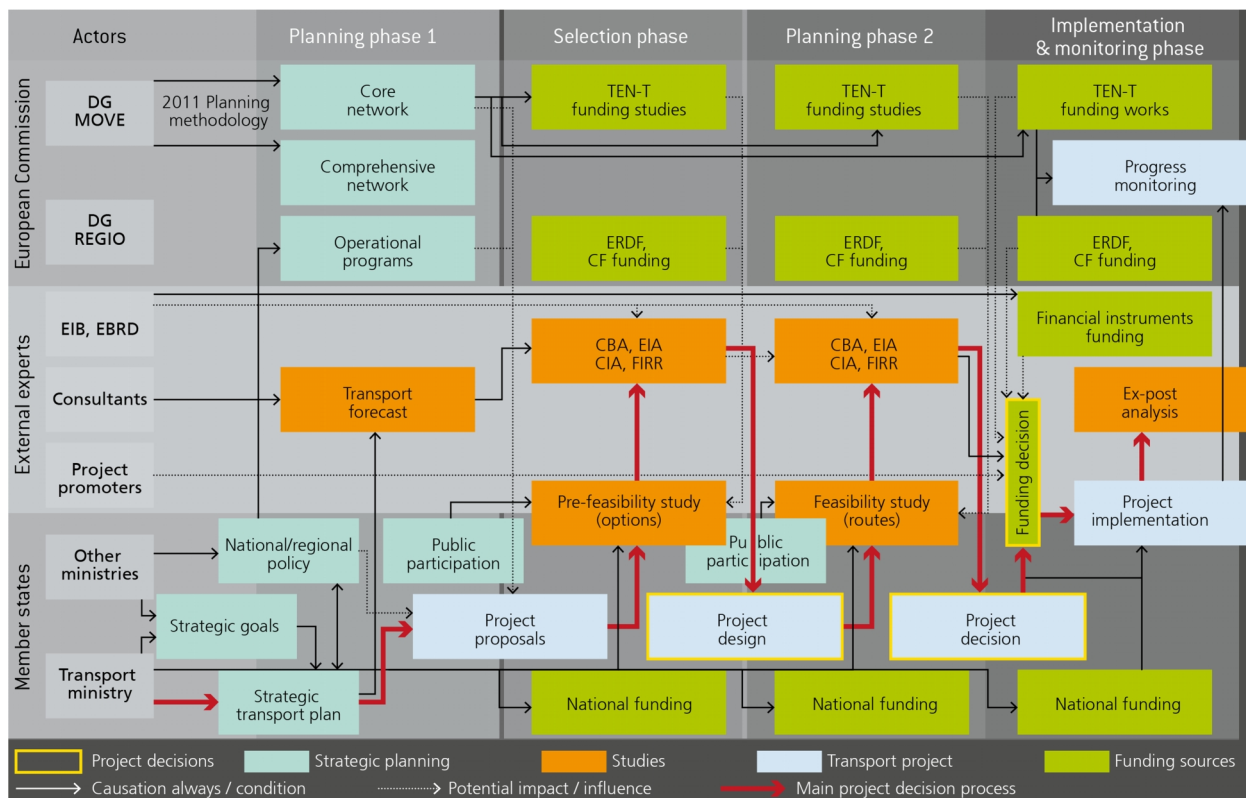
The analysis of the case studies follows a template that was developed for the previous study which was adhered to for each of the case studies. These are presented as 12 annexes to this study. The focus of the analysis is on the research questions concerning the assessment of projects related to investment costs, socio-economic cost-benefits including environmental benefits, environmental impact assessment, transport demand forecasts and updates of such studies over time. The latter is important for understanding the reasons for cost increases of the projects, since cost overruns for many transport projects have been observed in the literature. This study is written as an addition to the previous study, so that the focus of this update is on (1) issues which have gained importance over the past two years through the development of the new TEN-T guidelines and the CEF regulation, and (2) findings particularly related to the five new case studies which are also relevant to the previous cases. This includes the analysis of wider economic effects, (climate-related) long-term effects and of the role of public participation. In this sense, the two reports should be read as two complementary volumes on the same topic.

## Analysis and findings

Figure 1 shows a scheme of an integrated planning process, which can serve as a baseline for deciding on TEN-T project assessment, selection and funding. The scheme reveals the complexity of the decision process involving actors in Member States, at the European Commission and external experts including project promoters and project funders. Guidance is provided by highlighting the main project decision process (following the red arrows). The planning process is subdivided into phases of strategic and project planning. It is the aim of the strategic planning phase to develop a multi-modal network configuration (e.g. a core network) which is concordant with the strategic goals of the EU, as defined in the Transport White Paper of 2011. Strategic planning can be supported by methods for evaluating wider socio-economic impacts, by strategic environmental assessment (SEA) and climate impact analysis (CIA). These methods can address network configurations and measure their contribution to sustainable development. Project planning aims to select the most beneficial alternatives and define appropriate priorities. This is supported by methods of partial analysis which focus on the direct impacts of projects for users, operators and

exposed population. Cost-benefit analysis (CBA) is the most widely used instrument. It can be extended to multi-criteria analysis (MCA) if impacts cannot all be monetised. A financial analysis can show the expected financial internal rate of return (FIRR). The environmental effects can be measured by an environmental impacts analysis (EIA) which focuses on the area surrounding the project. In addition to the above *ex-ante* evaluations, *ex-post* studies are also suggested to control the achievement of objectives and provide information for the evaluation of similar projects, which are still in the planning phase. In the light of this study's findings the need for early and continuous public participation (including that of local stakeholders) should be emphasized. The scheme ends with the project decision and it should be noted that stakeholder participation is a continuous process which also needs to be followed during project implementation.

**Figure 1: Proposed decision-making process on TEN-T funding**



**Source:** Fraunhofer-ISI.

Table 1 presents an overview of the 12 case studies. The first five cases represent rail projects, the sixth a mixed rail-road project, the next two are road projects, projects 9 - 11 are base tunnels for Alpine rail crossings and the twelfth project is a waterway. Total costs of the projects range between EUR 131 million and EUR 9.7 billion. When benefit-cost ratios are available and reasonably low discount rates are applied for their calculation, the benefit-cost ratios are estimated to be between 1.5 and 6.5; payback periods lie between 15 and 50 years; economic internal rates of return amount to between 4.7% and 9.4%.

Two of the case studies allow for *ex-post* analyses, two others are partially completed, and two others are under construction. The other six case studies concern infrastructures at different levels of planning. Two of them are in an exploratory phase which has already started (Brenner, Lyon-Turin), and this phase is also likely to start soon for the Fehmarn Belt. Rail Baltic and Seine-Scheldt are still in the project design and planning phase while the Iron-Rhine seems to be at a preliminary planning phase.



As far as transparency is concerned, the generic observations found in the previous study can be confirmed. More recent projects, in particular when still in the planning phase, already seem to be adapting to requirements of becoming more transparent and providing more detailed studies online (e.g. Rail Baltic, Lyon-Turin) or on request (e.g. Fehmarn Belt Fixed Link). However, in some cases too many, and sometimes contradicting, documents and statements hinder clear understanding of a project. This underlines our recommendations from the previous study to maintain a central project data office at the EC, which compiles and distributes relevant data and relevant study information (e.g. for the Rail Baltic(a)).

**Table 1: Overview of the results of the case studies**

No	Selected TEN-T projects	Status	Cost EUR million	BCR / NPV / EIRR	EIA	CIA
1	Brenner base tunnel	Planning; exploratory works	8 585 including risks	BCR: 1.9 (for 2.5% SDR)	Complete, updated (2008)	Missing
2	Betuwe Line	Ex-post	4 705 (197 by TEN-T)	Payback per. 15-20 yr.	Simplified	Missing
3	Rail Baltic(a)	Planning	3 540 AECOM study (outdated)	1.75 BCR 9.3% EIRR 0.05% FIRR	Aggregate environm. assessment	CO <sub>2</sub> emission of traffic in environ. ass.
4	Iron Rhine	Preliminary planning	n.a.	n.a.	n.a.	n.a.
5	Rail Project S21/ Stuttgart-Ulm	Construction started	9 400 – 9 700	Payback per. 50 years 1.5 BCR for HSR parts	Yes, for the single elements	CO <sub>2</sub> emissions of traffic
6	Fehmarn Belt Fixed Link	Planning	7 228	2.6 BCR	Completed	Missing
7	Tunnels on SE40 Expressway Sevilla-Huelva	Construction, (ex-post)	239 (525) (24 by TEN-T EERP)	6.04 to 6.54 (6.36)	Yes, as of year 2000	Missing
8	A11 motorway Berlin-Poland	Construction (ex-post)	131 (10 by TEN-T)	Missing	Complete for plan approval	Missing
9	Lyon-Turin base tunnel	Planning, works at exploratory tunnels	8 600 (26 000 for the 257 km full link)	NPV EUR 12 to 14 billion EIRR 4.72% to 5.09%	Unclear, simplified requirements in Italy	CO <sub>2</sub> emissions of construct. and traffic in CBA
10	Gotthard base tunnel	Construction	~8 000	NEAT NPVe negative	n.r.	n.r.
11	Lötschberg base tunnel	Ex-post	~4,200	NEAT NPVe negative	n.r.	n.r.

No	Selected TEN-T projects	Status	Cost EUR million	BCR / NPV / EIRR	EIA	CIA
12	Seine- Scheldt waterway	Planning	5,900 (year 2006)	5.3% EIRR (France)	Completed 2005 (Flanders) & 2006 (France)	Missing

BCR = Benefit-cost ratio, NPV = net-present value, EIRR = Economic Internal Rate of Return, NPVe = NPV using only economic elements, SDR = Social Rate of Discount, FIRR = financial internal rate of return  
n.a. = not available, n.r. = not required

**Source:** different price bases, own compilation.

## Recommendations

(1) The methodologies for planning, forecasting and assessment need further development to effectively support decision-making for large transport projects in a multi-modal network context. This includes:

- Consideration of interdependency between the three basic pillars of transport planning: (i) strategic goal setting, (ii) systems analysis and optimal network design and (iii) comprehensive project analysis and assessment.
- Cost-benefit analysis (CBA) for all projects is necessary following harmonised European guidelines and considering network effects by appropriate network modelling tools.
- European added value and wider socio-economic benefits are typical benefits of mega-projects which should not be neglected. Hence, it is important to further develop the existing scientific knowledge and practical approaches to this field to improve the accuracy of measurement.
- Environmental Impact Assessment (EIA) is obligatory. However, the scopes and the levels of detail differ between analysed case studies. Definition of EIA-standards for the different phases of planning (pre-feasibility, feasibility, final project plan) is necessary. Furthermore, a clear definition of thresholds for intolerable environmental risks is necessary, particularly for the early phase of planning, to reduce planning costs, avoid problems of implementation and increase public acceptance.
- Strategic Environmental Analysis (SEA) is obligatory. It should be included in the initial phase of developing optimal network plans design rather than being placed at the end of the process of developing an investment programme. It seems that the new nine TEN-T corridors would provide the right scale to carry out an SEA.
- Climate Impact Analysis (CIA) has, up until now, not been obligatory. It is necessary, however, to check the compliance of the projects with EU climate goals. Beyond the carbon footprint of traffic activities the climate impacts of infrastructure provision and upstream/downstream processes should also be included.

(2) Planning and procurement processes in each Member State are different and may be biased by particular political interests. Moral hazards can lead to inappropriate project design if Member States are seeking EU funding. Therefore the EU co-funding mechanisms for transport projects need strict control and monitoring:

- It will be necessary to give narrower and clearer definitions of eligibility and the quality of documents (as e.g. of the strategic transport plan and the assessment process for projects). Conditionality for receiving EU co-funding should be defined more precisely and the enforcement of conditions should be ensured. The new TEN-T guidelines and the CEF regulations move in this direction, for example through the explicit definition of links belonging to the core network and the key performance indicators (KPI) to be achieved by link improvements. Conditionality and proportionality should go hand-in-hand. The higher the proportion of EU co-funding provided for a transport project the greater the importance of the EU conditions in decision-making and the higher the requirements for ensuring their enforcement. A project receiving 10% EU co-funding, apart from being bound by general requirements (e.g. provided by European legislation like the EIA directive), will have to respect the results of national assessments and decision criteria for issues under the responsibility of the Member States individual legislation. Projects receiving higher co-funding rates, particularly those above 50% or where the EU is the single largest co-funder (as in cross-border projects with 40% co-funding), should make EU conditions the dominant decision base.

(3) Better information, coordination and participation are central issues:

- Better coordination and information is a pre-condition for a learning process, taking into account the good and bad practice experiences of the past. It is recommended that a central data office is established, containing the project fiches with links to all underlying documents (incl. documents from the Member States) and that results after project completion are monitored, including *ex-post* analysis on the project and corridor scale. This central data office should build on the TENtec information system operated by INEA that should be extended to also store the *ex-ante* studies and make them accessible to the public, at least in the form of meaningful summaries of the studies.
- Better participation of stakeholders is indispensable because of a growing resistance to large transport investment projects (see the annexes on the case studies Lyon-Turin or HSR Stuttgart Ulm). This will also improve the project decision base and thus the implementation decisions. Participation is an ongoing process which should begin long before deciding on a project and should not stop after the formal approval of a project. For mega-projects, a public vote on their implementation should also be considered.

In general we understand that the decision process on TEN-T co-funding has significantly improved in the last seven years. The new TEN-T guidelines and the new CEF regulation will further improve project selection and funding of TEN-T. Naturally, due to the emphasis of cross-border projects and increased EU co-funding, Member States will have to accept a greater role of the EU in project decisions and project implementation. This seems reasonable for the development of a true European network.

Enforcing the new guidelines and respecting the existing and newly established conditionalities, taking into account the recommendations given in this study, seem to be the key elements for improving the TEN-T concept and making its co-funding most beneficial for the European Union. Transparency in decision-making seems to be an asset to this end, both for the project promoters who develop better performing projects which are less risky and more widely accepted, and for European citizens who will benefit economically and environmentally.

## 1. SUMMARY OF THE PREVIOUS STUDY

### KEY FINDINGS

- The **findings of our previous study** performed on behalf of the EP TRAN Committee (Schade et al. 2013) are **not changed by this update**. They are emphasised and complemented but a shift in focus has taken place. The focus of the previous study was directed onto the *ex-post* analysis of TEN-T development, while in this study it is more strongly orientated towards the prospective aspects.
- **Developing the transport networks has been a goal of the European Union and its predecessors since its foundation in 1957** but TEN-T projects were not actively promoted as such until the end of the 1980s. The Treaty of Maastricht, signed in 1992, legally established the TEN-T and initiated the process of developing TEN-T in a structured way. This process is still on-going today.
- The first guidelines for TEN-T development in 1996 foresaw the implementation of 14 European projects, the so-called Essen projects. The updated guidelines in 2004 suggested 30 priority corridors. Both concepts – **the 14 Essen projects as well as the 30 priority corridors - were largely influenced by national policies**.
- **The proposal for a comprehensive TEN-T revision of 2011 is a major attempt to centre TEN-T activities on a strategic European platform** and to complete the transition from a project- and then corridor-based perspective to a network concept grounded in a core and comprehensive TEN-T network. The concept is supplemented by extended funding instruments, summarised in the Connecting Europe Facility (CEF).
- In the light of the findings and recommendations of our previous study the **new approach**, with core network, corridors and CEF, is a promising development and a clear **improvement of TEN-T appraisal, funding and development**.

### 1.1. Objectives and contents of our previous study

The development of Trans-European Networks (TEN) is a premier issue of European economic and social policy that dates back to the Treaty of Rome (1957) which included the adoption of a Common Transport Policy. It serves the goals of economic development, regional competitiveness, regional and social cohesion and environmental sustainability. With the establishment of the European Regional Development Fund (ERDF, 1975) European funding was made available, with funding options expanded in 1982 by a specific line of the EU budget dedicated to transport infrastructure of European interest. However, the implementation of this infrastructure remained very slow, even after 1982 (ECA 1993, Brömmelstroet/Nowak 2008). Therefore, the Treaty of Maastricht (1992) included an obligation for the European Commission and the European Parliament to prepare guidelines for the development of TEN and update them periodically. TEN comprise communications, energy and transport infrastructure (TEN-T) networks. The first TEN-T guidelines were published in 1996, followed by updates in 2004 and 2011 (see section 2.1).

A number of major problems in the planning, construction and financing of large projects arose in the first phase of implementation of TEN-T starting in 1996. Completion of the original TEN-T projects fell behind the optimistic implementation timings. Several measures were taken to overcome these difficulties, including the establishment of the Trans-European Transport Network Executive Agency (TEN-T EA), designed to support the

European Commission, Member State governments, project managers and promoters with the implementation process. Other measures include the appointment of TEN-T Priority Project / Corridor Coordinators and the development of additional financial instruments to overcome financial barriers. Despite this, indications of sub-optimal planning, procurement and implementation of TEN-T projects remained due to inherent inefficiencies. On the analytical side, there was faulty project design, non-integration into the TEN-T network design, and an overly narrow impact analysis and evaluation. In particular, queries were raised as to whether the (*ex-ante*) assessment of projects took sufficient account of strategic objectives such as regional integration, environmental quality and control of the climate footprint. Beyond analytical weaknesses, the political processes of project definition, procurement and approval also needed to be improved. The same holds for regimes of project finance including EU co-financing, paying attention to the risk of creating unintended incentives.

Against this background, the objective of the previous study was to describe the assessment of transport projects, particularly large TEN-T projects, taking into account the following aspects in a sequence of analysis:

- History of TEN-T and TEN-T assessment.
- Problems with TEN-T assessment.
- Problems with TEN-T implementation.
- Case studies on TEN-T projects.
- Recommendations for the development of assessment and procurement of large TEN-T projects.

## **1.2. The study “TEN-T Large Projects - Investments and Costs”**

The previous study generated a comprehensive summary of the past TEN-T development and assessment, which was about 90 pages long, as well as explanations and details of 10 case studies on another 90 pages (Schade et al. 2013). The study began by providing a synopsis of the history of TEN-T development in Europe, including an explanation of the principles for co-funding the infrastructure by the EU within the frame of Member States being the main actors in the project development.

This was followed by a general description of the state-of-the-art of project assessment with respect to evaluating and assessing the TEN-T. This description was complemented by the explanation of future directions in which project assessment could develop (e.g. by considering wider economic benefits, or by risk assessment).

As in the past, several problems with TEN-T implementation were observed. These problems were described and analysed and the two major issues identified concerned problems of strategic planning and problems of the underpinning studies. The latter was particularly confirmed by analyses of the European Court of Auditors who concluded that project selection for TEN-T was a political process rather than being based on proper assessments. Furthermore we showed that the co-funding of projects conditional upon their economic viability has existed since 1996, and that the EC has requested proof of viability of the projects since at least 2007 (i.e. socio-economic assessment studies). However, this requirement has not been enforced. It is also important to note that projects to be co-funded had often not been specified and planning had not been sufficiently concrete. In these cases, the project definition remained fuzzy.

Based on the findings of the ten case studies we concluded that a normal sign of a good planning process would be both a cost increase **during the planning** process and the lack of alteration to planned costs **during implementation**. In other words: a project at the point of decision has a comprehensive specification and the costs at the point of decision were estimated correctly and need not be increased during implementation.

Transparency of assessment plays an important role in developing a project and avoiding delays. However, in the past transparency also depended on who was promoting a project, with private promoters tending to restrict full transparency. Building on the case studies, we then developed the recommendations that have been emphasised and complemented by this study (see section 6).

### **1.3. Enhancements provided by this study to the evaluation of projects at the European Commission**

The process of detailed assessment and evaluation of the projects by the European Commission has remained vague. However it was known that socio-economic analyses and EIA were required to obtain TEN-T funding in the past. The following sections explain in more detail the evaluation process, and the cooperation between the European Commission (DG MOVE) and the INEA (the former TEN-T EA). The distribution of works and responsibilities is as follows: first the INEA evaluates the proposals received for the multi-annual call for funding and for the annual call for funding, applying a pre-defined process (see sections 1.3.1 and 1.3.2). This results in a ranking of projects, so-called actions, to be funded, possibly requiring more budget than available in the call. Second, the ranking is proposed to the EC which adds political criteria and makes the final proposal of projects to be funded.

#### **1.3.1. Actions not projects as a base for decisions at INEA**

For this update we were able to collect additional information through further interviews with experts involved and other staff at the European Commission, particularly concerning the decision process on funding by the TEN-T funds. A funding decision covers a so-called action, which in case of project works usually refers to a section of some kilometres of new or upgraded infrastructure. This usually means that the large projects, such as a corridor, will not depend on just one funding decision of the EC, but rather on separate decisions for each action into which the project is split. This split depends on the way the promoters of a project submit their proposals for funding to the EC. In a few cases, one action may represent a large infrastructure that requires an investment of several billion euros. Such large projects are typically the base tunnels in the Alpine region (Brenner Base Tunnel, Lyon-Turin Base Tunnel) or the Fehmarn-Belt Fixed Link. Other projects are often treated as one action in the (national) public debate, but are split into separate actions when it comes to EU funding. The practical reason for splitting a project into several components is the adjustment of project actions to the multi-annual funding periods of the European Commission. Projects funded under the funding period 2007 to 2013 should have been completed by 31<sup>st</sup> December 2013. However, for several of them this was not the case, and the extension of their funding (to the end of 2015 at the latest) was decided by the EC on a case-by-case basis. Thus a project with an implementation period of more than seven years needs to be split into several actions which can be proposed separately to the EC for funding. Examples are Rail Baltic(a) or the Seine-Scheldt waterway project.

In turn, the decision to submit an action as a proposal for funding to the EC will be influenced by the EC calls opened for funding. For the funding period 2014 to 2020 the EC is planning a structure of multi-annual calls and a series of annual calls, for which the focus of the call may change from year to year (see section 2.3). Such a structure of combining annual and multi-annual calls was applied to the previous funding period 2007 to 2013.

### **1.3.2. Evaluation of projects on the base of actions**

Splitting projects into smaller actions may result in a project evaluation not being congruent with an action proposed for co-funding. Usually this should not cause difficulties with the Environmental Impact Assessment (EIA) as such an evaluation is carried out on a detailed local scale. However, the socio-economic assessments are usually carried out at the project level, i.e. on a scale larger than that of the action. Consequently, a socio-economic assessment would be available for the full project, but not for the action itself that is proposed to be co-funded by the EC.

This has resulted in the INEA, and its predecessor TEN-T EA, basing its decisions not on the results of a socio-economic assessment related to the proposed action, but on the so-called consensus report concerning an action. The consensus report is the outcome of the external evaluation organised by the INEA. For such an external evaluation of an action, INEA appoints at least three independent external experts. Each of the appointed external evaluators produces an individual evaluation report concerning a proposed action applying the four criteria of (1) relevance, (2) maturity, (3) impact and (4) quality. After that a face-to-face meeting is organised, moderated by staff of INEA to develop a consensus report. During that meeting a consensus concerning the marks (1 to 5) given to the four criteria must be achieved. This is the final evaluation of a proposed action, and the basis for INEA to propose actions for funding. However, the final EC co-funding decision will be taken at DG MOVE ranking the INEA evaluations and taking into account further political aspects.

The European Court of Auditors (ECA) was regularly auditing the TEN-T EA. The ECA confirmed that the transactions of TEN-T EA were legal and regular in all material respects (ECA 2012).

### **1.3.3. Re-injecting unused funds and reclaiming funds**

At the end of the funding period 2007 to 2013 it transpired that several projects were delayed and did not spend their assigned co-funding budgets as planned and agreed with the EC. In some cases it was obvious that the budget would also not be spent until the end of 2015, the latest date to which the budget could be reserved. Therefore the EC decided to re-assign budgets, i.e. to reduce the co-funding budgets of projects that would not spend their assigned budget by 2015 (e.g. Lyon-Turin base tunnel), and to increase the budget of others, which made better progress and could utilise their budget in time (e.g. Fehmarn-Belt crossing budget was increased in 2013 compared with the 2012 assignment). This allows projects performing positively, in terms of the speed of implementation, to obtain a higher share co-funding than originally foreseen.

## 2. THE RECENT TEN-T POLICY PROCESS

This section begins with a brief summarising of the TEN-T development to the end of the last programming period in 2013. A more detailed description of the TEN-T history was presented in the previous study. This is followed by a description of the TEN-T guidelines for the next programming period of 2014 to 2020 and the process to develop these guidelines.

### 2.1. TEN-T development up to 2013

In 1990 the Portuguese Presidency came forward with the proposal to establish a European infrastructure agency to co-ordinate national plans and generate operational network infrastructures (see Turró 1999, Szimba et al. 2004). The European Commission (1990) developed a report entitled "Towards Trans-European Networks", which included a concept for a European high-speed rail network. While the European infrastructure agency did not take any further part in the political process, the idea of Trans-European Networks (TEN) was taken up and extended to include telecommunications, energy and transport networks (TEN-T). It subsequently became a constitutive element of the 1992 Maastricht Treaty and the TEN were regarded as a key element in fostering economic and social integration, the free movement of persons and goods, and balanced regional development within the Union.

Article 129 of the Treaty called for a series of guidelines covering the objectives, priorities and broad orientations of the TEN, to implement any measures necessary to ensure the inter-operability of the networks and support the financial effort of Member States for projects of common interest. The first guidelines for TEN-T were published in 1996 as Decision No 1692/96/EC of the European Parliament and the Council (European Union 1996). TEN-T were subdivided into 9 sub-networks for air, road, rail and maritime transport and the supporting telecommunication systems (ITS). The first concept had been developed by a high-level expert group led by Henning Christophersen, the former Vice-President of the European Commission. The "Christophersen Group" proposed 14 projects which were agreed by the Council summit in Essen in 1994 and formed the backbone of the guidelines of 1996 ("Essen Projects"). Additionally the TINA backbone network in 1997 established 10 corridors in neighbouring countries who later joined the EU as New Member States in 2004 and 2007. These corridors were intended to improve connections between Western, Central and Eastern Europe. After publication of the Transport White Paper in 2001 the first TEN-T network for EU25 was defined consisting of 30 priority projects and a comprehensive network. In 2004 this comprised: 95 700 km of road links, 106 000 km of railway links (including 32 000 km of high-speed links), 13 000 km of inland waterways, 411 airports and 404 sea ports. Almost 20 000 km of the road links, over 20 000 km of the railway links (overwhelmingly high-speed lines) and 600 km of the inland waterway links were still to be built or substantially upgraded in 2009 to generate a fully implemented and comprehensive network (EC COM(2009) 44). The following rough budget estimates were provided at the different stages of TEN-T development:

- Budget estimate for the Essen projects (EU15, 1994): EUR 96 billion.
- Budget estimate for the TINA backbone network (EU12, 1997): EUR 92 billion.
- Budget estimate of the TEN-T network (EU25, 2005): EUR 600 billion.



As the implementation of the Essen projects proved sluggish, in 2005/2006 the European Commission established two institutional innovations to accelerate the process: the European Coordinators for priority projects and the TEN-T Executive Agency (TEN-T EA), which, as of January 1<sup>st</sup> 2014, has been renamed the Innovation and Networks Executive Agency (INEA). Between 2005/2006 and 2013, nine TEN-T Coordinators responsible for promoting 11 out of the 30 priority projects were appointed. Their task has been to primarily identify problems, especially concerning the cross-border sections of the projects, and to develop and promote solutions together with the national and regional authorities concerned. The TEN-T EA has been in charge of the technical and financial implementation of the TEN-T programme, which included about 350 single projects.

In accordance with the TEN-T Regulation (Art. 16), the infrastructure programme had to undergo regular evaluations. At the end of 2010 a first mid-term report evaluated the methods and procedures for granting financial aid and formulated overall conclusions and recommendations on the TEN-T programming period ending in 2013. Progress and compliance with funding regulations were controlled by the European Court of Auditors (e.g. ECA 2010).

## 2.2. Planning for the 2014-2020+ funding period of TEN-T

In 2009 the European Commission started to revise the TEN-T guidelines and the funding procedures to be applied for the programming period 2014 to 2020 by publishing the Green Paper "TEN-T: A policy review" (EC COM(2009) 44 final). The acting TEN-T Coordinators also published their recommendations on the future TEN-T policy in 2009 (van Miert et al. 2009). In line with the European Commission proposal they favoured the double layer concept of a network consisting of a *core network* and a *comprehensive network*, where the core network, though building largely on the existing set of priority projects, would still have to be exactly defined. A concrete proposal for developing the dual layer concept and an appropriate definition of the TEN-T network was then prepared by a consultancy study (TML et al. 2010).

The next step of the process was for the European Commission to establish six expert groups to discuss new concepts for the TEN-T guidelines: methodological issues; integration of transport and TEN-T policy; connection with other countries; financing issues; and legal issues. The guiding principle was to move from project orientation (Essen projects 1994) which was followed by the corridor orientation (van Miert priority corridors, TEN-T 2004, HLG 2003) to a network orientation (EC 2010d). The expert groups agreed with the European Commission to suggest a classification into:

- a Core Network, comprising all nodes and links of highest European importance, and
- a Comprehensive Network, comprising the whole TEN-T of 2004 together with additional missing links.

Building on these preparatory works the European Commission started a public stakeholder consultation. The consultation was framed by two Commission Working Documents (EC COM(2010) 212 final and EC COM(2010) 613 final), the former describing the broad future concept of TEN-T planning and funding and the latter detailing the previous stakeholder consultation concerning the Green Paper on TEN-T policy review (EC COM(2009) 44 final). In this consultation of approximately 300 stakeholders, 85% of those who responded preferred the dual layer concept of a comprehensive network and a core network (option 3). The TEN-T policy objective was stated more precisely, i.e. that **strategic projects** with

high European added value and that **foster the smooth operation of the internal market** should be promoted and receive funding. In particular, **critical bottlenecks**, which would most often be **cross-border sections** or **inter-modal nodes** should be addressed (EC 2010f).

In parallel, the recast (EC COM(2010)661) of the EU guidelines on the TEN-T suggested concentrating EU funding on the priority projects requiring that a progress report on these projects be developed by 2010. This report should take into account amendments to the list of priority projects. Furthermore, it was determined that five years after completion of a project of European interest, an *ex-post* socio-economic impact assessment and an environmental impact assessment should be carried out by the concerned Member States (EC 2010e).

The next step was the publication of the new Transport White Paper *Roadmap to a Single European Transport Area* (EC 2011a) followed by the European Commission proposal of the revised TEN-T guidelines (EC 2011f). Both incorporated the strategies defined by the EU in the Europe 2020 Strategy (EC COM(2010) 2020), particularly concerning the flagship initiative to develop a resource efficient Europe and the actions to mitigate climate change. Even though all the preparatory documents of the TEN-T policy revision in 2009 and 2010 include the objective of mitigating climate change within the transport sector, the Transport White Paper added the fixed target of 60% reductions of GHG emissions within transport by 2050 compared to 1990. In 2010 the European Commission expected that the revision might be completed by 2011 at the earliest (Adelsberger 2010). However, it took until November 2013 until the last vote was completed in the European Parliament.

In parallel to the revision of the guidelines for the network development, the legislation on the funding mechanisms and the planned budget for the period 2014-2020 was carried through the legislative process. After the European Commission had tabled the proposals for the new TEN-T guidelines (EC COM(2011) 650) and the Connecting Europe Facility (CEF) as a major funding facility (EC COM(2011) 665) the different European policy bodies and their responsible Committees provided an opinion. The total investment in EU transport networks between 2010 and 2030 was estimated to be EUR 1,300 billion. Between 2014 and 2020 EUR 500 billion would be invested in the TEN-T network, of which EUR 250 billion would be necessary to progress the core network. Initially, the proposed budget for CEF was EUR 50 billion, of which EUR 31.7 billion was allocated to the TEN-T. The Cohesion Fund would have a budget of EUR 34 billion for transport, of which EUR 10 billion would be handled by the CEF and be dedicated to implementing the core network.

The Committee of the Regions (CoR) and the REGI Committee of the European Parliament (EP) in the second half of 2012 were generally supportive of the proposals. However they suggested amendments to the EUR 10 billion of the Cohesion Fund to be provided to CEF and ring-fencing for implementing the core network. The BUDG Committee of the European Parliament agreed that the proposed CEF budget of EUR 50 billion is the minimum required, though a higher budget would be recommended (Pond 2012).

The TRAN Committee has established two groups of rapporteurs, one responsible for developing an opinion and amendments to the proposed legislation on TEN-T guidelines and the other on the CEF.

The rapporteurs of the TRAN on the TEN-T guidelines (Koumoutsakos and Ertug) in their draft report of July 19<sup>th</sup> 2012 suggested substantial amendments to the proposal (Koumoutsakos/Ertug 2012). These included:

- To consistently make reference to the harmonised and common methodology for planning Union infrastructures.
- To require a socio-economic assessment that would prove the positive net present value of a planned co-funded project.
- To assess the impact of projects on climate change through a climate impact analysis (CIA) which not only includes the emissions of vehicles but also the effects of providing the infrastructure.
- To require a contribution of the projects to achieve the targets of the Transport White Paper, in particular the GHG mitigation target of 60% by 2050 compared with the reference year 1990.
- To ensure stakeholder participation, particularly of the affected civil society and the local authorities.
- To set measurable deadlines for implementation progress and to provide, on a regular basis, detailed and up-to-date data on funding, including its sources, and of progress of implementation.

On 30<sup>th</sup> May 2013 the discussion between the European Parliament, the European Commission and the European Council reached an agreement on the new TEN-T guidelines and the CEF. This agreement was finally endorsed and voted on by the Parliament on 19<sup>th</sup> November 2013, such that after their official publication the new regulations on the TEN-T Guidelines [EU REG 1315/2013], the CEF and the funding mechanisms for the TEN-T [EU REG 1316/2013] could enter into force. The debate was heavily influenced by the agreement on the Multi-annual Financial Framework (MFF) of the EU for the period 2014 to 2020. This was actually voted on at the same time in Parliament and the Council agreed to the MFF a few days later on 2<sup>nd</sup> December [EU REG 1311/2013]. However, as the MFF was cut by the leaders of the Member States, and the Council's initial proposal for TEN-T funding was EUR 13.2+10 billion instead of EUR 31.7 billion, the CEF budget for TEN-T was reduced to EUR 23.17 billion. Furthermore the CEF was assigned a budget of EUR 5.12 billion for energy infrastructure and of EUR 1 billion to support telecommunications leading to a total CEF budget of EUR 29.3 billion in constant 2011 prices (in current prices this amounts to EUR 33.2 billion). In total, although this amount was much less than was needed to achieve the objectives set in the legislation, it still meant tripling the budget available for TEN-T compared with the previous financial framework of 2007 to 2013.

The Parliament succeeded in including a number of their proposals into the new regulation. This includes the improved socio-economic assessment, the climate impact assessment (CIA), the local stakeholder participation, increased co-funding rates for certain infrastructures (e.g. 40% for cross-border projects, 30% for the removal of bottlenecks as well as 30% for motorways of the sea (MoS)) and the requirement that the EC details their funding plans at the beginning of the funding period giving the Parliament the opportunity to respond to or modify planning.

In summary, the revised TEN-T policy focuses on the funding of strategic infrastructure that is of particular European interest, i.e. of interest for long-distance flows across several EU Member States as well as for creating intermodal nodes and gateways to the EU. Since

there is substantial interest to complete the European transport network European funding becomes particularly relevant when there is little national interest for example when a Member State is primarily focused on infrastructures with high domestic demand. . This is particularly true for cross-border sections that are thus assigned a higher priority by the revised TEN-T policy.

### **2.3. Initial budget planning for the funding period 2014 to 2020**

Following the new requirements of the CEF the European Commission presented their initial concept of distributing TEN-T funds between different funding priorities in February 2014 to the TRAN Committee. About EUR 20-21 billion should be allocated to the multi-annual programs (MAP) of TEN-T funding the core network and the 9 corridors, of which EUR 9 billion would be assigned to the first call for proposals in 2014. This would mean that close to half of the budget for the MAP would be assigned at the beginning of the new funding period. A further EUR 5-6 billion are assigned to annual calls, with the first call in 2014 having a budget of EUR 1 billion. Out of this total of EUR 10 billion, 40% is likely to go to the cohesion countries with about 75% being allocated to the core network. The size of the first work programme indicates that the EC also intends to use the TEN-T funds as an economic stimulus.

Further funds will be assigned to improving the interoperability of networks including ERTMS (EUR 350 million), new innovative transport technologies including alternative fuels (EUR 310 million) and MoS (EUR 340 million).

Although EUR 9 billion for the multi-annual programs (MAP) is a substantial amount, it should be remembered that a few mega-projects, including several of the case studies analysed in this report, are awaiting this funding. For instance, on 19<sup>th</sup> November 2013 the promoter of the Lyon-Turin project directly claimed a budget of EUR 3.4 billion (see LTF news website), Rail Baltic is assigned EUR 2.6 billion (statement of Commissioner Kallas), and the Fehmarn Belt crossing, the Brenner base tunnel and the Seine-Scheldt waterway also constitute cross-border projects that could expect to receive 40% of EU co-funding.



### 3. CASE STUDIES AND FEEDBACK ON THE PREVIOUS STUDY

#### KEY FINDINGS

- The **list of case studies** analysed has been **extended by five cases** each representing a multi-billion Euro investment. Two of them expecting substantial funding in the 2014-2020 funding period (Lyon-Turin base tunnel, HSR Stuttgart-Ulm).
- The feedback on the previous study was limited to criticism concerning our findings of one case study. To gather a broader spectrum of feedback the **study team started to collect feedback proactively** by contacting stakeholders, including those concerned with the other case studies. .
- Against the background of the recent literature on large transportation projects, which underlines the limited scope of traditional CBA, we still argue that it is necessary to **consider both wider economic impacts and risk provisions within the overall assessment of large projects**, even though this was criticised by the stakeholders in the previous case study.

#### 3.1. Feedback on first study and response of the authors

The study *TEN-T Large Projects - Investments and Costs* (Schade et al. 2013) commissioned by the TRAN Committee of the European Parliament was presented at the TRAN Committee in Brussels on 22<sup>nd</sup> January 2013. The feedback on that occasion was moderately positive, including that from the European Commission DG MOVE.

To our knowledge, two promoters of case studies reacted to the report: in the Fehmarn Belt case the project company, Femern A/S, quoted the study as a confirmation of their proactive role in communicating their project planning and assessment of the Fehmarn Belt crossing. In the Seine-Scheldt case both the study findings about the project as well as recommendations concerning the consideration of wider economic benefits were criticised by the French inland waterway public agency VNF, and the criticism was communicated both to the European Parliament and the study authors. Considering the criticism concerned with the process of gathering information, our understanding is that desk research, plus email contacts, phone contacts and personal contacts with the relevant people at the TEN-T Agency were sufficient to draw the attention to our requests. The project team was in contact with the VNF and scientific/policy bodies working on the project, and the documents supplied at that time led to the conclusions presented in the previous study. After the completion of the study the dialogue between the project team continued to clarify misunderstandings which had occurred; the last phase of communication was influenced by the time pressure caused by the study deadline while relevant information from VNF had come in after the deadline had passed. The project team also received notice from other sources in the final phase of the study that new documents were being prepared for the French part of the project which could not be provided by VNF because they were not public at that time. This gave rise to critical remarks of the project team on the transparency of the data situation and reliability of forecasting and assessment figures; this mainly stemmed from the year 2006. Clarification of misunderstandings and updating of project information were the reasons for selecting the Seine-Scheldt waterway project as one of the previous case studies; this has been completely revised through

additional contact with the stakeholders and policy-makers dealing with the project. The revised case study on the Seine-Scheldt waterway is summarised in section 5.2.12, and the detailed study is presented in Annex 1.12.

Together with the criticism on the Seine-Scheldt case study, two issues of a general nature were raised by the stakeholders that should be further debated. The first concerns the consideration of wider economic impacts (or secondary or leverage effects) for the assessment of large transport projects. VNF proposed basing the assessment on a partial equilibrium transport model approach, without considering any wider economic benefits as they still belonged to the research domain. They would expect that methods to capture wider impacts would first be applied within individual countries and later applied in national transport planning.

Wider economic impacts, by their very nature, cannot be studied on a small scale. , There is a high probability that step changes can be achieved by stimulating wider economic impacts beyond the change of generalised user costs in large TEN-T projects which may generate European value through distributing impacts beyond national borders. Of course, the models potentially capturing such wider economic impacts are not yet as standardised as the neoclassical CBA methods using partial economic approaches, i.e. measuring the impacts on users as well as population and nature in the directly affected areas. Nevertheless, it has already been found by the SACTRA-Committee (1999) in the UK that these effects are relevant and methods should be developed to quantify them. Meanwhile, different approaches exist which have actually been applied to a few of the TEN-T projects. Examples of such models are provided in the previous study (e.g. CGEurope, SASI, ASTRA). A further modelling example was presented at the STOA workshop on "Financing and assessing large scale infrastructure projects" in Brussels on 26<sup>th</sup> September 2013: the RHOMOLO model, which is a general equilibrium model built for the 267 NUTS-II zones of EU27 and run by the European Commission. Furthermore, the NETLIPSE project concluded "*that conventional modelling tools are unsuitable for use where new infrastructure links are created by a project or where a step-change improvement in connectivity is obtained*" (Hertogh et al. 2008, p. 37). We do not go so far as to call the conventional CBA approaches "unsuitable" but think that they only address part of the benefits. Wider economic impacts should be analysed to generate the most comprehensive picture of all relevant impacts of a large project. In the final paragraph of their comments VNF underline the importance of such effects. In one of the recent documents submitted an analysis of these "indirect", "secondary" or "wider" economic benefits is presented (SETEC, 2013), although the measurement is done descriptively rather than by means of sophisticated modelling.

Looking at other European infrastructure sectors we should note that models that capture wider economic impacts are applied to assess the benefits of potential European policies. The EC proposal for the CEF quoted a study that "*estimates that connecting all of Europe to modern high-speed broadband would create about 3.99 million jobs in EU27 Member States. This analysis also shows that the average level of GDP growth arising from broadband investment is 7.03 per cent. This would equate to an increase in EU27 GDP of EUR 862.47 billion*" (EC COM(2011) 665, p. 58). For this comparable infrastructure the European value added was estimated by models that enable benefits in increased employment and GDP to be expressed. These were actually what we proposed as relevant indicators to measure wider economic benefits. To conclude, we argue that for the large (cross-border) projects it is also important to assess their wider economic benefits, because they have the potential to generate such benefits and there are tools available to carry out such assessments. If experts/scientists and policy-makers continue to apply such models,

analyse and compare their results the acceptance of such an approach will grow and potential standardisation of the model(s) could progress. As no standard methodology exists for measuring the wider economic impacts, such analyses should be undertaken by independent consultants and supervised by an independent committee of international experts, as it has been proposed in the Rapport Quinet (CGSP 2013).

The second general comment of stakeholders is related to our suggestion of adding risk premiums, or in other words, consider risk provisions as part of the cost estimates. Of course specific risk provisions should be estimated for each case, but in early planning stages these would be benchmarks derived from *ex-post* analyses of similar cases. During project planning and definition the risk provision will be continuously reduced, though we suggest it should not be eliminated completely for the large projects. This is again similarly proposed by the NETLIPSE project: *"A best practice relates to the use of levels of optimism bias, i.e. making an extra allowance in the appraisal to recognise that there are many elements at early stages of a project which have yet to be quantified or indeed identified. As the project proceeds and the levels of definition improve, the percentage of optimism bias is reduced, until, at the 'go ahead' stage, this is replaced by a risk margin within the overall project costs"* (Hertogh et al. 2008, p.38). For instance the Brenner Base Tunnel is calculated with a risk provision for risks that are yet not identifiable of 7.5% amounting to EUR 602 million as of the beginning of 2011 (Bergmeister 2011). This example shows the feasibility of our proposed approach to calculate risk provisions as it is already implemented in practice. Also the recently revised French evaluation guidelines for public projects (CGSP 2013) include a section on the treatment of project-related risk.

In addition to direct feedback, the terms of reference of this study covered the consideration of further and ongoing studies on the issue of European mega-projects, in particular the NETLIPSE project. In response, we have contacted the NETLIPSE manager and NETLIPSE senior experts and added section 4.1ff reporting on NETLIPSE and other relevant projects contributing to the assessment and implementation of mega projects. In brief, NETLIPSE aims to understand project implementation failures and to provide a very useful tool to assess the maturity of a project for implementation, also providing recommendations to improve a specific project planning and implementation process. NETLIPSE is not a tool for assessing and selecting beneficial projects.

### **3.2. Selection of case studies**

The selection of case studies was oriented towards the selection of the cases in the previous study (Schade et al. 2013). Three of the previous cases have been omitted (West-Coast Main Line, the Slovak-Hungarian railway, Malpensa airport), as they were studied in depth, have been completed and it is likely that their situation remains unchanged. Three of the studies for which major developments were expected, were re-assessed in detail (Seine-Scheldt waterway, Fehmarn Belt Fixed Link, Rail Baltic(a)) and the other four previous case studies were revised where appropriate (Brenner base tunnel, Betuwe line, SE40 expressway, A11 motorway). Additionally, five new case studies were analysed from scratch: Iron-Rhine rail from Antwerp to Duisburg, the railway project Stuttgart – Ulm in Germany (including the construction of an underground through station in Stuttgart), and three Alpine base tunnels: the Lyon-Turin base tunnel, the Gotthard base tunnel and the Lötschberg-Simplon base tunnel (see Table 2).



**Table 2: Selected case studies**

No	Selected TEN-T Projects	Mode	Area / Country	Current Project Phase
1	Brenner base tunnel	Rail	EU15 AT/IT	planning exploratory tunnelling
2	Betuwe line	Rail	EU15 NL/DE	<i>ex-post</i>
3	Rail Baltic(a)	Rail	EU12 PL/LT/LV/ES/FI	planning
4	Iron-Rhine	Rail	EU15 BE/NL/DE	pre-planning
5	High speed rail project S21/ Stuttgart - Ulm	Rail	EU15 DE	construction
6	Fehmarn Belt Fixed Link	Rail/road	EU15 DK/DE	planning
7	SE40 Expressway Sevilla-Huelva	Road	EU15 ES	construction, <i>ex-post</i>
8	A11 motorway Berlin-Poland	Road	EU15/EU12 DE/(PL)	construction, <i>ex-post</i>
9	Lyon-Turin base tunnel	Rail	EU15 FR/IT	planning, construction
10	Gotthard base tunnel	Rail	CH (DE/IT)	construction
11	Lötschberg-Simplon base tunnel	Rail	CH (DE/IT)	<i>ex-post</i>
12	Seine- Scheldt waterway	Waterway	EU15 FR/BE	planning

**Source:** own compilation.

## 4. NEW EU STUDIES ON MEGA PROJECT DECISION-MAKING

### KEY FINDINGS

- The previous study mentioned and considered a number of assessment approaches e.g. **OMEGA study, TIPMAC, IASON**. Nevertheless, the comment was made that it would be useful and important to consider other approaches, in particular NETLIPSE.
- The **NETLIPSE** approach provides a tool to **assess the maturity of project planning** and implementation. The so-called IPAT tool is supported by the NETLIPSE knowledge network that is educated to undertake IPAT analyses in a structured way.
- **Decision-making** on infrastructure plans and large projects **has recently been progressed in several European countries, in particular France, Germany and the United Kingdom**. Interdependencies between single projects and wider economic effects are discussed or even proposed to be considered by revisions of the national assessment procedures.

A number of scientists have published on planning, assessing and implementing mega projects (e.g. Flyvberg et al. 2003, Priemus 2007, Priemus et al. 2008; Rothengatter 2008, Priemus and van Wee, 2013). This study considers the results of other recent or ongoing studies on the topic:

- NETLIPSE: Network of Large Infrastructure Projects in Europe.
- Rethink!PSM: Rethink project stakeholder management.
- ASSIST: Assessing the social and economic impacts of past and future sustainable transport policy in Europe.

Further, the Science and Technology Options Assessment Panel of the European Parliament organised a workshop on the issue of "Financing and assessing large infrastructure scale projects" on 26<sup>th</sup> September 2013 in Brussels<sup>1</sup>. The workshop covered project issues in the energy, transport and ICT domains, highlighting that there are some similarities between the three types of infrastructure. In particular, large projects both in energy and transport sectors at European level may often aim to ensure or improve European connectivity (or accessibility). Such projects however, may face difficulties in attracting private or national funding as a large share of their benefits are realised in European countries other than the country of implementation which bears the cost.

<sup>1</sup> For downloading the presentations see: <http://www.europarl.europa.eu/stoa/cms/home/events/workshops/stoa1>. For watching the video stream of the workshop see: <http://www.europarl.europa.eu/ep-live/en/other-events/video?event=20130926-0900-SPECIAL-STOA-WKSHOP>.

## 4.1. NETLIPSE

NETLIPSE constitutes a knowledge network on the management and organisation of large infrastructure projects in Europe. The NETLIPSE network was founded in 2006 and is today in its fourth study phase which started in 2013. During the first two phases NETLIPSE was co-funded by European funds (6FP and TEN-T funds).

NETLIPSE began with the analysis of the management and organisation of 15 case studies, two of which are included in the cases of our first study (i.e. Betuwe line, West Coast Main line). The results were issued in a book without publishing the details of the case studies (Hertogh et al. 2008). The detailed case studies remain the property of the owner of the project under analysis and are thus essentially confidential. On request we could only obtain the case study of the West Coast Main Line, which demonstrated the case for NETLIPSE.

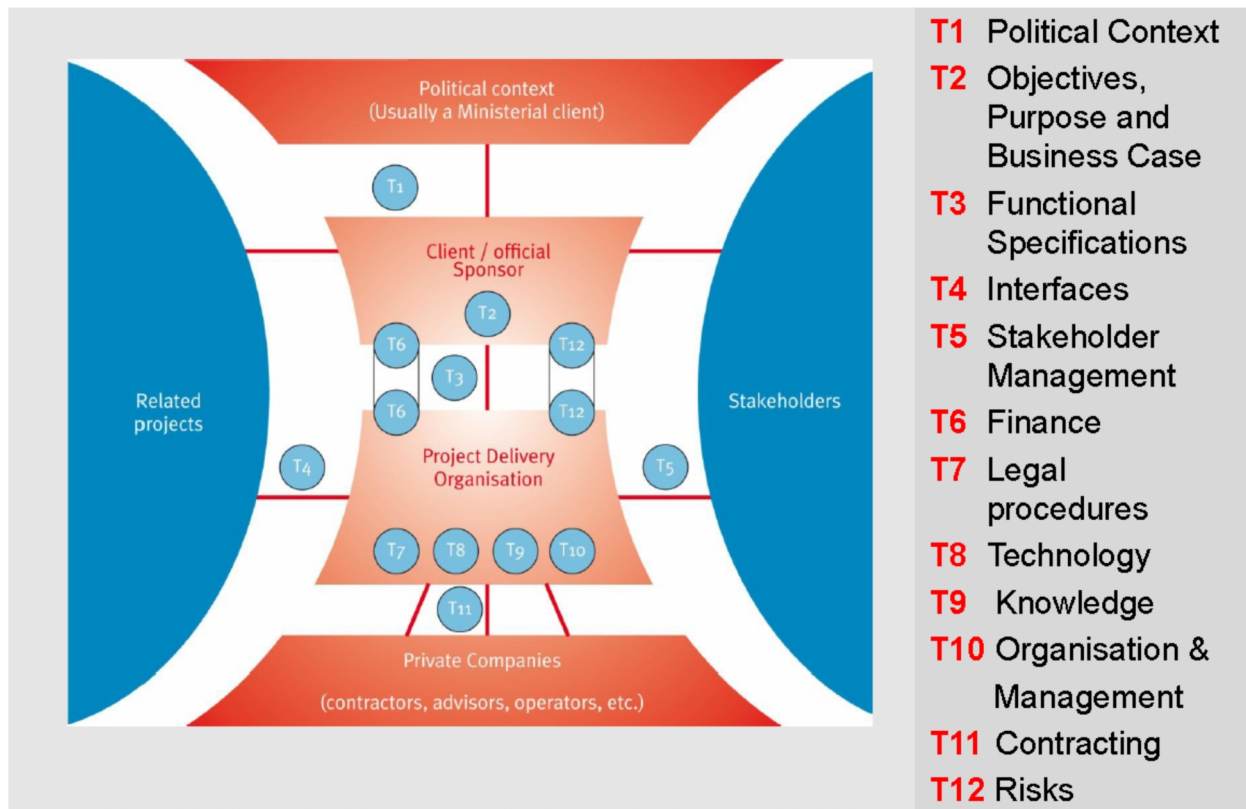
The objective of NETLIPSE is to provide project promoters as well as funding agents (including the EU) with an assessment of the maturity and deliverability of a (proposed) project. The assessment can be undertaken at different stages of project development i.e. at the project start, during planning, and also when construction has started. The aim is to monitor progress and to continue improving the implementation process to increase the probability that the project is ultimately successful, i.e. that delays and/or cost overruns are avoided.

In other words, NETLIPSE does not deal with some relevant questions raised by our first study, e.g. on how to get the transport forecast right and on providing a proper cost-benefit assessment or socio-economic assessment. In fact, these terms or CBA - apart from mentioning "cost benefit analysis" twice in the background explanations and the peer review comments to NETLIPSE - are not referred to in the NETLIPSE book (Hertogh et al. 2008). NETLIPSE assumes that a project is decided because it will bring about socio-economic benefits. The purpose of the NETLIPSE analysis is to ensure that the process of planning and implementation delivers a project according to plans in which the business case and the project implementation cost fit the agreed and available funding sources and the revenues generated by the project operation. Therefore, for instance "environmental impact assessment" and "risk assessment" are often referred to by NETLIPSE as the former may cause delays and cost increases of decided projects, while the latter may help to handle such delays and cost changes.

As assessing the maturity for planning and implementation is the core objective of NETLIPSE the development of an "infrastructure deployment maturity tool" was the logical consequence. This was later referred to as an "Infra Maturity Tool" (IFM) and has today been renamed "Infrastructure Project Assessment Tool" (IPAT). The IPAT is designed to assess the quality management and process of the whole project, including the implementation of the outputs, which has to be understood more broadly than just the physical construction. The IPAT should highlight the weaknesses and strengths of project management and the realism of project planning, particularly focussing on the next project phase. The absolutely crucial message of NETLIPSE reads: *"If a project is not ready or not ready to move to the next stage, get it right before spending money!"* (Baker 2013). With our previous study we strongly confirm and support this conclusion. We indicated this in our process approach by highlighting several points in the procurement process when a project needs a fundamental decision before entering the next stage of planning. Such decisions may always include a revision of the project, making a new decision at the same stage, or even cancelling components or the whole project.

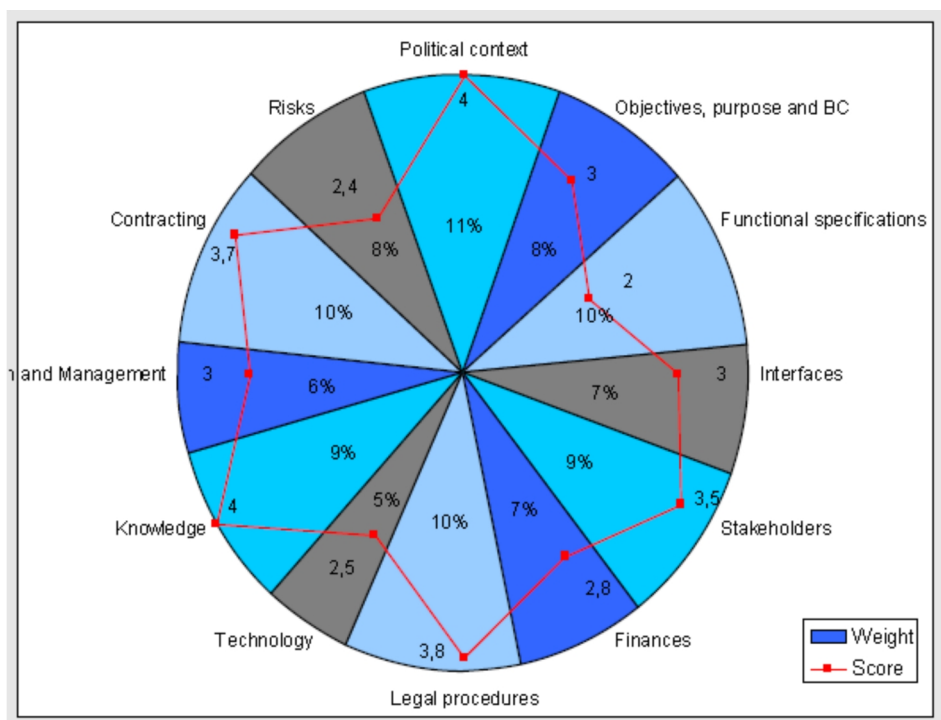
An overview of the IPAT tool developed by NETLIPSE is provided by Figure 2. The project analysed by IPAT is framed by the political context (e.g. a ministerial client) and includes the official sponsor(s), the project delivery organisation (PDO) and private companies which “benefit” from the project (e.g. generating revenues either during planning and implementation or during operation). Other projects and stakeholders interact with the analysed project. The twelve themes of the IPAT analysis are listed on the right. The bullets in the figure indicate the way they affect the analysed project.

**Figure 2: NETLIPSE IPAT model and themes**



Source: Baker 2013.

The process of carrying out an IPAT analysis is prescribed in detail, for example by defining the team’s qualifications and compositions, through the offering of qualification courses for IPAT assessors before they carry out an assessment. The assessors’ courses and the IPAT analyses are designed such that they can be carried out within a moderate time budget. The analysis builds on a four point scoring system that can be summarised for the twelve themes by a spider diagram as shown in Figure 3.

**Figure 3: IPAT results overview: spider diagram**

Source: Baker 2013.

Two final comments on NETLIPSE should complete this summary. The first concerns the use of conventional transport network modelling tools, where NETLIPSE states that “*One of the key findings of this NETLIPSE research [] is that conventional modelling tools are unsuitable for use where new infrastructure links are created by a project or where a step-change improvement in connectivity is obtained*” (Hertogh et al. 2008, p. 37). In our study we proposed that tools other than conventional models should be applied in addition to CBA (e.g. System Dynamics Models, SCGEs, Regional Economics Models) to capture the potential socio-economic benefits that could not be measured by transport network models in the described cases.

Secondly, the reports of the IPAT pilot analyses of NETLIPSE remain confidential and are only given to the project owner. We would suggest publishing the main outcomes and recommendations and comparing them with other studies which might have come to different results.

## 4.2. Rethink!PSM study

The Rethink!PSM study should also be mentioned here as it is somehow linked with NETLIPSE and deals with one of the most important issues of managing large projects: the involvement of stakeholders. The study suggests taking a proactive role in stakeholder management to run a smoother project planning and implementation process. Stakeholders are defined as *people and groups affected by the project or in a position to influence it regardless of whether they have an official role in the project or not* (Eskerod/Hueman 2013).

### **4.3. ASSIST study**

The purpose of the ASSIST study was to assess in particular the indirect effects including the wider economic effects of sustainable transport policies. The analysed transport policies also included infrastructure policies. The wider economic effects were analysed qualitatively using a fact sheet template describing the impact chains and the stakeholders or person groups affected. A subset of the policy measures were also analysed quantitatively. In this case wider economic effects were measured by the so-called ASTRA-EC model (Krail/Schade 2014). The ASSIST project and the ASTRA model thus would be one source for analysing wider economic effects of infrastructures.



## 5. CASE STUDIES OF LARGE TEN-T PROJECTS

### KEY FINDINGS

- **Cost increases during the course of the project were identified for several projects.** However, **reasons differ** for these and include extensions required to mitigate environmental impacts, consideration of inflation, adding further sections to the project or altering the specifications and objectives of the project mainly in the planning phase.
- **Methodologies of Cost-Benefit Analysis (CBA) vary widely** and so do the input parameters. **A standardised methodology, or at least standardised parameters, would be desirable** for projects submitted for TEN-T co-financing. Minimum viability criteria could then be introduced for selecting projects for co-funding depending on the mode and on the country's economic level.
- **Environmental Impact Assessment (EIA) is required and carried out for all projects in Member States.** However, depending on the country and time of the submission, the formal EIA requirements differ; they have evolved over time. Early EIAs of the 1990s would often not comply with today's EIA requirements (the EU EIA Directive was revised several times). In some cases the EIA for parts of a project can be avoided by applying specific laws to speed-up infrastructure planning.
- **Strategic Environmental Assessment (SEA)** for plans and programmes is obligatory but not always applied for large projects. In some cases it is only submitted for a later planning phase.
- **Climate Impact Assessment (CIA) has not been legally required;** all documents reviewed date from before the new TEN-T and CEF guidelines introduced the CIA. In the case studies assessed, GHG or CO<sub>2</sub> emissions from transport activities have usually been part of the environmental assessment, or the GHG savings are included in the benefits of the CBA. Further climate impacts stemming from the provision of infrastructure, vehicles or energy generation have not usually been considered, but frontrunners take them into account.
- **Transparency has improved over the past two decades.** For large-scale projects developed more recently, detailed studies are often, although not always, made publicly available; past projects often classified them as confidential. **Public availability of underpinning studies could still be improved.**
- Large cost overruns or an increase in estimated investment costs occurred in selected cases. **Parliamentary debate helped shed light on the causes of the cost overruns** and the flawed project development process. Cost overruns can result from flawed planning, but may only show up in the construction phase. Adverse impacts of cost overruns could be mitigated by risk management. **Differentiation of cost increases during the planning and construction phases is helpful in analysing the causes of cost overruns.**
- **Information about TEN-T projects is fragmented** across different DGs of the European Commission, national ministries, project promoters, consultants, etc. With the development of the INEA it should be more readily available, but it leads to an unnecessary lack of transparency jeopardising the public acceptance of projects.



This section first explains how the data on the case studies was collected and, second, presents a summary of each case study. The detailed results are reported in the 12 case study annexes. This summary section is followed by four sections explaining specific findings regarding the difference between increases of costs during the planning and implementation phases, the role and importance of public participation, the option to apply phased approaches to implement mega-projects and the need to consider and concepts of wider economic benefits and European added value for mega-projects.

## **5.1. Methodology of obtaining official documents for case studies**

The case studies were built on available documentation of the selected transport projects. As the transparency of TEN-T co-funded projects was an issue, the primary source should have been publicly accessible documents, i.e. documents that could be obtained via desk research on the internet or via libraries (citizens' perspective). Unlike the EVA-TREN (2008a) project, on-site visits of archives were not possible due to the short project duration.

Documentation in the public domain, at least for a number of projects, was expected to be limited. Therefore desk research on documents with restricted access for the public was also planned, for example through databases maintained by the INEA (e.g. TENtec Information System, EIB analyses, other funding agents analyses). Furthermore, interviews/contacts with experts at the European Commission, European project co-ordinators, project financiers and project promoters were anticipated. These were largely performed via telephone and/or email, but a few face-to-face interviews were conducted, particularly with experts at the European Commission and with project stakeholders. Further, the expertise of the contractors who had previously participated in the assessment and selection process of TEN-T projects was an important source of information, as was contact with the European Parliament.

We had established contacts for seven out of the 12 case studies and collected material during the first study (Schade et al. 2013). We continued building on these contacts, but further experts/stakeholders were contacted and new documents collected particularly for Rail Baltic(a), SE40 and the Seine-Scheldt waterway. In general, our earlier finding was confirmed; pure desk research, together with the access provided by INEA to the TENtec Information System, generated only a limited number of hits. This was particularly evident in the more detailed *ex-ante* cost-benefit / economic studies, transport impact studies, financial studies, and environmental studies as well as detailed *ex-post* studies. However, INEA ensured that further documents, particularly those related to the delegated acts on EU co-funding decision, were provided to our Consortium. A significant number of people were contacted for the five new case studies at the following organisations: DG MOVE (>5), INEA (>5), Members of the European Parliament (3), European TEN-T co-ordinators (3), National Ministries (>10), project promoters and project operators (>10) and other academic experts (>10).

The generic observations of the previous study also apply to the revised and the new case studies. However, more recent projects, particularly when they are still in the planning phase, seem to be naturally more transparent and provide more detailed studies online (e.g. Rail Baltic, Lyon-Turin) or on request (e.g. Fehmarn Belt Fixed Link). For earlier projects their development and planning is either described in scientific literature or through secondary sources of data such as the public debate in media and parliament (e.g.

Betuwe Line). The original documentation was only available in printed form and could not always be obtained.

In some cases, studies could only be provided in national language(s), which is an additional complication. According to some experts this is increasingly the case, affecting assessments at the European level and the wider involvement of the European public, if documentation should not be made available in one of the more common languages. In several cases we are aware that documentation should exist, but it has remained confidential and thus could not be used for this study.

## 5.2. Summary of individual case studies

Table 3 provides an overview of the twelve case studies. Four case studies are in the planning phase (one being in a pre-planning phase), three allow for an *ex-post* analysis, three are under construction (one seems to be on hold) and for another two the exploratory works have been carried out both to support detailed planning and as part of initial construction works. The costs of the projects range from about EUR 131 million to EUR 9.7 billion (considering the full Lyon-Turin link the highest cost would amount to EUR 26 billion). Available benefit-cost ratios (BCR) range between 1.5 and 6.5, while economic internal rates of return range between 4.7% and 9.4%. It should be pointed out that the figures have not been derived by harmonised approaches so that comparisons need to be interpreted with care. Further estimates of benefits and costs involve uncertainties, related both to the transport demand forecast and the investment cost, particularly for mega-projects.

**Table 3: Overview of the costs and assessment results of the case studies**

No	Selected TEN-T projects	Status	Cost EUR million	BCR / NPV /EIRR	EIA	CIA
1	Brenner Base Tunnel (AT/IT)	Planning; exploratory tunnelling	8,585 including risks	1.9 BCR (for SDR of 2.5)	Complete, updated (2008)	Missing
2	Betuwe Line (NL/DE)	Ex-post	4,705	Payback per. 15-20 yr.	Simplified	Missing
3	Rail Baltic(a) (PL/LT/LV/EE)	Planning	3,540 AECOM study	1.75 BCR 9.3% EIRR 0.05% FIRR	Aggregate environm. assessment	Included in environmental assessment
4	Iron Rhine (BE/NL/DE)	Preliminary planning	n.a.	n.a.	n.a.	n.a.
5	Rail Project Stuttgart-Ulm (DE)	Construction started	9,400 – 9,700	Payback per. 50 years 1.5 BCR for HSR parts	Yes, for the single elements	CO <sub>2</sub> emissions of traffic
6	Fehmarn Belt Fixed Link (DK/DE)	Planning	7,228	2.6 BCR	Completed	Missing

No	Selected TEN-T projects	Status	Cost EUR million	BCR / NPV /EIRR	EIA	CIA
7	Tunnels on SE40 Expressway Sevilla-Huelva (ES)	Construction/unclear ( <i>ex-post</i> )	239 (525) (24 by TEN-T EERP)	6.04 to 6.54 BCR	Yes, as of year 2000	Missing
8	A11 motorway Berlin-Poland (DE/PL)	Construction ( <i>ex-post</i> )	131 (10 by TEN-T)	Missing	Complete for plan approval	Missing
9	Lyon-Turin base tunnel (FR/IT)	Planning, works at exploratory tunnels	8,600 (26,000 for the 257 km full link)	NPV EUR 12 to 14 billion EIRR 4.72% to 5.09%	Unclear, simplified requirements in Italy	CO <sub>2</sub> emissions of construction and traffic
10	Gotthard base tunnel (CH)	Construction	~8,000	NEAT NPVe negative	n.r.	
11	Lötschberg base tunnel (CH)	Ex-post	~4,200	NEAT NPVe negative	n.r.	
12	Seine- Scheldt waterway (FR/BE)	Planning	5,900 status 2006	5.3% EIRR (France)	Completed 2005 Flanders, 2006 France	Missing

BCR = Benefit-cost ratio, NPV = net-present value, EIRR = Economic Internal Rate of Return, NPVe = NPV using only economic elements, SDR= Social Rate of Discount, FIRR = financial internal rate of return  
**Source:** own compilation.

### 5.2.1. Brenner Base Tunnel

#### Timeline

The idea of the Brenner Base Tunnel (BBT) was revived in 1971 when the International Union of Railways (UIC) commissioned a study for a new railway line with a base tunnel between Innsbruck in Austria and Fortezza in Italy. By 1989 three feasibility studies had been drawn up which formed the basis for further planning of the Brenner Base Tunnel. In 2000 these feasibility studies were followed by the first traffic study by Prognos and then updated in 2005, 2007 and 2012 by ProgTrans. The first CBA conducted in 2004 by Ernst & Young was revised in 2007 and exploratory tunnelling works started in 2011. Progress will be slower than originally anticipated because of financing constraints resulting from budgetary limitations in both Austria and Italy. The completion of works is now envisaged for 2026.

#### CBA and financial analysis

The revised CBA in 2007 resulted in an economic internal rate of return (EIRR) of 4.73%, with a total economic investment cost of EUR 6 billion. In a sensitivity test assuming 25% higher construction costs the EIRR drops to 3.91%.

#### EIA-SEA-Climate Assessment

In the framework of the BBT project, various EIAs were conducted. These studies include the evaluation of environmental criteria such as noise, vibration, air, public health, geology, surface water and ground water, landscape, ecosystems, vegetation, agriculture and fauna.

### **Transparency of assessment – public availability**

The 2007 CBA compiled by Ernst & Young was not available to the public, but was available on request by BBT SE. The EIA and the traffic studies prior to 2012 are available on the World Wide Web.

### **Funding**

The basic financing structure of this large-scale project is quite simple: the European Commission formally guaranteed a very high level of support for the project, being TEN-T priority project n°1, with a grant of up to 20% of works. Austria and Italy will share the remaining costs equally, although they hope that the EU will shoulder one third of the entire costs for the construction of the tunnel. The TENtec information system as of 5<sup>th</sup> December 2013 reported a TEN-T co-funding of EUR 320 million on the Austrian side and EUR 820 million on the Italian side. Other sources, possibly funded by the States via BBT, amount to about EUR 3 billion for the Austrian side and EUR 2.2 billion for the Italian side. For the next funding period a budget of EUR 1.5 billion will be allocated to the feeding line to the BBT in Germany as reported by TENtec.

### **Project specific issues**

The basic idea of the 1987-1989 feasibility study for the Brenner Base Tunnel was a mixed transport system with a capacity of 400 trains per day with 80% freight trains. Examples of such base tunnels are the Swiss Lötschberg and the new Gotthard Tunnel currently under construction. The BBT is being built for mixed traffic.

### **Development since end 2012**

The Brenner Base Tunnel project is now the centrepiece of the new Scandinavian-Mediterranean corridor in the TEN-T core network. As a cross-border link it could obtain up to a maximum of 40% TEN-T co-funding due the new CEF regulation. Construction works have been going on, so far mainly for exploration and access tunnels. The adaptation of the access lines in Germany and Italy are now of major concern.

### **Conclusions to be drawn**

- The Brenner Base Tunnel project is an important and urgently needed high-capacity trans-Alpine rail link catering for transport needs throughout the 21<sup>st</sup> century.
- The Brenner project fully meets EU objectives, confirmed by the status of priority project and inclusion in the TEN-T core network. Funding remains the main bottleneck in both Italy and Austria in an economically difficult environment. BBT will be financed by Austria's and Italy's national budgets plus the TEN-T co-funding. Under the Connecting Europe Facility (CEF), an increase of the EU contribution can be expected.
- Progress has been slow although the project was already on the list of the 14 "Essen" projects and heavyweight political co-ordinators Karel Van Miert and Pat Cox have accompanied the process for more than a decade. Institutional and financing problems are delaying the planning and exploration process.
- The main activities at present are the construction of exploratory tunnels in a geologically difficult environment.
- Traffic analysis and forecasts have been updated as needed; most recently in 2012. The only CBA available is that of 2007 and a financial analysis is not publicly available. Therefore, it is not possible to judge the impact of the economic crisis of recent years on the economic and financial viability of the project.

- The project lacks transparency. The implementing agency, Brenner Base Tunnel SE, did not respond to our request to clarify facts and exchange views. Hence, the only sources of information were the recent reports by the EU co-ordinator and a meeting with the Commissions task officer.

### **5.2.2. Betuwe Line**

#### **Timeline**

The initial impulse to build the Betuwe line between Rotterdam harbour and the German border seemed to stem from a master plan for the future of the Port of Rotterdam in 1985. Instead of closing down the existing parts of the line it was suggested that it should be regenerated as a dedicated rail freight line. In 1990 the Betuwe Line was recognised as part of a strategic Dutch transport network, however, in 1994 the project was put on hold. Supported by the report of the so-called Hermans Commission the project was revived in 1995, when the government took the final decision to build the dedicated rail freight line. Renewal of the existing section started in 1997, and construction of the new section commenced in 1998. The Betuwe Line opened in 2007, although some construction works on the cross-border section and in the area of the Port of Rotterdam are still ongoing.

#### **CBA and financial analysis**

The economic analysis carried out in 1992 and 1993 concluded that the payback period would be 15 to 20 years. Some approximate alternatives have also been considered. None of the projects has been subjected to rigorous economic analysis. . The Netherlands Court of Auditors in 2000 concluded that “a sound and comprehensive cost/benefit analysis of the Betuwe Route is still missing”. The economic analysis was fundamentally flawed, as it was based on an inappropriate transport demand forecast, which did not reflect the impact the Betuwe Line might have. An *ex-post* analysis of the socio-economic impacts still seems to be missing.

#### **EIA-SEA-Climate Assessment**

In 2000 The Netherlands Court of Auditors concluded that policy information on environmental benefits of the Betuwe Line was missing. Environmental impacts only considered air pollution, while noise, safety and land use issues were omitted. The final design chosen for the Betuwe Line indicates that environmental and health concerns were taken into account by circumventing the 15 villages along the line, and building 95 km of track parallel to the already existing motorway A15 Safety measures were considered but climate impacts were not assessed. An *ex-post* EIA was completed in 2013, broadly revealing that the Betuwe line complies with environmental legislation, with the exception of noise and vibration issues at 27 houses along the line. Noise and vibration mitigation measures will be planned and discussed with the affected inhabitants.

#### **Transparency of assessment – public availability**

There has been intense public debate in The Netherlands over the Betuwe Line. We assume that this has been the case since planning started in 1990, but this cannot be confirmed. There have been many forums on the internet and in newspapers discussing the Betuwe Line that are now off-line. Regular progress reports have been published, and both the Dutch parliament and the Court of Auditors have held several debates or audits on the issue of the Betuwe Line. Reports on these government debates or at least summaries thereof can today still be obtained on the internet.

## Funding

In 1990 it was originally envisaged that the whole project would be built with private money. The opposite happened, however, when the Betuwe Line was actually built. About 95% of funding came from the Dutch government, while 4% was co-funded by the TEN-T budget as the Betuwe Line constitutes priority project 5 of the TEN-T networks.

## Project-specific issues

The Betuwe Line constitutes of a dedicated double track electrified rail freight line. It connects the Port of Rotterdam, one of Europe's biggest freight hubs with its Hinterland. The project has the potential to provide an excellent case study on the financial and economic output of a dedicated rail freight line which could be important for future decisions on similar dedicated freight tracks in Europe.

## Development since end 2012

The Betuwe line constitutes one of the few cases for which selected *ex-post* analyses have been undertaken. This concerns in particular an *ex-post* EIA completed in mid 2013 that concluded that the environmental impacts generally occurred as expected and remained within the required environmental standards. The one exception was that for 27 houses noise/vibration impacts were above limits and needed further mitigation measures. Demand on the line is continuously growing, along with the track tariffs, such that we assume the line today covers its operation costs.

A substantial step forward was made on the German side concerning the 73 km long connection from Emmerich to Oberhausen, which currently causes a bottleneck in several European transport corridors. On 23<sup>rd</sup> July 2013 a funding scheme was agreed to provide EUR 1.5 billion to upgrade this line to three (or even four) tracks. However, it was only in November 2013 that all 12 planning sections entered into the German plan approval process. For six out of the 12 sections the process of public participation has been started. Thus construction works should start in 2015 at the earliest and completion is expected for 2022, i.e. about 15 years after the Betuwe line opened.

## Conclusions to be drawn

The Betuwe Line presents a prominent example of a political decision on a transport project, triggered by a stakeholder (i.e. the Port of Rotterdam). Of course, the project fitted in with strategic plans promoting the concept of "Mainports" in the Netherlands. However it is too early to decide if the project has actually been beneficial in socio-economic and financial terms as a published *ex-post* socio-economic analysis is still missing. From the European perspective the project fits well into the strategic transport policy objectives as it promotes rail freight, making it attractive for long-distance transport on major demand corridors connecting European freight/economic hubs. Given its potential success, it is recommended that an *ex-post* socio-economic analysis is carried out, especially considering that European funding is still being provided to complete the line.

### 5.2.3. Rail Baltic(a)

This case study first requires two definitions:

- **Rail Baltica:** refers to the existing broad gauge network (1 520 mm track width) and its renewal and upgrade.

- **Rail Baltic:** refers to the EU standard gauge of 1 435 mm that should be used to construct a fast north-south railway through the Baltic States, connecting them with Helsinki and Warsaw.

In the public debate the terminology is often not used in a clear manner causing confusion. We use *Rail Baltic(a)* when we speak about both projects.

### **Timeline**

The Rail Baltic(a) project includes the railway corridor between Warsaw and Tallinn with a maritime extension to Helsinki (TEN-T priority project PP27). Construction work can be started on the Polish side (existing standard gauge; upgrade to 160 km/h) while the project is, in our opinion, still premature for the northern part (existing broad gauge), in particular north of Kaunas. Two major studies have been developed which are entitled "feasibility studies" (COWI et al., 2007; AECOM, 2010). The two studies start from substantially different design parameters, routing of potential variants and station locations. For example, COWI et al. assume a design speed of 160/120 km/h and standard gauge for one variant only, which appears financially doubtful. AECOM assumes a design speed for passenger trains of 240 km/h and a double track standard gauge. As the results of transport modelling and the subsequent recommendations are completely different, careful analysis is needed before defining the final design parameters for a sound feasibility assessment.

For some sections detailed planning has been started, co-funded by EU TEN-T Programme (up to 50%) and reconstruction works on cross-border sections (up to 30%). Only the sections between the Polish-Lithuanian border and Kaunas are compatible with the alignment favoured in the AECOM study ("red option") and selected for support by the Prime Ministers of the Baltic States in November 2011.

### **CBA and financial analysis**

CBA and financial analysis is covered in both studies including the "mandatory" and environmental/safety CBA impacts. COWI calculated Benefit-cost ratios (BCR) of 1.9-2.8 with the use of high value-of-time (VoT) and 1.1-1.7 with a more realistic national VoT. Investment costs are between EUR 1 and 2.37 billion (price base 2006). AECOM assessed a BCR of 1.8 for the "best feasible option" requiring estimated investment costs of EUR 3.54 billion. The financial analysis shows that for both studies the project is not viable without EU co-finance. Assuming a co-finance of 60%, COWI calculates a financial IRR between 2.6% and 4.7% for the different variants. AECOM calculates a financial IRR of 9.3% assuming 56.3% co-financing for total investment costs and 85% for priority axis.

### **EIA-SEA-Climate Assessment**

Both studies include the evaluation of environmental criteria (air pollution) and a climate footprint. They do not include a formal EIA or SEA.

### **Transparency of assessment – public availability**

Both studies are publicly available and background information is given on request from the European Commission or the Baltic States' governments. The COWI study applied methods which have been used in other EU studies (in particular TEN-STAC, NEA et al. 2004) and are well documented. However it is not easy to verify the set of assumptions for the AECOM study and to understand the model algorithms applied for the modal split and assignment of traffic. Not all results seem plausible, particularly in regions with low population density (e.g. Estonia). Also the investment budget of EUR 3.54 billion for 728 km double track standard gauge railways with a design speed of 240 km/h seems to be rather optimistic.

## **Funding**

EU co-funding rates are assumed to be 60% (COWI) and 56.3%/85% (AECOM). Funding is expected from various EU sources (TEN-T/CEF, ERDF, CF).

## **Project-specific issues**

Rail infrastructure is currently characterised by broad gauge tracks in the Baltic States and poor conditions, particularly on the north-south axis. Changing to standard gauge implies a new line of 728 km (favoured "red line option"). Passenger demand in the northern sections is low, while freight demand is strong in an East-West direction, linking Baltic Sea ports with Belarus and Russia, but modest on the North-South corridor. Financially the project is not viable but it may provide high added value for the EU (not quantified in the studies).

## **Development since end 2012**

In this update study we focus on Rail Baltic i.e. the north-south oriented network connecting the Baltic States with Finland and Poland.

It is generally understood that the Rail Baltica project is almost complete, since it has achieved the connection between the different Baltic States to Poland using both 1 520 mm and 1 435 mm gauge railways. It is claimed that it will be finished in 2015 as there are some security systems that currently delay its operation. According to different sources (see for example RBGS, 2013), the new Rail Baltic project is starting taking shape while implementing the Rail Baltica project. A European electrified standard gauge of 1 435 mm is being conceived so it can be used with higher velocities and mixed with freight traffic. A maximum speed of 180 km/h is proposed which is an upgrade from typical speeds in the area. Rail Baltic is seen as more ambitious and more attractive than the former Rail Baltica. It would start via ferry from Finland to Tallin (Estonia), continues on the European 1 435 mm gauge through Riga (Latvia), Kaunas (Lithuania), to Poland (Bialystok, Warsaw) and on to Berlin. The Rail Baltic implementation has not started yet but the goal is to have it finished by 2026.

It is important to highlight that the Russian railway standard gauge is 1 520 mm wide, whereas the European is 1 435 mm. This change of gauge takes place at the Lithuanian-Polish border in a small village called Sestokai. The Rail Baltic project would mean that there are cases where the two gauge systems exist in parallel for regional and international purposes. It is assumed to be one of the most important transnational transport projects. It costs approximately EUR 3.6 billion (RBGS, 2013) and the problem lies in the different options required to achieve interoperability between the different rail gauge systems. The RBGS (2013, p.23) describes the different alternatives, along with the opportunities, drawbacks, and costs both for passenger and freight transport. One important fact which questions the benefits for freight transport is the strong freight flow between east and west (between Russia, Ukraine, Belarus and the Baltic countries). The north-south flows which could be accommodated by the Rail Baltic are much weaker (RBGS, 2013 p.28). Some experts claim that the actual N-S demand is already satisfied by road with the Via Baltica. According to a recent report (Hilmola, 2012 p.13) there are in fact weight restrictions on many roads in the Baltic States and Poland. Nevertheless, the report mentions that transport units are rarely completely filled.

In summer 2013 a political agreement was achieved between the countries involved in the project and the European Commission to use a Joint Venture (JV) to build, manage and operate the whole infrastructure in order to get access to cohesion funds and other economic resources. This would be especially beneficial in countries like Latvia, Estonia and Lithuania since they cannot undertake the project alone. In the following spring (2014) the



JV would need to submit a financial proposal to the European Union in order to access funds which could total 85% of investments. Moreover, with the new policy on priority projects, the EU plans to allot a total of EUR 10 billion in modernisation projects. The report "Rail Baltic Joint Venture Study" was published last year (TRINITI, 2013) and covers different issues such as law, taxes, and finance along with different European experiences. However, it refers to the study carried out by AECOM. Nevertheless, it highlights that there are many risks associated with a large and cross-border infrastructure, mainly related to: the differences in laws and governments between countries, rail specific and environmental planning risks, cost estimate risks, tender procurement risks, contractual risks, risks related to permissions or licenses to be obtained, land acquisition, financing risks, cultural and communication problems, construction methods, timetable risks, risks related to nature and resources, and the chances of changing long term goals of the project framework by some governments (TRINITI, 2013 p.160).

According to Malla Paajanen Consulting (online) there have been different activities in order to push forward the Rail Baltic project. For example the project was presented at a kick-off conference for the nine Core Network Corridors in Brussels on 8<sup>th</sup> – 9<sup>th</sup> January 2014 promoted by the European Commission. A new Consortium (PROXIMARE) was contracted to carry out a study on the development of the Rail Baltic project, which would include environmental and economic feasibility studies, as by mid 2014 the only study available is still the one carried out by AECOM (2011). However, as Mr. Pavel Telička was elected MEP he resigned from his position as TEN-T coordinator of the North-Sea Baltic Corridor and the appointment of his successor is pending.

### **The importance of the Russian bond**

The Rail Baltic project highlights that nowadays transit among the Baltic countries is based on road transport, both for passengers (through private cars or buses) and freight. However, almost 95% of Russian freight transiting the Baltics is transported by rail to the Baltic seaports. This indicates that logistics play a major role in this infrastructure and therefore commitments with other countries such as Russia, Byelorussia and Ukraine should be reinforced. Moreover, most of the tourists in this region come from Russia.

Railway transport in Russia carries about 30-35% of the total volume of commercial freight and 40-45% of commercial revenues (Karamysheva *et al.*, 2013). Rail transport volumes in Russia increased from 1.0 to 1.4 billion tons between 1995 and 2012. This study identifies raw materials as being the most relevant goods to be transported by rail. Since joining the World Trade Organization (WTO) in 2012, Russia has had to follow certain trading rules, and is obliged to unify railway tariffs to improve her system. The system is currently being deregulated and, with the link to the EU, it provides good competition for road transport.

The Rail Baltica Growth Corridor - Russia (RBGC Russia) was founded to act on these issues. It seeks to promote the development of transport and logistics networks between North-West Russia (Leningrad Oblast and St. Petersburg) and the EU-states in the Eastern Baltic Sea region. It is a sister project to the RBGC and intends to foster the political dialogue regarding Rail Baltic. It is a project financed by the Delegation of the European Union to Russia. The report by Karamysheva *et al.* (2013) states that the development of rail transit corridors between the Baltic States and Russia could be competitive and improve prices, frequencies and travel times. However, Russia needs to solve interoperability problems and capacity problems at border-crossing points to make this project attractive. A further study that has collected information in the public transport sector (Laisi *et al.*, 2013), also states that both road and rail networks need more investment to attain minimum standards. Moreover, the study points out that the Baltic States (Estonia, Latvia

and Lithuania) do not individually generate sufficient cargo flows for a mega project such as Rail Baltic. The freight to their ports comes from Russia, but further prioritising either passenger or cargo could also be an issue. The authors of this report indicate that the Sulphur Directive [Directive 1999/32/EC amended by 2012/33/EU] may force all stakeholders to come together to find new transport solutions. Even if the Rail Baltic project is appealing to the European actors, the Russian actors regard it as unpromising and fear that the money already invested in ports is wasted.

**Figure 4: Embedding of Rail Baltic into international rail connections**



Source: (Laisi *et al.*, 2013).

### Concerns Arising

Interest varies among countries. For example, Poland's interest in the project is substantial although the border with Lithuania and the consequent bottleneck is an important issue for both countries. However, the RBGC report (RBGC, 2011) states that the interest of Latvia is diminishing. According to this study, public and private road transportation companies are threatened by the Rail Baltic project, and they need to know how they could benefit in order to cooperate with the project.

Following the TEN-T days in October 2013, a "Rail Baltic Express Conference" took place from Vilnius to Tallin in order to discuss the experiences and findings from the RBGC (The Wall Street Journal, online). The RBGC-Russia was also presented. In Tallin, Commissioner Siim Kallas signed an agreement assigning EUR 11.3 million to the cooperation project between the ports of Helsinki and Tallinn, known as the TWIN-PORT project. It aims to improve the smoothness of ferry operations in both ports and to improve the ferry capacity between Helsinki and Tallinn (Malla Paajanen, online).

Finally, the situation in Lithuania seems to be a barrier. In the official project definition (PP27) the railway line passes through Kaunas, whereas the national authorities expect the new Rail Baltic project to pass through their capital, Vilnius, as in the other countries. Since this is not in the current design it would increase the costs. Some countries claim that Lithuania should provide the link from Kaunas to Vilnius using their own resources, especially since, as a new member state, the country is eligible for Cohesion Funds. Moreover, the other partners complain about Lithuania's delayed opposition to the project since the design has been under discussion for several years.

In our understanding, the AECOM study (2011) refers to what today is called Rail Baltic. Therefore we apply the AECOM analysis to describe the Rail Baltic assessment.

### **Conclusions to Rail Baltica (minor revisions of previous study)**

Although many documents were available, the status of planning was not transparent. Two "feasibility studies" were launched which may better be characterised as "pre-feasibility studies": one relates to Rail Baltica (the broad gauge network extensions) and the other to Rail Baltic (the new European standard gauge North-South link). Four fiches covering planning documents and technical design for sections of the Rail Baltica have been received from TEN-T EA (now INEA). According to the documents available for the first study, Rail Baltic(a) investment in the Baltic States meant two different things: (1) Renewal and upgrade of existing broad gauge rail sections and (2) construction of a new standard gauge track, eventually with dual gauge sections. Summarising the conclusions of the previous study we would again highlight the need:

- To develop a strategic transport (master) plan to integrate the various rail investment plans including Rail Baltica and Rail Baltic in a complete multi-modal network context, i.e. including the improvement of alternative transport modes;
- To revise the very optimistic demand figures in a network context, using an integrated multi-modal transport forecasting model;
- To prepare a revised CBA, as well as an EIA (for each section), SEA and CIA, based on a strategic plan for the development of the transport sector and its infrastructure;
- To prepare a regional economic impact analysis to quantify the European added value;
- To decide on a favoured final alignment with appropriate design parameters for the Rail Baltic North-South axis on the one hand, and the development of the regional railway network on the other hand;
- To design the stations for the favoured option in a way that transfer of passengers between the broad gauge and standard gauge networks is easy and does not cause major delay; construct synchronised operation schedules with regional public transport lines (important because not all major cities can be linked directly to Rail Baltic);
- To develop a clear organisation for the multi-national project management, i.e. establish a project company – beginning with the existing Task Force – for final design, construction, finance and eventually the operation, after completion of the Rail Baltica and Rail Baltic project (DBFO or similar organisation);
- To develop a realistic financing scheme for the construction and operation phase including contributions from the operating company, EIB loans and state funding. The EU co-funding should be kept at a reasonable level below the maximum

ERDF/CF co-funding rates because the main purpose of the Rail Baltic(a) project is commercial.

- It seems evident that Russia plays an important role in this area; therefore more attention should be paid to the Rail Baltica project link with this country. If freight is transported primarily from east to west, the question is how to make a profitable line when it only runs one-way at full capacity. In this respect, the EU must focus on discussing the project with its Russian counterparts. The sooner this is done, the greater the bargaining power of the EU.

### **Conclusions to Rail Baltic (new from this study)**

In general terms the conclusions suggested in the previous version of this study are still valid; however, it would be worth giving a more detailed analysis of some issues:

- In our understanding, there are no recent, concrete studies into the feasibility of the Rail Baltic project. As suggested in the previous version of this study, an updated and improved version of the AECOM study is needed.
- The project needs to ensure that the Rail Baltic line provides a comfortable connection to major poles of employment, and main cities. Transport hubs, as interchange stations between different transport modes (for example, airports and bus stations) should be enforced within the Rail Baltic project. Therefore, comprehensible transport plans for interchange stations are needed and coordination between transport authorities is required. Furthermore, interchange stations should be planned in order to have high local accessibility using different modes, especially by public transport.
- The planning process of the “Sectoral Plan AlpTRansit” of the New Railway Link through the Alps (NRLA), where Federal, Cantonal and local authorities discussed and integrated their spatial planning activities would provide a good example to this project. The result was a binding document for all levels that must be taken into account for future planning. This document is seen as one of the key success factors of the NRLA (Hertogh et al., 2008).
- New sidings for warehouses and industrial poles should be planned to reinforce the long term use of the Rail Baltic project for railway freight services. The numbers regarding exports/imports are worrisome (See Annex 1.3 on Rail Baltic). There are some scenarios that are negative for some of the countries involved. For example, trains may be full from east to west (from Russia to Germany or to the Baltic countries), whereas on their way back they may be empty, which would not be cost-effective. The project can also be seen as a bridge between Russia and central Europe, and in such a case the effort and investment of Baltic countries would not be fruitful. Therefore, clear and down-to-earth strategies to promote commercial trade between all the countries concerned are needed.
- A rail network that fully tackles interoperability problems, coordination and border crossing issues would definitely improve the performance of the project (for example, allowing a train driver to operate in the different states for the Rail Baltic line). In this case, it would be best for all the states involved in the project to define the common standards and guidelines of a Rail Baltic railway authority. This would be an outstanding result not achieved anywhere before in the European rail network. This should be also the task of the new North-sea-Baltic corridor, which in the Baltic States is composed of elements in standard gauge and in broad gauge. There are links to Klaipeda, Ventspils and Vilnius, so the gauge to be used for these needs to be debated specifically.

- As a positive point to highlight, there has been a huge effort to produce many recent research studies to improve the knowledge of the impact of the Rail Baltic project together with the vision of the different stakeholders. On the negative side the level of quantification is poor so that a thorough picture of the Rail Baltic project is not provided. The Joint Venture agreement is an important challenge and urges the support of more detailed quantitative studies to fund the organisation of such a task.

#### **5.2.4. Iron-Rhine**

The "Iron Rhine" is a historic railway line that runs from the Port of Antwerp in Belgium through The Netherlands to Rheydt in Germany to link up with the Rhine-Ruhr area and the main inland port of Duisburg. The Iron Rhine railway line was built between 1868 and 1879 and operated under a 99-year concession. Transit freight trains between the port of Antwerp and the Ruhr area ceased operating in 1991. Since then, the "Montzen route", about 50 km longer, via Hasselt, Montzen and Aachen has predominantly been used. The Port of Antwerp, with the support of the Belgian federal government, has clarified its interest to revive the Iron Rhine line for long-distance cross-border freight transport. The ruling of the Permanent Court of Arbitration of 24<sup>th</sup> May 2005<sup>2</sup> confirmed that the 1839 treaty still gives Belgium the right of transit through the Netherlands on the historic line (International Arbitral Tribunal 2005). The ruling also recognises Dutch concerns regarding the crossing of the line through the De Meinweg nature reserve that was classified as a National Park in 1994. A traffic forecast was completed in 2007, followed by a CBA in 2009 (both studies were carried out with EU co-financing).<sup>3</sup> No further studies have been carried out since 2009, pending the signature of a memorandum of understanding by the governments of Belgium and The Netherlands. Thus, the project is, for the time being, on hold and its future is uncertain.

#### **Conclusions to be drawn**

- The Iron Rhine project has not been included in the TEN-T core network.
- Notwithstanding the results of traffic forecasts in 2007 and a CBA in 2009 with rather negative results regarding the economic viability, the Iron-Rhine project has not been abandoned. The project, although on hold for the time being, is still in the conception phase, with several options being considered.
- The future of the project is uncertain.

#### **5.2.5. High-speed rail Stuttgart - Ulm**

##### **Timeline**

The project has been planned and procured since 1996. It consists of two major components:

- (1) The HSR link between Wendlingen and Ulm (federal competence)

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<sup>2</sup> International Arbitral Tribunal (2005): Award in the Arbitration regarding the Iron Rhine ("Ijzeren Rijn") Railway between the Kingdom of Belgium and the Kingdom of the Netherlands, decision of 24 May 2005, in: United Nations: Reports of International Arbitral Awards, Volume XXVII, New York 2005, pp.35-125.

<sup>3</sup> Three earlier studies are of interest: (1) Prognos (1991): The Iron Rhine Railway link between Antwerp and the Rhine-Ruhr area, Basel; (2) Tractebel Development n.v. / Technum n.v. / Prognos AG (1997): Study of the transport potential of the Iron Rhine, Final Report, January 1997; (3) ARCADIS (2001): Comparative cross-border study on the Iron Rhine, Draft Report, 14 May 2001.

- (2) The project Stuttgart 21, including the HSR Wendlingen-Stuttgart, regional links, 2 regional/urban railway stations and a new Central Station Stuttgart underground which replaces the existing dead-end station (federal/regional/urban competence).

Most sections of the project are legally approved. Construction work started in spring 2010 for Stuttgart 21 and was interrupted after heavy protest movements. An arbitration process was held in autumn 2010 and ended with a statement by the mediator which supported the continuation of the project subject to a number of requirements. These requirements are based on issues raised by opponent stakeholders. After a referendum in autumn 2011, which was positive (59% in favour) for a continuation of the project, construction work was continued. Construction work for the HSR link Wendlingen-Ulm started in 2012. According to the plans construction work should be finished in 2021.

### **CBA**

The components of the project address different public competences. For the HSR component a CBA has been performed (revised in 2010) according to the federal standard evaluation scheme for transport infrastructure investments. This analysis referred to the extended HSR link Stuttgart-Augsburg. The CBA resulted in a benefit-cost ratio of 1.5 (reduced to 1.2 in a sensitivity analysis). While this does not seem very high it has to be remembered that the line crosses a difficult topographical area such that half of the link has to be constructed underground (30 km of tunnels).

The urban components have been evaluated by a standardised multi-criteria analysis for public urban transportation projects. The institutes in charge (Intraplan and the University of Stuttgart) have reported that the results are positive. It was not possible to obtain the study of 2006.

The comprehensive railway project Stuttgart-Ulm has also been evaluated by a macroeconomic evaluation in a study of IWW et al., launched by the State Ministry of Interior Affairs, and delivered in 2009 (IWW et al. 2009). The study was based on regional production and potential function analysis and indicates that the GVA of the State of Baden-Württemberg will increase by EUR 440 – 530 million per year. The pay-back period for the public capital invested was estimated to be about 20 years for the cost figure of EUR 5.1 billion. This in turn was estimated in 2009 to be the base of the financial agreement, assuming a real interest rate of 3.5%. By the end of 2012 the cost estimate had increased to EUR 9.4 billion and the public capital will not pay back at a real interest rate of 3.5%. If the real interest rate is reduced to 2.5% the pay-back period will be around 55 years. In this analysis the project finance was treated as a PPP because Deutsche Bahn AG and Stuttgart Airport Company were treated as private investors. There was no information received on the benefits of these “private” partners.

### **EIA – SEA – Climate Impact Assessment**

An EIA has been performed in the context of the approval of individual sections of the project. A comprehensive SEA is planned for the comprehensive federal public transport investment plan 2015. An SEA is not planned for individual projects.

A climate impact assessment for the transport operations is included in the three evaluation approaches of the federal HSR project Stuttgart-Augsburg, the urban links of Stuttgart 21 and the macroeconomic evaluation of the comprehensive railway project Stuttgart-Ulm. It is estimated that the project will save 177,000 tons of CO<sub>2</sub> per year.

### **Transparency of assessment – public availability**

The CBA for the federal project Stuttgart-Augsburg and the macroeconomic assessment of the comprehensive railway project Stuttgart-Ulm including Stuttgart 21 are publicly available. The standardised evaluations of urban links of Stuttgart 21 are not available. The project plans for Stuttgart 21 have been displayed in the tower of the railway station since 1998. In a phase between 2006 and 2009 the project partners negotiated a financial agreement and gave little information to the public. The information covering construction or operation details and cost estimates was particularly unreliable and provoked protests of the project opponents. A referendum was announced but not realised by the Mayor of Stuttgart in 2006, which would have reinforced the distrust in official statements. Poor transparency and confidence in the publications of project promoters as well as missed attempts to integrate opposing stakeholders were the main reasons for the protest movements in 2010.

In general the allocation of competences to different public bodies and the treatment of the project by Deutsche Bahn AG as a private business case did not help transparency. However, this could be overcome by the project company for the comprehensive project which was established in 2013.

### **Funding**

The investment costs of the HSR project Wendlingen-Ulm are estimated to be EUR 2.9 billion which have to be financed in principle by the Federal government. The state of Baden-Württemberg is offering a co-finance such that the project can be started earlier. Deutsche Bahn AG is providing a small proportion while another small share is being contributed by the European Commission, because the project is part of the TEN-T corridors and internationally relevant (connections to Austria and to France). The total co-funding amounted to EUR 117.2 million by 2013 which is 19.3% of the eligible costs of EUR 604.9 million.

The project Stuttgart 21 is financed by a partnership: Federal government, state governments, city of Stuttgart, association of regions of Stuttgart, Stuttgart Airport Company and Deutsche Bahn AG. These partners signed a financial agreement in 2009. It is based on total costs in the order of EUR 3 billion plus a financial reserve of EUR 1.5 billion, i.e. EUR 4.5 billion in total. Deutsche Bahn presented a new cost estimate by the end of 2012, announcing a cost increase to a volume of EUR 6.5 billion, plus political costs of EUR 0.3 billion, reflecting the costs of project delay and of protest movements. As the state government and the city of Stuttgart have refused to increase their contributions, the financial situation is unclear. The EU co-finances a small part of the cost for HSR Stuttgart-Wendlingen. This amounted to EUR 135.1 million until 2013 which is 13.7% of the eligible costs of EUR 986.2 million.

### **Project-specific issues**

While the major project components are closely linked and the projects should be integrated, the different legal competencies for the major project components have prevented this for planning and procurement. Furthermore, the responsible planning company, Deutsche Bahn AG, began with different aims, then accepted political wishes for project extensions for a while, but caused progress to slow down thereafter because of the high costs. They finally agreed with the political and financial plans which were signed in 2009 but these strategic swings caused uncertainties, substantial delays and reinforced the opposition against the project.

In spring 2011 there were political changes in Baden-Württemberg – the Green Party began ruling together with the Social Democratic Party and a Green Lord Mayor was elected in Stuttgart. Since then there has been no dedicated political support for the project, because the Green Party was against the project from the beginning of the planning process. Furthermore, although the protest movements calmed down after the arbitration process, opponents have still been active since the end of 2010 and the “referendum” in autumn 2011. It is widely agreed that it was a major political mistake to not integrate the ideas of opponent stakeholders into the procurement process. Apart from the last phase of violent protest movements, the opponents have accompanied the process with various suggestions which were not taken seriously and their petition for a referendum was refused by the city government in 2006. This situation became heated and the project disputes became very emotional.

Planning failures have been made by Deutsche Bahn AG. First of all they had not prepared detailed train operation plans to prove that the expectations concerning the increased rail capacity of the Stuttgart 21 project were realistic. A “stress test” for the capacity increase was only performed under pressure from the opponents after the arbitration process. Other planning issues were not prepared sufficiently well, allowing the opponents to find good arguments for rejecting the plans by demonstrating weaknesses in detail. Last but not least the cost estimates proved highly unreliable; dramatic cost increases had been predicted by the opponents and proved partly true after some years (although not to the extent of the worst case scenarios described by the opponents). For details see appendix 1.5.

### **Conclusions to be drawn**

- The railway project Stuttgart-Ulm can be regarded as a prototype of planning failures with large transportation projects in Germany. The procurement process took an unnecessarily long time because of the changing commitment of the main partners (Deutsche Bahn AG, Federal and State Governments, City of Stuttgart). Interested stakeholder groups were not integrated and there was no mediation or referendum before the protest movements peaked in summer 2010.
- There was a chance to integrate citizen groups into the plan developments for the 106 ha of gained land at grade. Instead, this urban development process taking place in the city center of Stuttgart was governed by the administration and driven by commercial interest groups.
- While the project has been presented as integrated and unique to the public and stakeholders, without capacity for any alternative components, it has been decomposed into a number of components for reasons of public legacy and finance, which has revealed that alternative designs would have been possible.
- Deutsche Bahn AG insisted on their status as a private stockholding company, keeping data on costs and on commercial success secret. Therefore there has never been transparent information on the impacts of the project. A project company was not established before summer 2013, which was too late to rectify the situation. Although no details have been communicated it can be assumed that massive planning failures have occurred. This would explain why the cost estimates have increased from EUR 3 billion (incl. reserves 4.5) to 6.8 (incl. reserves) just three years after starting construction work.



- It is unclear the extent to which risk management and change management have been applied. Many changes were introduced by policy makers in the first phase of planning in the late nineties which were obviously not properly considered in detail by Deutsche Bahn AG or converted into efficient change management before construction started.
- For projects with such a long procurement time and construction period it is essential to establish a central information office providing all project data and linking this with a building information management system for the planners and construction firms. So far such an information system has not been installed – neither for the public nor for the planners. There has always been uncertainty about the reliability of data.
- Lacking reliable information the protest movements were widely driven by emotions which were partly supported by rational and technical arguments. Green protagonists for instance focused on risks for particular species living in the castle gardens and close to the access rail tracks. However the advantages of re-converting a large part of the gained area into a park, or the possible reductions in noise emissions or of external costs through a change of modal split were neglected by the opponent groups.
- A main argument of the opponents was the tremendously high costs of the project and the missed opportunity of investing this money into other projects which would bring more transport and environmental benefits. Neither the Federal nor the State's Government have launched studies to investigate this argument in detail.

#### **5.2.6. Fehmarn Belt Fixed Link**

##### **Timeline**

The Danish government has been committed to implementing the Fehmarn Belt Fixed Link since the signing of the agreement with Sweden in 1991 to build the Oeresund fixed link, one of the most successful large-scale TEN-T projects. Technical, environmental and economic studies were carried out in 1999 followed by an enquiry of commercial interest to implement the Fehmarn Belt Fixed Link as a PPP project. In the end, Denmark assumed full responsibility in a treaty signed with the German Government to finance, build and operate the Fehmarn Belt Fixed Link. The project was submitted for EU co-financing under the TEN-T 2007-2013 cycle and approved as one of the Priority Projects (n°20). It is now part of the proposed EU transport core network. The project is still in the planning phase. The project planning agency, Femern A/S, a subsidiary of Sund & Baelte, is the organisation that was in charge of the implementation of the Størebelt and the Oeresund project on behalf of Denmark. Femern thus can draw on the experience of two major European fixed link projects; this is not only relevant for the implementation phase but is also very influential in the ongoing planning phase. In 2013 studies were underway for the approval of the project by the Danish Parliament, which will also decide whether to go for the preferred technical solution of an immersed rail/road tunnel rather than any other technical solution. The project requires approval from the German side but construction is expected to start in 2015 with the fixed link becoming operational in 2021.

##### **CBA**

An initial CBA was carried out in 1999 as part of a joint Danish-German feasibility study on the basis of appropriate technical and traffic studies. Benefit-cost ratios varied between 0.84 (EIRR: 2.2%) for a bored railway tunnel and 2.6 (EIRR: 7.8%) for an immersed combined rail (2 tracks) and road (2x2 lanes) tunnel.

A new Danish assessment in 2004 confirmed the earlier assessment, with an EIRR of 6.9%. No further CBA has since been commissioned.

### **EIA – SEA – Climate Impact Assessment**

An EIA in accordance with EU legislation is underway with expected completion in 2013 for submission to the Danish Parliament for the final approval of the project. The EIA will also cover the climate impact.

### **Transparency of assessment – public availability**

Femern A/S provides full transparency of technical, environmental and economic aspects by allowing internet access to all studies and other relevant documents for the past 15 years. This level of transparency is unique.

### **Funding**

The final engineering of project funding has not yet been finalised by the Danish government. Construction funds will be raised on private capital markets. The Danish State will guarantee loans and bonds as well as the equity of the implementing body, which is most likely to be Femern A/S. The Danish National Bank will be on stand-by to complement private funding if it is insufficient. In the longer term, revenues from the usage of the fixed link are currently estimated to pay back all debts in a period of 39 years. According to the most recent assessment, the investment costs will amount to EUR 5.5 billion, up from EUR 3.8 billion in 1999. Inflation accounts for 35% of the price escalation of 45%. Furthermore, there have been changes in the design of the tunnel, partly responding to changed legal and safety requirements, and finally, the planning phase that was originally assumed to last three years will now take at least six years. The TENtec system, as of 5<sup>th</sup> December 2013, reports funding by the Danish state of EUR 4.9 billion and a TEN-T co-funding of EUR 2.1 billion. This indicates that the revised CEF regulation, with increased co-funding rates, will be applied to this project. .

### **Development since end 2012**

The EU budget of 2007 to 2013, extended to 2015 has now been reduced to an EU co-funding of EUR 205 million (down from EUR 338 million) due to the delays occurred. The (transborder) environmental impact assessment was completed in 2013 and data collection for a new traffic study has started. This study will be carried out in 2014 and will be submitted later in the year together with an updated cost estimate to the government in the legislation process for the construction law. A new CBA is not planned as the decision by Parliament to implement the fixed link is final.

### **Conclusions to be drawn**

- The Fehmarn Belt project is mainly driven by political forces on the Danish side and the German government has withdrawn from the coast-to-coast fixed link project. Despite this, there are critical arguments for the cancellation of the project put forward by the German public who have built up a strong opposition.
- The project is developed by a competent Danish government agency, Femern AS, building on the experience of two other large-scale fixed-link projects. Most reports are made public, albeit some in Danish only. The postponement of the opening date of the new infrastructure by three years (2021 instead of 2018) is minimal compared to the delays encountered in many other EU supported projects.

- An inquiry of commercial interest to develop the project as a private venture or as a public-private partnership was carried out in 2003. Although banks, construction companies and PPP promoters expressed a keen interest, the result was inconclusive as, at that time, the Danish and German governments failed to commit themselves to a clear risk-sharing scheme.
- It must be born in mind that the Fehmarn Belt Fixed Link would divert significant parts of freight traffic from the Great Belt to the Fehmarn Belt. Part of the Great Belt investment would thus become sunk costs.
- The economics of the project are unclear. Both traffic forecast and cost-benefit analysis were last carried out more than 10 years ago. An update of the traffic forecast is currently being prepared but there are no plans for an update of the CBA, which is the crucial measure for the assessment of the socio-economic soundness of an infrastructure investment project.
- An independent audit of the forthcoming traffic forecast would be desirable; the audit ought to pay particular attention to the options of the ferry operator(s) to respond to the opening of the fixed link.
- The Hamburg rail knot is a critical point of the German rail freight sector. Special attention ought to be given to the prospects of its capacity once the Fehmarn Belt crossing has become operational. Doubts could be raised concerning the strategic planning and the seriousness of Germany's commitment to an upgrade of the Hamburg rail knot and the rail link between Lübeck and Puttgarden. In similar cross-border corridor cases such as the connection of their network with the BETUWE line, or in the case of the Upper Rhine rail infrastructure upgrade prior to the opening of the Gotthard base tunnel Alpine crossing, Germany demonstrates that commitments may not be met as expected. Delays of more than a decade may occur.
- The Fehmarn Belt project meets all relevant EU objectives. The EU contribution to the financing of the project should be based on a sound assessment of cross-border and wider socio-economic benefits.

### **5.2.7. SE-40 Expressway Sevilla-Huelva – two tunnels at Dos Hermanas**

#### **Timeline**

The project is part of the longer road link of Cordoba-Seville-Huelva that in turn forms part of TEN-T priority project 8 (PP8). SE-40 constitutes a ring road around Seville. The funded project analysed concerns regarding the construction of two tunnels of a length of 2.76 km and 4.14 km on this ring road southwest of Seville. In narrow terms this section would not have been part of priority project 8. This passes northwest Seville, while the project is located southwest of Seville. However, the project is assumed to provide a bypass around Seville on PP8 and the TEN-T funding provided for the construction of the two tunnels comes from the European Economic Recovery Plan (EERP), i.e. the economic stimulus package that was defined in 2009 to mitigate the economic crisis of the years 2008/09. In that sense the project fulfilled the funding criteria, as it seemed sufficiently mature to expect that the money would be spent during 2009 and 2010. Nevertheless, it seems that construction is significantly delayed (Giorgi 2011, p.53) or even completely on hold.

**CBA**

Two cost-benefit analyses have been provided by the Spanish Authorities. One concerned the SE-40 northwest section of the ring road between the motorway connections to Huelva (direction west) and Cordoba (direction north-east). Improving this northern part of the ring road would generate a substantial benefit with a cost-benefit ratio of 6.36 and an internal rate of return of 26.31% over a period of 20 years applying a discount rate of 3.5%. This CBA also considered the traffic on the upgraded southern part of SE-40. The second cost-benefit analysis also provided figures for the two tunnel sections and the six different options generated benefit-cost ratios of between 6.04 and 6.54.

**EIA – SEA – Climate Impact Assessment**

An EIA in accordance with Spanish legislation and presumably also EU legislation was carried out, probably in 1999. The EIA analysed and recommended compensation measures for adverse environmental impacts. Issues addressed included air pollution, hydrology, geology, climatic conditions, impacts on flora, fauna, health and territorial planning, cultural heritage, nature and landscape. Impacts on greenhouse gas emissions were not considered.

**Transparency of assessment – public availability**

The CBA documents, financial analysis and EIA have been provided by the Spanish Authorities at our request. There seems to be some debate in the Spanish newspapers on the project, but we could not identify how public participation is ensured.

**Funding**

90% of the project costs of EUR 239 million are funded by the national budget and 10% by TEN-T funding (EUR 24 million), the latter provided under the European Economic Recovery Plan (EERP). The TEN-T website reports that the project has been completed, while the TEN-T EERP website reports that the project is on hold due to further checks of environmental laws. The website of the State Company for Land Transport Infrastructure (SEITT) as of the end of 2012 lists two tunnel projects on the southern section of SE-40 with a budget totalling EUR 525 million. According to SEITT both projects are still ongoing.

**Project-specific issues**

The project receives a specific TEN-T funding from the EERP call. However, the status of implementation is unclear. The project was actually selected for this study because the TEN-T EA website indicated that it had been completed, which would have allowed for an *ex-post* analysis. However, it seems that either the project is ongoing or has not yet even started. This is indicated by other websites.

**Development since end 2012**

Contacts were made with the SEITT. Unfortunately, according to their files, the status of the project is the same as in the previous report. Due to financial constraints, the civil works have been stopped and there is no indication as to when they will start again.

Since 2011 (with the previous Government) many solutions have been discussed by the current and former Ministries (Limón, 2011; El País, 2012). These include bridges, reducing the number of lanes in the tunnels, reducing the number of tunnels etc. They have even considered resigning the contract with the construction companies to start all over again (Fernández Magariño, 2013). However, none of these alternatives have been approved and there are no studies that could corroborate the feasibility of these alternatives.

According to the SEITT (2013) the tunnels are still under construction and have not yet been finished (The webpage's last actualisation status was on September 30th, 2013, see Table 4).

**Table 4: Official documentation of project status**

Civil Works	Actual Budget (Tax included)	Company Awarded	Current State
<i>Autovía SE-40. Sector suroeste. Tramo: Dos Hermanas (A-4)-Coria del Río (A-8058). Subtramo: Enlace A-4 (Dos Hermanas)-Túneles sur del Guadalquivir-Embocadura oeste (South tunnels, west entrance)</i>	280,169,678.26 €	Aldesa Construcciones, S.A., Copisa Constructora Pirenaica, S.A., Bruesa Construcción, S.A.	<i>En ejecución (in execution)</i>
<i>Autovía SE-40. Sector Suroeste. Tramo: Dos Hermanas (A-4)-Coria del Río (A-8058). Subtramo: Embocadura Este-Túneles Norte del Guadalquivir-Coria del río (A-8058) (South tunnels, east entrance)</i>	245,552,177.34 €	OHL, Construcciones Sánchez Domínguez-Sando, S.A., AZVI, S.A.	<i>En ejecución (in execution)</i>

Source: SEITT online.

Although the website suggests that the projects are being executed, as a matter of fact they have been stopped and neither reprogramming information, nor official project amendments are available (Limón, 2013). Moreover, the project related to the tunnels' installation works has been resigned by the enterprise (SEITT, online) (project number 20081041-C). The Major of Seville, Juan Ignacio Zoido has declared in a recent symposium that the National Government should prioritise this infrastructure project (Agencias: Sevilla, 2013).

The Civic Association "Asociación de Defensa del Territorio del Aljarafe – ADTA" states that there have been better and more sustainable alternatives, which could improve mobility in the area with a reduced level of economic resources, while, most importantly, lessening the environmental impacts (Limón, 2013). With regards to environmental impacts, they claim that the existing bypass impacts ecological regeneration projects, such as the Pudío river regeneration project, which is also funded by the EU (Limón, 2012).

It is interesting to note that the modification of the Spanish law concerning the *ex-post* environmental evaluation of a transport infrastructure has recently been discussed and that the proposed changes were published in the Official Deputy Bulletin (BOCG, 2013), known as "Strategic Environmental Assessment". Therefore the tunnels would be subjected to this new law, or a modification of the project should comply with the new legal requirements.

Finally, we note that in the progress report on the Priority Projects (2010, p.154), the PP8 regarding motorways indicates the project is fully operational: "*On the Spanish side, the motorways linking Lisbon- La Coruña and Lisbon-Seville are now operational*".

Similar commentaries have been written in subsequent reports (Implementation of the Priority Projects 2012, p.83; TEN-T projects, online).

### Conclusions to be drawn

This case is interesting as specific conditions concerning maturity have led to the selection of the project for TEN-T funding by the EERP call. Nevertheless, it seems that the files provided to the EC to prove maturity were deficient, as project progress, if any, seems much slower than expected. Further, the monitoring of the project at the TEN-T EA (now INEA) provided contradictory messages. On the one hand it suggested that the project was

completed in 2010, and on the other hand it reported that pending issues related to environmental law have to be resolved before funding is provided. Different Spanish media sources report that the project has been temporarily stopped since mid 2010 and discussions on its completion or redesign were ongoing at least until June 2012.

This situation, already described in our previous study, has continued until mid 2014 and although public concern through the media has examined the debate about different alternatives, none of them has been officially studied or accepted.

Interestingly, the EC Decision Granting Financial Aid for an Action (C(2009)8012 final) shows that the last milestone to be covered in the Action are the beginning of the excavation of the north and south tunnel. It seems that by starting these civil works, the completion of the last milestone could be certified and the reimbursement of the co-funding to the EC avoided.

Major economic drawbacks along with a complex engineering infrastructure seem to have caused the project to be put on hold. These should be openly analysed. It is not worth having a finished but deficient infrastructure. It also seems better to clarify the problems and find solutions rather than be left with an unfinished infrastructure.

### **5.2.8. A11 Berlin-Poland motorway**

#### **Timeline**

The A11 motorway dates back to the 1930s connecting Berlin with Szczecin in Poland. Today the part from Berlin to the Polish border constitutes the A11 motorway in Germany and forms part of the European Highway E28 that connects Germany via Poland to the Baltic States. After the German reunification in 1990 the German government defined the so-called "Verkehrsprojekte Deutsche Einheit" (VDE) (transport projects to implement German reunification), of which a large part was to renew poorly maintained existing transport infrastructure, and, where necessary, increase the capacity to accommodate expected transport growth between Western and Eastern Germany, and beyond towards the neighbouring Eastern countries. The latter became an even higher priority after the decision that neighbouring Eastern countries would accede to the EU. Since 1996 the A11 is being continuously renewed, but up until 2007 there were sections which were still constructed using concrete slabs from the 1930s. Completion of the renewal, building new pavements, adding emergency lanes, re-constructing all bridges and adding new bridges including green bridges allowing animal crossings is expected to last until 2016.

#### **CBA**

The "Verkehrsprojekte Deutsche Einheit" (VDE), which comprised 17 projects to re-establish the transport connections between West and East Germany (9 rail projects, 7 road projects and one inland waterway project), were decided within a period of 6 months between 3<sup>rd</sup> October 1990 and 9<sup>th</sup> April 1991. The projects were a political decision to react to the fast and unexpected German reunification process. Therefore a CBA was not applied. During these 6 months the initial cost estimate for the 7 road projects was about EUR 12 billion. The costs increased, up to the near completion of the projects in 2010, by about 40% to EUR 16.6 billion. This was largely due to the construction of tunnels required in hilly areas (DEGES 2011). Although no CBA was required for the initial decision to build the VDE projects, a CBA or financial analysis was conducted for the decision on exact routes to be followed. The part of the A11 receiving funding from TEN-T was built between 2000 and 2010 at a total cost of EUR 131.5 million supported by a TEN-T budget of EUR 10 million.

### **EIA – SEA – Climate Impact Assessment**

The plan approval procedure for the A11 was split into five sections, for which we obtained an EIA, and the remaining part of about 20 km length for which we did not obtain an EIA. The EIAs considered impacts on water, soil, climatic conditions, flora and fauna, nature and landscape. Two patterns can be observed for the assessment of the different sections: (i) the impacts were assessed as less dramatic since the construction of the A11 in the 1930s had already led to impacts on the living space on both sides and as a result of the separation caused (ii) the areas crossed by the A11 are sparsely populated and several sites of ecologic importance were identified. Mitigation measures needed to be considered. No estimate of greenhouse gas emissions was provided.

### **Transparency of assessment – public availability**

There have been intense discussions about other projects of the VDE, i.e. the A20 motorway that was a new construction project. Related documents were largely public. However, since the A11 mainly concerned renewal instead of new construction, there is either documentation for underpinning studies that are not publicly available or there is no documentation at all.

### **Funding**

Funding is provided from the national budget of the Ministry of Transport and the TEN-T funding (EUR 10 million). It seems that the overall national funding is significantly higher than reported in the TEN-T fiche of the project, which indicates an implementation period of 2000 to 2010. National sources suggest a project period from 1996 to 2016. German budget regulation seems incompatible with TEN-T funding procedure regarding the decision process: first the project financing from national sources has to be secured for the whole budget and then the TEN-T funding can be subsequently applied for. This means that the condition that TEN-T funding should be allocated in order to go ahead with the project could never be met.

### **Project-specific issues**

The A11 motorway constitutes a case in which an existing infrastructure required very substantial renewal. This included completely rebuilding part of the route, selected bridges and adding emergency lanes. Thus planning choices concerning the specification and selection of an optimal route were not applicable.

### **Development since the end of 2012**

At the end of 2013 the new interchange “Kreuz Barnim” was completed connecting the A11, A10 and B2 with a high capacity and safe interchange. There was also further progress on the renewal of a 10 km section north of Brandenburg. The significant renewal of another 20 km section of the A11 is planned for 2016, shifting the completion at least two years later than reported previously.

### **Conclusions to be drawn**

The decision to implement the project was taken at the political level after German reunification in 1990, accelerating the normal planning procedures. Public availability of studies is limited. This seems to be due to the fact that the project is essentially the renewal of an existing infrastructure. It should be analysed in terms of infrastructure renewal, as opposed to new constructions, as different rules apply, for example in terms of CBA or transparency. At the moment this seems to be the case.

### 5.2.9. Lyon-Turin base tunnel

#### Timeline

The idea of building a base tunnel of a length of 50 km through the Alps to connect Lyon and Turin by a fast train connection appeared for the first time in about 1989, when it was promoted by the French side to extend their TGV network. In 1994 the Lyon-Turin link became one of the 14 Essen projects agreed upon by the European Council. From 1995 until 2001 plans were developed and assessed by the Alpetunnel Company, which, after they published some weak studies, was replaced in 2001 by Lyon Turin Ferroviaria (LTF) after an agreement on the construction of the tunnel was signed between France and Italy. In 2003 the first works on the base tunnel started with boring the 2.4 km long access and evacuation tunnel of Saint Martin La Porte. This was after the French Ministry of Equipment and Transport approved the pre-project studies in 2003. On the Italian side the works should have commenced in 2005, but due to strong local and regional opposition it took until 2012 before work actually started. In the meantime the project was extended from the 57 km long base tunnel to include another 14 km of tunnel plus 72 km new track in Italy as well as 52 km for three tunnels and 120 km new track in France. The new infrastructure would implement a 257 km long rail connection between Lyon and Turin offering high speed (though moderate at 220 km/h) and high capacity for both passenger and freight transport.

#### CBA

In the literature we could identify indications related to four CBA studies (1990/91, 2000/01, 2006 and 2011). But only the last CBA was made public by the Lyon-Turin Observatory (2012). This CBA covers the full Lyon-Turin link of 257 km and estimates the net present value (NPV) for a time horizon until 2072. The NPV is estimated applying both the French and Italian valuation parameters. NPV using the French system amounts to EUR 14 291 million, and EUR 11 972 million using the Italian system. The CBA considers traffic changes and the resulting time savings, operators cost changes and external cost (air pollution, greenhouse gas, noise, accidents, congestion). The traffic forecast underpinning the CBA is heavily criticised by the opponents to the project who raise three major issues: (i) the forecast is outdated using a base year of 2004 (e.g. omitting the Gotthard and Lötschberg base tunnels), (ii) the forecast is prepared by LTF i.e. it is not independent, (iii) the approximate tenfold increase of freight demand from 2010 to 2035 is unrealistic and cannot really be explained. Some benefit categories might not be consistent with commonly used valuation parameters (e.g. accident rates, CO<sub>2</sub> cost values).

#### EIA – SEA – Climate Impact Assessment

The CBA of 2012 assesses the reductions of greenhouse gases considering the net balance of the increased GHG during construction versus the savings during operation. Applying the so-called “legge obiettivo” in Italy the standard environmental assessment procedures (e.g. for exploratory tunnels) and public participation were avoided until 2006. We were neither able to identify an EIA nor an SEA for the full project, though environmental analyses exist on specific aspects.

#### Transparency of assessment – public availability

The assessments prior to the CBA from 2012 were not public apart from fragments that appeared in media, papers or presentations. The situation related to transparency on the French and the Italian side was rather different. On the French side public participation was organised early in the project planning leading to greater transparency and acceptance of the project by the local municipalities. On the Italian side an effort to involve the local citizens in the planning process was only made in 2006 after strong and partially violent clashes between the police and the opposition against the new rail link occurred at the end



of 2005. This was achieved by founding the Observatory which organised a three-year stakeholder process up to 2008 to develop agreements on the debated issues. The process was documented by seven reports that had been published by 2008 (the so-called Quadernos). The eighth document, being the first public CBA, was published at the end of 2011. The activities of the Observatory substantially increased transparency, though it could not satisfy all fears of the opposition.

### **Funding**

Funding of the project will come from the governments of France and Italy as well as the European Commission TEN-T funds, with the EC contributing the largest share of the funding for the base tunnel. Though there had been earlier agreements to split the investment equally between France and Italy, the most recent distribution foresees a share of 57.9% to be paid by Italy, and 42.1% by France.

### **Project-specific issues**

This project belonged to the very first group defined as projects of European interest, and was included in the Essen project list in 1996. At the same time doubts have been raised as to whether it will ever be built, despite construction having started and at least 3 out of 4 exploratory tunnels being completed by 2010. The reason seems to be that on the Italian side the public opposition against the project was ignored for 15 years, public participation was not carried out until the end of 2005 and the local opposition, who had formed the NO-TAV movement (TAV = High-speed train), joined forces with a growing citizens' movement in Italy that was connected with Attac, the Genoa globalisation protests and the Occupy movement. Some sources say that NO-TAV was the nucleus of the current movement in Italy to develop a civil society that claims participation and raises its voice on relevant political issues. NO-TAV also raises a number of issues that should be reflected in the further project development.

### **Conclusions to be drawn**

Lyon-Turin is obviously a bottleneck on major corridors of the EU TEN-T network important for East-West Alpine crossing and to some extent also for flows in a Northwest-South direction. Though the project has been revised, and a phased approach for its implementation has been developed, there are doubts as to whether, in the current setting, the project could become beneficial and fulfil its objectives i.e. to shift existing freight from road to rail and generate new trade that would chose rail mode. A shift from air to rail is also expected for passenger transport. Conditionalities for making the project beneficial seem to us to be:

- The French and Italian rail markets (SNCF, FS) should be liberalised such that on the freight rail market further operators make offers to the market that benefit from the new base tunnel.
- The Ventimiglia Alpine crossing is the cheapest of all Alpine crossing alternatives and freight traffic accordingly grows there. The cost of the Ventimiglia route needs to increase to favour rail freight (either there or on the Lyon-Turin base tunnel) and to reduce the environmental impact along the densely populated and touristic Mediterranean coast.
- During the construction phase, monitoring and transparency of progress and cost will be of utmost importance. The Swiss tunnel boring process provides good examples such as real time webcams of the boring works. Cost control by independent authorities will be even more relevant. This includes the EC who will be funding the largest share of the investment.

- In parallel to the rail tunnel boring there are initiatives to increase the Lyon-Turin road capacity. This would counter funding a huge investment for rail.
- A financial analysis of the operation phase does not seem to exist, nor is there an updated assessment of the wider economic effects considering the most recent cost estimates and the phased implementation approach. Such analyses should be developed and published.

### 5.2.10. Gotthard base tunnel

#### Timeline

The NEAT "*Neue Eisenbahn-Alpen-Transversale*" in German, or the NLFA "*La Nouvelle ligne ferroviaire à travers les Alpes*" in French is a railway tunnel whose objective is to increase the total transport capacity across the Alps, particularly for freight, with special attention to the link between Germany and Italy.

This project is part of the Rhine-Alpine Corridor (named since 1<sup>st</sup> January 2014) which was formerly named "Corridor Rotterdam-Genoa". It also belongs to the project "Rail Freight Corridor 1" (RFC1).

Its final goal is to shift freight from road to rail to reduce environmental impacts. Nonetheless, it would also benefit passengers since it would reduce the length of train journeys. It is expected that a train from Zurich to Milan would take about 3 hours, and from Zurich to Lugano around one hour and 50 minutes (with both the Gotthard and Ceneri base tunnel being operational). The St. Gotthard base tunnel will be the world's largest rail tunnel (Office Fédéral des Transports OFT, online). It is 57 km long and construction works started at the end of 1999. Both construction fronts were finally connected in March 2011 (for the first tube this happened in October 2010) and the total costs have amounted to about CHF 9.8 billion since 1998.

According to the NETLIPSE book (Hertogh et al., 2008 p.50), the planning took 7 years, construction is taking around 18 years and therefore the total delivery is about 25 years. Civil works are now concentrated on the equipment of the rail systems and the Ceneri base tunnel which should be connected in 2015 and operational in 2019.

#### CBA

The assessment makes use of the NIBA-methodology (Bruns/Erismann, 2006), with a time period of 60 years and an interest rate of 2%. The net benefits of the total infrastructure were in the order of magnitude of CHF 526 Million per year from 2008-2070 (Ecoplan, Infras, 2011).

The socio-economic assessment evaluates the total costs of the railway system without the NEAT, but with the Lötschberg (see 5.2.11) and the Gotthard opening over the long term for transport of people and goods. The economic analysis took into account the following aspects:

- Environmental
  - Emissions of air pollutants
  - Noise exposure
  - Weather

- Economic
  - Infrastructure: operation, maintenance, energy, reinvestment
  - Transport of people: rail operation, revenues from tickets, and from time savings
  - Transport of goods: productivity savings from rail.
- Society
  - Accidents

According to the economic feasibility study carried out by Ecoplan, Infrac (2010) the previous study (carried out in 1997) cannot be compared with the new one since many things have changed. However, the cost of infrastructure increased around 50% compared to 1997.

### **EIA – SEA – Climate Impact Assessment**

We were not able to find a detailed methodology carrying out this analysis. However, according to Ecoplan, Infrac (2010 p.56), for the whole NEAT, the benefits would be more for countries other than Switzerland (CHF 49 compared to 91 million per year).

In fact, nowadays the project is explained as the “largest environmental protection project in Switzerland” to ensure a positive perception from its citizens, despite being previously advertised differently (Hertogh et al., 2008 p. 80).

### **Transparency of assessment – public availability**

There are many reports available. It is important to bear in mind that this project was selected through a plebiscite and that the Parliament has committed itself to informing the public periodically about the economic status of the project. Many studies have been published on the website of the Federal Office of Transport (online) which is a result of previous complicated experiences where cost overruns made it impossible to finish a certain infrastructure.

### **Funding**

For transparency purposes, the NEAT projects introduced an index which relates price increase to cost types relevant to tunnel construction projects. They also added 15% of the budget for contingencies (Hertogh et al., 2008 pp. 87-88).

The NLFA global credit of CHF 19.1 billion (EUR 15.6 billion) was officially accepted by the Federal decree of 16<sup>th</sup> September, 2008. This includes the investments of different tunnels: St.Gotthard base, Ceneri and Loetschberg, the development of the Surselva, developments over the rest of the resources from the Loetschberg and St.Gotthard, plus urgent developments in Arth-Goldau and the surveillance of the project (AlpTransit, 2014).

At the end of 2013, the OFT, “Office Fédéral des Transports”, estimated that the total costs would reach CHF 18.5 billion, which is equal to EUR 15.3 billion (AlpTransit, 2014) (prices from 1998). Approximately CHF 12.4 billion (around EUR 10.6 billion ) of this are funds for the St. Gotthard axis (which also includes Ceneri). The Saint Gotthard axis represents about CHF 10 billion (EUR 8.2 billion) (Office Fédéral des Transports OFT. Confédération Suisse, 2011). However, figures differ between sources depending on the year of publication. For example, the NETLIPSE report (Hertogh et al., 2008) has a budget of EUR 5 900 million for the year 2006, which indicates the cost overruns incurred by this project.

Both the Gotthard and Lötschberg base tunnels were subject to long discussions regarding their project viability (Hertogh et al., 2008). From 1992 to 1995 two ministers discussed the projects, and a solution to the financing problem materialised through a special fund, called the FinöV-Fund, for the construction and financing of designated projects.

The NLFA is being financed by a special fund which is nurtured by three different resources: the heavy goods charge, fuel taxes, and a tenth of a percent of the value-added tax (AlpTransit, 2014; Hertogh et al., 2008 p.84).

### **Project-specific issues**

The official webpage of the Swiss Federal Office of Transport (OFT, online) states that, in 1992 Swiss citizens approved the first draft project of the new rail link through the Alps, NRLA (*La nouvelle ligne ferroviaire à travers les Alpes*, NLFA in French) and on 29<sup>th</sup> November 1998, the citizens also approved the revised project. This project is also part of the agreement regarding land transport between Switzerland and the EU.

It is noteworthy that the planning process of the project ensures its success. It is based on the "Sectoral Plan AlpTransit", first published in 1995. Federal, cantonal and local authorities discussed and integrated their spatial planning activities. It is a binding document at all levels and has to be taken into account for future planning. Any overlap with new programs should be identified and discussed with the Division for Infrastructure of the Federal Office for Transport to develop a solution. Furthermore, it can be updated, adapted and reviewed as necessary (Hertogh et al., 2008). This key step might be seen as a very simple one, but it is one of the indicators of success in infrastructure development and, as discussed elsewhere, not easy to achieve in most projects (Mejia-Dorantes & Lucas, 2013). Moreover, communication responsibilities have been specifically assigned since the beginning of the project (Hertogh et al., 2008 p. 91). The progress of civil works was discussed by a specific unit (the Division for Infrastructure of the FOT) and topics related to finance had to be discussed by the appropriate responsible unit. Nevertheless, the project was based on the cooperation between all the people involved in the project for its success.

A special parliamentary delegation also carries out political supervision. It is the "Delegation for the Supervision of the NEAT", known as NAD, the highest supervisory authority for the planning and construction of the "New Railway Lines under the Alps". It is designed to ensure the continuity of the project over new governments or different authorities (Hertogh et al., 2008).

### **Conclusions to be drawn**

(Done together with Lötschberg, see section 5.2.11)

#### **5.2.11. Lötschberg-Simplon base tunnel**

##### **Timeline**

This project is also part of the NEAT "*Neue Eisenbahn-Alpen-Transversale*" in German, or the French NLFA "*La Nouvelle ligne ferroviaire à travers les Alpes*". It is a railway axis whose objective is to increase the total transport capacity across the Alps, particularly for freight, with especial attention to the link between Germany and Italy.

As noted in the previous case, Lötschberg's final goal is to shift freight from roads to rail to reduce environmental impacts. Nonetheless, it would also benefit passengers as it would reduce train journey times. In fact, the Swiss rail operator observed a tenfold increase of

commuters from the Canton of Valais towards the cities of Bern and Thun after opening of the Lötschberg base tunnel (up from 200 commuters per day to more than 2000).

When we refer to the Simplon tunnel as part of the Lötschberg-Simplon base tunnel, we actually refer to the rail tunnel that passes through the Alps which connects the town of Brigue in Valais (Switzerland) to the Iselle station (Piedmont) in Italy. It is 19.823 km long and was inaugurated in 1906. Until 1982 it was the longest tunnel in the world.

The Lötschberg base tunnel itself is a tunnel that connects Frutigen (Berne Canton) and Rarogne (Valais Canton) in Switzerland. It is part of the NLFA or NEAT. It is 34.6 km long with two galleries.

### **CBA**

The feasibility studies conducted for the project EVA-TREN (2008b) stated that two tunnels would not be profitable even with a long concession period. However, due to the political and social situation it would have not been possible to carry on with the project with only one tunnel. In fact, BLS (online) states that it was designed with twin single-track tubes to ensure optimum reliability, but for financial reasons, only one of the tubes was fully equipped, while the second one was left largely as a shell.

The socio-economic assessment of the NEAT makes use of the NIBA-methodology (Bruns, Erismann, 2006), with a time period of 60 years and an interest rate of 2%. The net benefits of the total infrastructure were calculated as being in the order of magnitude of CHF 526 million per year from 2008-2070 (Ecoplan, Infrac, 2011).

Many sources such as BLR (online) describe the funding strategies developed for this project. These include the special fund, which largely contributes to financing the NEAT through the heavy-vehicle fee (HVF) along with tax revenues from mineral oil.

Ecoplan/Infrac (2011) evaluate the total costs of the railway system without the NEAT, with the Lötschberg and the Gotthard opening over the long term for transport of people and goods. The economic analysis took into account the following aspects:

- Environmental
  - Emissions of air pollutants
  - Noise exposure
  - Weather
- Economic:
  - Infrastructure: operation, maintenance, energy, reinvestment
  - Transport of people: rail operation, revenues from tickets, and from time savings
  - Transport of goods: productivity savings from rail.
- Society
  - Accidents

### **EIA – SEA – Climate Impact Assessment**

We were not able to find a detailed analysis of Climate Impact Assessment, or the approach to carry out such an analysis. However, as stated in the previous section, the NIBA-methodology was used which takes into account the following environmental issues: emissions of air pollutants, noise exposure and weather. Finally, according to Ecoplan, Infrac (2011 p.56), for the whole NEAT the benefits would accrue more for foreign countries than for Switzerland (CHF 49 compared to 91 million per year).

### **Transparency of assessment – public availability**

There are many reports available. It is important to bear in mind that this project was selected through a plebiscite, but we did not find any analyses such as the EIA, and neither did we have access to the NETLIPSE study of this infrastructure. The results on financial status, including cost development and final cost forecasts, are made publicly available on the website of the Swiss Office for Transport ([www.bav.admin.ch](http://www.bav.admin.ch)).

The Swiss Parliament has committed itself to periodically inform the public as to the economic status of the project, and as a result many studies have been published. See for example the Economic Analyses from 2010 and 1997 (Ecoplan & Infrac, 2011; Ecoplan, 1997); or the periodic status reports from the New Railway Link through the Alps from different years (Neue Eisenbahn-Alpentransversale Standbericht 2007/I, 2008/I, 2008/II in Federal Office of Transport, Online).

### **Funding**

The NLFA global credit of 19.1 billion francs (EUR 15.6 billion) was officially accepted by the Federal decree of 16<sup>th</sup> September 2008 which includes the investments in different tunnels: St.Gotthard base, Ceneri and Loetschberg, the development of the Surselva, developments over the rest of the resources from the Loetschberg and the St.Gotthard, plus urgent developments in Arth-Goldau and the surveillance of the project (AlpTransit, 2014).

At the end of 2013, the OFT, "Office Fédéral des Transports", estimated that the total costs of the total infrastructure would reach CHF 18.5 billion, which is the equivalent of EUR 15.3 billion (AlpTransit, 2014) (prices from 1998).

Both the Gotthard and Lötschberg base tunnels were subjected to intense discussion regarding the project viability (Hertogh et al., 2008). From 1992 to 1995 two ministers discussed the projects, and a solution to the problem of financing arose through a special fund, called the FinöV-Fund, for the construction and financing of designated projects. The FinöV is nurtured by three different sources: The heavy goods vehicle charge, fuel taxes, and a tenth of a percent of the value-added tax (AlpTransit, 2014; Hertogh et al., 2008 p.84).

### **Project-specific issues**

The official webpage of the Swiss Federal Office of Transport (online) states that, in 1992 Swiss citizens approved the first draft project of the new rail link through the Alps, NRLA (*La nouvelle ligne ferroviaire à travers les Alpes*, NLFA in French) and on 29<sup>th</sup> November 1998, the citizens also approved the revised project. This project is also part of the agreement regarding land transport between Switzerland and the EU.

Ecoplan & Infrac (2011 p.9) indicate that passenger transport will benefit from the NEAT project, giving positive revenues of about CHF 87 million per year. On the other hand, in the case of transport of goods, they assume a complete liberalisation and competition of rail logistics. Even if these factors give rise to uncertainty in the results, they consider that the transport of goods would give balanced results. Finally, taking into account the profits from the infrastructure transporting people and goods along with the generated costs, a profit of CHF 96 million per year would result, and approximately 20 years later this amount would decrease to CHF 87 million per year due to replacement costs.

## **Conclusions to be drawn (together with Gotthard)**

- The NEAT projects are understood to be a necessary modernisation shifting much of the current road traffic for passengers and transport of goods to rail. This was decided following a referendum (Swiss Alpine Initiative) to stop the growth of road freight transit transport through the Swiss Alps.
- The Swiss government considers that there are three important mechanisms for a successful modal-shift policy: the New Rail through the Alps, the mileage-related heavy vehicle charge and the opening of the markets through the rail reform.
- The NEAT was planned as a group of complex infrastructures rather than three independent infrastructures. Therefore, its completion, problems, profitability and other outcomes are interrelated.
- It is worth highlighting the efforts to have proper coordination between different levels of authorities in order to ensure the continuity of the project without political changes.
- The fact that this project was largely discussed and later voted for in a plebiscite, eases the confrontation and problems that normally arise in mega projects.
- Even if the project has incurred substantial cost overruns, a periodic and transparent publication of the state of the art of the project has improved its image in the long term.
- The decision in favour of two Alpine rail base tunnels, Gotthard and Lötschberg, is the result of a political compromise, not of a capacity-needs-assessment. Therefore the capacity of the Lötschberg tunnel has been limited by reduced rail equipment.
- There will be long time delay in the upgrade of the access links on the German side (to the Gotthard tunnel) and on the Italian side (to the Lötschberg tunnel). This will prevent transport flows from using the tunnel capacities for an uncertain period of time in the future.

### **5.2.12. Seine-Scheldt waterway**

#### **Findings of the first study including documents up to December 2012**

##### **Timeline**

TEN-T Priority Project 30 (PP30 after TEN-T definition of 2004; North-Sea Mediterranean Core Network Corridor, definition of 2013) consists of several projects in France and Belgium that have been planned and implemented parallel to each other. They were presented by the two governments in 2004 for partial TEN-T co-funding and an EEIG was set up for the implementation of the programme. Our assessment focuses on the Seine-Nord Europe canal project in France, which is in itself a large-scale project with a now estimated total cost of EUR 4.3 billion (2009). The project planning follows French government procedures established for large-scale infrastructure projects and public hearings (Débats publics) were held in 1993/94. Technical, economic and environmental studies were carried out prior to the enquiry in early 2007 for the Declaration of Public Interest, which became effective by the end of 2008. The contract for the construction of the canal will be awarded to a Public-Private Partnership, and it is currently up for tender. It is still unclear when construction will be started or completed.

**CBA**

A traffic study and cost-benefit analysis was carried out in 2006. For our assessment, a summary document was available to us which was however not detailed enough for our purposes. Traffic forecasts were based on a toll level of 2.5 euro/tonne. The CBA assumed an EU grant contribution of 19% which was deducted from project costs. Various options of financial engineering investigated make it difficult to determine the suitable EIRR value from a range of 4% to 7%, although the central base value is 5.2%. According to VNF, a complementary study was carried out and approved by the EEIG in 2010 to define more precisely the expected impacts of the project, which focused on French territories. All the impacts (growth, traffic, added value) were updated, but again, the relevant documents were not made available to us for review.

**EIA – SEA – Climate Impact Assessment**

A project of the size of the Seine-Nord Europe canal requires a detailed EIA under EU legislation. We assume that the relevant documents were submitted for EU grant approval from the TEN-T 2007-2013 budget but only a summary document was available to us. We are uncertain whether or not the CBA of 2006 was updated at any time and there is no evidence that a separate CIA was carried out as this is not compulsory under French law.

**Transparency of assessment – public availability**

Some of the documents for the enquiry prior to the declaration of public interest are published on a dedicated website, partly with English translations. There are also a number of public relations documents available, but apart from these there are no documents relevant for a proper assessment which are publicly available. VNF, the leading party in the EEIG, has commented on our draft assessment in 2012 but could not supply the relevant documents before the deadline for data compilation at that time.

**Funding**

The canal project is still at the planning stage and hence the financial engineering of the project is still uncertain. The project includes a major PPP component currently up for tender and private investments in port and combined transport facilities. An EU contribution of 20-30% is expected and for the multi-annual programme up to 2013 the EU co-finance is EUR 176.6 million (EUR 145 million for France, EUR 22.9 million for Flanders and EUR 8.6 million for Wallonia). Eligible costs (in the first instance planning costs) are estimated at EUR 503 million up to 2015.

**Project-specific issues**

We have been unable to make direct contact with the Walloon authorities regarding the project components in their jurisdiction. We have established contact with the Flemish partners in the EEIG but have not been able to obtain the proper documentation in order to assess the Upper Scheldt upgrading programme. The French part of the programme is currently under review by a governmental audit committee put in place by the new government administration in view of budgetary constraints. The audit report is due within the coming weeks and the fate of the project is in the balance. It should be noted that the French government has established very clear and binding procedures for the approval of large infrastructure projects which take into account EU legislation.



## **Development since December 2012**

### **A. French part: Canal Seine-Nord Europe (CSNE)**

A summary of additional documents received since December 2012 is given here and will be described in more detail in the appendix.

1. VNF and a Scientific Committee have responded critically to our first study in March 2013. Necessary corrections of cost figures have been included in the above text, comments on the criticisms are given in the appendix.
2. The French Committee "Mobilité 21" issued a report in 2013 in which all major transport investment projects in France are classified according to their priority. The CSNE project has been excluded because of international agreements taken.
3. IGF and CGEDD issued a report in 2013 in which the financial figures for the CSNE project were commented on very critically.
4. The Pauvros Report of 2013, which had been launched by the French Ministry of Transport (MoT), was issued in 2013. It suggests a re-configuration of the project.
5. A study of SETEC of 2013 on the logistics and economic impacts of the CSNE has been prepared for VNF, which is also referred to in the Pauvros Report.
6. A study of SETEC of 2013 on the revision of transport forecasts and CBA has been prepared for VNF but was not made available.
7. The "Tallinn declaration" has been published from which the promoters conclude that up to 40% of the finance of the project will be provided by the European Commission.
8. A change of the organisation has been decided. The PPP regime has been abolished and a public project company comparable to the Belgian Albert Canal is under discussion.

### **Conclusions to be drawn**

- Thanks to the support of VNF the documents 1., 2., 4. and 5. were received and could be evaluated. Document 3. was received from other sources. The important document 6. is still missing such that the changes of forecasts and CBA evaluations cannot be reported in this study. It appears obvious that the main drivers for transporting freight on the canal will not be the market development for freight, in particular for bulk cargo, but the modal shift from road and rail to the inland waterway.
- After the re-configuration of the project, which is reported in the Rapport Pauvros (2013), the investment costs could be reduced by up to EUR 650 million such that the overall investment costs for the French part are estimated as being a maximum of EUR 4.7 billion. This suggests that the cost estimate of 2009 (EUR 4.3 billion) has been revised and that the cost for the project without re-configuration was estimated at about EUR 1 billion higher than reported by the end of 2012.
- It is not clear whether the capacity parameters for CSNE remain the same after re-configuration.

- The abolishment of the planned PPP regime brings more certainty to the implementation of financial plans, but means that there will be no private sector influence on cost control and efficiency of implementation.
- The political support on the French side, which was temporarily weakened, has been revived since the announcement of the European Commission (“Tallinn declaration”) to co-finance the project by 40%.
- The main scientifically based arguments in favour of the project seem to have shifted towards the wider economic impacts, including the expected employment effects for the Region Nord Pas de Calais. These are quantified at around 50,000 new jobs up to 2060 according to the Pauvros report (2013). The validity of such figures could not be checked.
- The information base for the project has increased compared to the status in December 2012. However an important document, which includes revised transport forecasts and CBA, is still missing, so we cannot confirm that the project is satisfactorily transparent. While the political promotion of the project has been successful in the last year, leading particularly to a higher than expected rate of EU co-finance, a scientifically founded appraisal, for instance based on the recommendations of the Rapport Quinet (CGSP 2013) is still missing and its development and publication are recommended.

## **B. Belgian part: Lys axis and extended project perimeters**

On the Belgian side the main project is the upgrading of the river Lys to class Vb (4,500 tonnes, 185x11.4x3.5m barges, bridge clearance 7m i.e. 3 container stacks). The extended project perimeters comprise the Upper Scheldt axis, hinterland connections of Bruges, modernisation of canal Roeselare-Lys and canal Bossuit-Kortrijk and upgrading the Upper Sea Scheldt. These plans are embedded in an ambitious plan for IWW extension which among others includes the upgrades of the Albert and the Brussels-Charleroi canals to class VIb (up to 10,000 tons barge combinations). A decision has been taken on the Seine-Scheldt project between Ghent and France and several of the above mentioned projects. “The realisation of these projects should be continued unabated” (NV De Scheepvaart, 2014).

### **5.2.13. Summary conclusions from the case studies**

In our first study we highlighted that the most important question was to determine whether the cost estimates were correct. We also asked whether the decision to implement a project was helped if it was based on the correct cost estimate. To deal with these questions we recommended differentiating cost estimates provided at three stages in the project (see Schade et al. 2013):

- **Initial cost:** the first available cost estimate of the process that leads to the implementation of the project. Often this cost estimate is produced many years before the actual implementation and funding decision is taken, and is thus not relevant for the funding decision. However, in other cases, it is exactly that figure which has kicked off a process of project planning and implementation that cannot subsequently be reversed. This suggests that a decision of general principle is taken based on preliminary cost estimates that do not consider realistic alternative options. This might include the option to do nothing.

- **Cost at decision:** the cost estimate on which the decision to implement the project was taken. This cost estimate must be accurate and up-to-date when deciding to proceed with a project.
- **Actual cost:** the *ex-post* investment cost as reported in official documents after project completion. This usually comes from the European Commission TENtec system, but national reports or reports of the infrastructure promoters could also provide such costs.

We would like to reiterate that it is most important to (i) consider the cost at decision when evaluating success or failure of a project implementation and (ii) get this cost at decision right before deciding whether to go ahead with a project. Of course, this requires an appropriate and transparent planning process, which, as our analyses reveal, is feasible for mega-projects.

### 5.3. Planning cost increases vs. implementation cost increases

Increases in investment costs for new infrastructure may occur during two different project phases as we highlighted in the previous study. This is particularly the case with the six *ex-post* case studies analysed in Schade et al. (2013):

- **Planning phase:** during the planning phase amendments to plans may occur for good reasons e.g. due to the adaptation to transport needs or to fulfilling environmental requirements of an EIA or SEA; modifications of plans should be seen as a positive activity. In general, such amendments will also modify the cost estimates and the cost-benefit analysis or the financial analysis could be changed from both sides i.e. the cost side due to changes of the infrastructure elements or the benefit side due to modified transport or environmental benefits. In the ideal planning phase any such modifications are detected during planning and the final infrastructure plan is improved accordingly. The funding decision should then be taken on the basis of the final detailed plan. Thus there would be no internal project reason for a change in investment costs during the implementation of the project. The reality of planning processes looks very different:
  - The decisions on realisation and public funding of projects are often taken on the basis of first rough cost estimates.
  - After the legal approval of a project a second cost estimate is performed, usually leading to a much higher result than the first estimate.
  - Before starting the construction, when the first results of tendering of construction lots are known, a third estimate follows.
  - This estimate may also be updated during construction.

The project Stuttgart 21 (a component of the case study HSR Stuttgart-Ulm) provides a good example of this cost evolution: 1995: DM 4.8 billion = EUR 2.4 billion. 2009: EUR 3.1 billion. 2013 after the decision: EUR 6.5 billion. This indicates that the cost estimates in the early phase of projects can be very influenced by political strategies to push a project to pass the parliamentary barriers.

- **Implementation phase:** this phase starts with the implementation decision based on the final plan which includes a financing plan. During project implementation, further cost increases should not occur, or they should at least have been covered by appropriate risk management that avoids cost overruns of the planned budget.

This normative issue does not currently correspond to the realities of project implementations. A reform commission of the German Ministry of Transport found that the efficiency of project monitoring and control, together with risk and change management, is underdeveloped in public infrastructure planning. We recommend bringing more private management skills into the implementation phase and to apply advanced methods for project planning and control, using, for instance, the Building Information Modelling (BIM).

This means that cost increases during the planning phase can partially be seen as a normal element of the planning process, indicating that further details and performance requirements of the project need to be taken into account to improve the planning, and that a funding decision will be based on better understanding of the project. Cost increases during implementation, however, is an indicator of insufficient planning and that the funding decision might have been taken on the wrong grounds.

Two recommendations would further improve the outcome of the planning and decision phase: (i) adding a risk premium to the estimated cost considering both the classes of risks and the probability that a cost increase will remain below the planned cost including the risk premium (e.g. for rail project a risk premium of 40% would be added to remain below this total cost with a probability of 50%) (Flyvberg 2008); (ii) rather than relying on one *ex-ante* study (such as a transport forecast or CBA), consider several produced by different stakeholders or external experts (Flyvberg 2009). Of course, we also recommend that studies are transparent so that their outcomes can be compared and validated independently.

#### **5.4. The importance of public participation and public votes**

Four of the new case studies detailed in this update study (HSR Stuttgart-Ulm, Lyon-Turin base tunnel, the NEAT cases with the Gotthard and Lötschberg base tunnels) highlight the extremely important role of public participation and even public votes to develop transport mega-projects.

The lack of transparency and public participation over 15 years in Italy when developing the Lyon-Turin link led to a constantly growing opposition against the project, which in fact was amongst the TEN-T projects defined by the EU in 1994. In common with the HSR Stuttgart-Ulm project, public involvement was limited, partially because the project promoter blocked a transparent process. Both project developments culminated in mass protests of several tens of thousands opponents and severe clashes between demonstrators and the police occurred in 2005 and again in 2011/12 in Italy and in 2010/11 in Germany. In both cases the reasonable option to further develop the projects, and probably also the only democratic option, was to start an open and transparent public participation process. In Turin and the Susa Valley the Observatory (*Osservatorio collegamento ferroviario Torino-Lione*) was set-up. This has worked since 2006 with the stakeholders to improve the project and to establish consensus. In Stuttgart a public mediation process was set-up in which proponents and opposition exchanged and debated their arguments. Most of these debates were also broadcasted live on TV. In both participatory processes it was very important that the local municipalities were involved and both organisations were presided over by highly respected persons (elder statesmen), who were deemed to be neutral concerning the project. In both cases, common understanding of many debated issues was achieved, though not on all issues and not with all stakeholders. However, in both cases opposition remains and there are still protests against the projects. Nevertheless, solutions

have been found such that the projects are moving forward and it seems to us that without the participatory process both projects would have definitely failed. For the base tunnel Lyon-Turin it was the phased approach, the new alignment of the route in the Susa Valley and the connection of the City of Susa to the new line which produced the understanding. In Stuttgart, when the public voted on the funding of the project it transpired that the majority of voters of Baden-Württemberg were in favour of the project.

In the two cases of the Gotthard and the Lötschberg base tunnels, the projects actually commenced with a public vote. In 1992 the Swiss citizens voted in favour of implementing the *Neue Eisenbahn-Alpentransversalen* (NEAT, New Alpine Crossings by Rail). Both base tunnels are part of the NEAT which aims to shift most (transit) road freight transport from road to rail. Profitability of the NEAT failed, however, and since government funds were insufficient to fund the whole investment, other funding opportunities were needed. These were set-up by another public vote defining a fund to invest in NEAT and fed by revenues from the Swiss heavy goods charge and shares of further taxes.

We conclude that transparency and public participation from the beginning of mega-project development is necessary. Public votes can be an important instrument in obtaining a mandate to develop a project, but they should be at the beginning of the project development and depend on the availability of a sufficiently robust knowledge base of the planned project. However, if the early opportunity for public debate is missed, a public vote can help confirm a project at a later stage. This is demonstrated in the example of the HSR Stuttgart-Ulm.

## **5.5. Phased approaches as a solution for mega-projects**

Two of the new case studies were re-defined during project planning such that they were not or will not be implemented fully from the beginning; their implementation will be phased. After each phase the development of transport demand will be observed to determine whether further infrastructure capacity is needed in the future. Only then will a decision in favour of the next phase of investment be taken. The motive for this phased approach is, of course, to save investment cost. However, the approach is also a method of managing the risk of overestimating demand.

A phased approach was followed for the Lötschberg base tunnel. In the first phase, instead of building two fully equipped tubes, one tube was fully equipped and the second only partially bored and equipped. If there is strong growth in demand, the second tube could be fully bored and equipped. A phased approach is also planned for the Lyon-Turin link; in the first phase the base tunnel will be built and other elements will only follow if transport demand on the link grows towards capacity limits.

The phased approach has at least two requirements: (i) a mega-project must be dividable into sections that can be used separately and independently, and (ii) the complete project should provide a positive socio-economic assessment.

## 5.6. Commitment to supportive policies for new infrastructures

The cases of the Gotthard and Lötschberg base tunnels as well as the Lyon-Turin link / base tunnel reveal that the new large infrastructures should be integrated into general transport policy. In order to reap the potential large scale benefits, the infrastructure policies should be accompanied by transport and/or funding policy packages. In the Swiss cases the funding of the infrastructure through the heavy goods charge and revenues from fuel taxes generate a package of (i) new infrastructure and hence increased capacity for rail, (ii) a dis-incentive for the use of road by the road charge, and (iii) a safeguarding of funding through the revenues from the road charge and the fuel tax.

In the case of the Lyon-Turin base tunnel relevant supportive policies to reap benefits include the opening of French and Italian rail markets to improve services by competitive operators on the link, and the increase of the cost for freight on the competing road link through Ventimiglia. Further policies should be analysed to identify whether more promising supportive policy packages could be developed. Analyses of supportive policies will also be required for Rail Baltic.

## 5.7. Consideration of wider economic benefits of mega-projects

Our previous study emphasised that wider economic benefits should be assessed for mega-projects. Such benefits have been or are currently being estimated for two cases in the study and could improve the socio-economic assessment. In the case of the Lyon-Turin link an assessment of growth effects based on 2004 status of information concluded that GDP would increase by EUR 61 billion over 15 years for the EU15 countries (Schade 2006). In the case of the Seine-Scheldt waterway an assessment of the wider economic benefits is underway, but documentation could not be obtained.

The scientific literature on European added value, which is a wider economic benefit, is also developing. Early papers argued that European added value is particularly relevant for cross-border projects (Exel et al 2002), but this would not be questioned today. They proposed methods to measure indirect effects, which are synonymous with wider economic effects, and to consider the dynamics between transport, the production system and international trade (Schade/Rothengatter 2004). Recent papers suggest further methods to measure European added value e.g. building on the assessment of spillovers of single sections of a large project and then suggesting increased European co-funding for those sections that would generate high spillovers across borders. In general, these would also be cross-border sections, though this could not be generalised as other factors play a role to generate spillovers (Gutiérrez et al. 2011). Proost et al. (2011) additionally point out that the share of through traffic and the marginal cost of public funds should determine whether EU co-funding for transport projects is provided. The French Quinet Report recently recommended extending CBA by looking at the macro-economic effects (GDP and employment) of transport projects (CGSP 2013).

A further example of European added value is demonstrated by the analysis of the socio-economic impact of the NEAT. The most recent assessment estimates a socio-economic benefit of CHF 174 million for the neighbouring EU countries, while Switzerland is experiencing a cost of CHF 205 million (Ecoplan/Infras 2011, p. 56). It is important to note that (i) the benefits of freight transport particularly accrue in the neighbouring countries, while the larger share of passenger benefits goes to Swiss citizens, and (ii) a method was applied largely building on the direct benefits of transport than on the indirect benefits.



## 6. RECOMMENDATIONS FOR ASSESSMENT, PROCUREMENT AND ELIGIBILITY FOR FUNDING

### KEY FINDINGS

- Transport planning should be based on three pillars: **Strategic goal setting, systems analysis for optimal network design and project assessment**. Often there is too much emphasis on project assessment while its contribution to an efficient network configuration and to strategic goals is neglected.
- For systems and project analysis a **European transport model** is needed. The developments for the Commission do not meet essential requirements such that further methodological progress is necessary. Beyond traditional CBA (cost-benefit analysis) risk aspects, a phased approach and wider economic impacts should be analysed for large projects.
- **Environmental assessment** is widely applied in the form of an EIA (environmental impacts assessment) while a standard SEA (strategic environmental analysis) is being developed for evaluations in some member countries. A CIA (climate impact analysis including infrastructure provision, vehicle production and upstream/downstream processes) is a new challenge, propagated by the European Parliament and included in the new TEN-T guidelines.
- More emphasis should be paid to a detailed design of a large project in the **early phase of planning and procurement** to avoid fuzzy project definitions and vague impact estimations. Permanent information on the project development, for instance through BIM (building information modelling) for the whole life cycle of a project helps avoid planning and management failures.
- The **maturity** of projects could be a further criterion for prioritising projects beyond CBA and EIA/SEA.
- Clear eligibility conditions, in particular **conditionality criteria**, should be set and enforced. High co-funding rates might cause a moral hazard, in the sense that member countries design their transport infrastructure investment programmes to maximise subsidies. Therefore the subsidiarity principle of national planning has to be complemented by EU control and monitoring with growing co-funding rates.
- **Large projects could be classified** according to economic viability, maturity and conditionality, into top priority, priority and promising projects.
- **Funding rules should be harmonised**. The European Commission has developed a proposal for setting up a Common Strategic Framework (CSF) for funding, including ERDF and CF but not TEN-T funding. This is certainly a step in the right direction for making the funding options and the control of funds allocation more transparent.
- A **central data office** is recommended (e.g. within the TENtec information system operated by INEA) for compiling the project dossiers (fiches) with links to all underlying documents, and for the monitoring of key performance indicators during the operation phase after project completion.
- **Early participation of stakeholders** is indispensable because of the growing risk of resistance of the population to large transport investment projects.



## **6.1. Improvements of Assessment Methodology**

In the first study the following aspects were discussed:

- Integration of long-term strategic goals
- Systemic analysis for the choice of best network design and project alternatives
- Development of a sound multi-modal European transport model
- Use of more sophisticated methods for the evaluation of economic impacts
- Interdependency analysis
- Explicit integration of dynamic feedbacks
- Explicit consideration of uncertainties
- Improved standards for EIA, SEA and CIA.

The extended analysis in this second study has underlined the importance of these aspects. They do not play a dominant role in national assessment because in many countries large transport infrastructure projects are the exception rather than the rule in public investment planning. In the European context of core network corridors however, they are very important because the methodology of traditional cost-benefit analysis, based on national traffic forecasting studies, does not capture the full national and European values of transnational infrastructure improvements. In recent revisions of national assessment methodologies (in France and Germany) the aspects of risk/uncertainty, interdependence and wider economic impacts are treated explicitly which underlines their relevance.

### **6.1.1. Treatment of risk/uncertainty in the French assessment**

Most CBA studies assume that risk need not be considered for public projects. They refer to the Lindahl theorem which concludes that the risk of public investments can be perfectly spread across the projects, such that the variance of the total investment budget is zero. There are, however, serious doubts that this can be assumed for large transportation projects. The first reason is the appraisal bias (see Flyvbjerg et al., 2003) which causes most public projects to incur higher costs and lower benefits than planned. The second reason is that systematic risks exist which cannot be correctly identified in the planning phase. This particularly concerns the transport drivers which are inputs for transport forecasting, for example GDP, employment or technology development. The third reason is that the project itself is exposed to specific risks which cannot be generalised, for example construction risks or demand risks in the case of competition. All these risks need to be taken into consideration and treated appropriately, for example the appraisal bias can be avoided by an appropriate procurement process whereas the project-specific risks can be avoided through taking precautions and risk management.

The Rapport Quinet (CGSP 2013) suggests treating the systematic risk with a mark up to the social rate of discount. For projects with a medium life time (ending before year 2070) it suggests a risk free rate of discount of 2.5% and the mark-up for risk of 2%. For projects with a very long life the risk free rate of discount is 1.5% and the mark-up 3%. This means that the overall discount factor is left a constant with 4.5% but it is composed of different elements depending on the life of the project. It is recommended that a sensitivity analysis is applied for the risk mark-ups in the first phase of method application to explore the

range of impacts for the investment decisions. Alternatively the approach of adding risk premiums to the investment cost, as proposed in our previous study, could be followed (Schade et al. 2013 after Flyvberg 2008). The selection of the appropriate approach depends on the risk to be mitigated. When the uncertainty surrounds construction risks (e.g. of tunnels), the latter approach seems more appropriate.

### **6.1.2. Interdependency analysis**

Projects can have substitutive (complementary) relationships, i.e. the sum of the benefits when realising several projects together is smaller (higher) than the sum of the benefits of individual projects. Applying the with/without principle to calculate benefits then leads to incorrect results and wrong rankings. The new methodology of the German transport infrastructure investment plan therefore tries to identify all major interdependencies among projects through network analysis and then bundle the projects to form combinations which can be treated as one project in the CBA. In the case of large projects it is possible to identify the most detrimental parallel investments in the same and in competing modes (e.g. a parallel motorway to a high-speed rail link) and to identify the most important complementary investment actions (e.g. an extension of a shunting yard between a maritime port and a dedicated freight railway line).

### **6.1.3. Treatment of wider economic benefits**

Wider economic benefits were discussed early in the SACTRA Committee (1999) and by Schade/Rothengatter (2004). Recently they have been included in the UK assessment methodology for transport infrastructure investments (DfT 2013). The Rapport Quinet (CGSP 2013) includes an extensive discussion of impacts which are not included in traditional CBA. These are:

- effects of imperfect competition (strategic behaviour of agents)
- spatial agglomeration impacts
- macro-economic impacts
- redistributive impacts.

The Rapport Quinet refers to a number of methods to integrate and treat such effects, which are partly quoted in our first study. It concludes that it is desirable to include wider economic impacts in the surplus calculation. As there is no scientific consensus on which methods are best suited to quantify the different types of wider economic impacts and there is a high risk of double counting "mandatory" and "wider" benefits in the CBA the report suggests quantifying such impacts for large projects only, and monitoring appropriate studies through a neutral expert committee. We conclude that for large projects it will also be necessary to quantify the wider socio-economic benefits.

## **6.2. Recommendations for the planning and procurement process**

The recommendations given in the first study stressed:

- the need for reliable information and adaptation/change management,
- the need for coherence between planning and financing.

We extend these points here by emphasising the importance of generating reliable information in the early phase of a project and establishing an information modelling system which guides the information process of a project for its entire life cycle.

In many cases the planning phase starts by collecting preliminary data from other projects or from historical experience to generate rough figures on costs and benefits. In this environment of fuzzy information, important decisions are often taken in favour of a particular alternative or for the exclusion of competing alternatives from consideration (see the case study on the Stuttgart-Ulm railway project). Feasibility studies carried out in an early phase can include many speculative elements sidelining options which, with a better information base, might have been maintained for further assessment. Therefore we recommended more investment in the planning of the early phase of a project, to investigate relevant alternatives so that there is a clear definition of the preferred alternative (see the project Rail Baltic(a) for an unclear project definition). An appropriate design and a sound estimate of all requirements are also needed for implementation.

It is important to establish a building information modelling tool (BIM) which incorporates all relevant data of a project, making it possible to reconstruct or predict every step of planning and implementation. Architects and planners apply BIM with a three-dimensional modelling of the project which makes it possible to zoom to every component in detail. This is the precondition for constructing reliable time paths required to realise and estimate the risk of any disturbance or change of proposals by policy makers. The delays and cost overruns have been caused in many cases by changed policy requirements or by neglecting environmental issues.

For instance, in the case of the on-going Berlin-Schönefeld airport project, the former chief architect and planner listed more than 300 major changes which were brought in by policy makers. In contrast to this negative example the planning and implementation of the London Olympic Games infrastructure was conducted by a strong team with clearly assigned responsibilities on the public and private side, supported by strong data management. The team was prepared for change management and confronted policy makers immediately with the consequences of changes, including additional costs. This moderated the appetite for frequent interference by policy makers and allowed the inclusion of early efficiency enhancing changes without major consequences for the cost and time planning.

### 6.3. Maturity of projects and priority ranking

While socio-economic evaluation aims primarily to provide a check of the economic viability of a project, it is important to rank projects according to the timing of their implementation. It is not sufficient to use the benefit-cost ratio for priority ranking, as it has been suggested in many standard CBAs. The first reason is that the time trajectories of benefit streams can be very different: projects which provide missing links in a network will provide significant benefits immediately after opening, while projects providing wider economic benefits may realise their highest benefit streams in a later phase. Secondly, the state of maturity of projects may depend on:

- planning,
- legal procedures,
- financial arrangements (e.g. in the case of joint public finance and PPP),
- risk evaluation and management,
- project management (e.g. in the case of setting-up a managing company),
- tendering and contracting.

Thirdly, there may be projects which are less acceptable by particular stakeholder groups and may result in protest actions and conflicts leading to longer procedures in courts. The probability of delays, changes of project design or increase in costs is particularly high if environmental and noise protection or unsolved land use/expropriation problems are the reasons of such conflicts. Therefore the state of maturity of a project is an important indicator for its priority setting, as it is proposed by the NETLIPSE IPAT analysis (see section 4.1).

Based on these considerations we recommend classifying large projects into three categories:

- top priority projects: projects with high economic priority which are mature for implementation
- priority projects: projects with high economic priority for which maturity for implementation is being developed
- promising projects: projects, which are not finally defined, could be re-designed because of high costs, have unsolved barriers or possible interdependencies with other projects. These projects will need a redesign to show positive results for CBA or have wider economic impacts for a realistic configuration.

Similar considerations can be found in the report by the French Mobility 21 Committee (Commission Mobilité 2013) or the revised German evaluation methodology for transport infrastructure projects. This type of priority setting could be reflected through co-funding planning and construction work for eligible large projects.

## 6.4. Eligibility criteria and funding rules

In the first study the following issues were addressed:

- eligibility and conditionality and
- harmonisation of funding regulations

It was emphasised that low requirements for project maturity and viability and high co-funding rates can lead to appraisal bias and moral hazards. Therefore stricter control and monitoring of EU co-funding would increase efficiency of investment policies in transport. This would require embedding large projects into a long-term national development (master) plan for transport infrastructure. Such an integrated national multi-modal master plan could be supplemented by an obligatory life cycle analysis for the transport infrastructure investment programme. This would include the maintenance and operation costs and call for long-term financial provision for maintenance and operation. Integrating such requirements into the conditionality criteria would increase the motivation of member states to develop plans for real transport needs and for financial sources which may exist after EU financial assistance for the transport network has been terminated.

Harmonising funding regulations for the different EU funding instruments would make the funding options more transparent, by reducing transaction costs and the risks of pure fund-seeking strategies. The plans of the Commission for laying down common provisions for funds as presented in COM(2012)496 move in the right direction.

## 6.5. Improving information and participation

The conclusions of the first study were:

- A data office should be established, possibly within INEA, to record all relevant and valid project information, including national sources, in a project file with links to data sources held by other organisations. The new TEN-T legislation (EU REG 1315/2013, Art. 49.1) requests that the TENtec system “*shall include all relevant data concerning projects of common interest in receipt of Union funding*”. However, detailed specifications concerning the relevant data have been made for the implementation phase, but not for the planning phase, which generates the risk that the relevant planning data will not be made available in the EC systems.
- Participation of stakeholder groups should be organised as a continuous process which does not stop after legal approval of a project. At an early stage of project development, alternative options should be discussed within a mediation process. A large part of a large complex project could be planned flexibly such that compromise solutions are possible.

The research activities for the two EP studies on large projects have shown that the transparency of project data varies by project and country. Information received from INEA concerns particular sections of projects and their eligible costs/co-funding volumes while comprehensive information on the whole project including transport forecasting, assessment and financial plans is an exception rather than the rule. Information had to be

compiled from different sources to get a complete picture of a large project and this was not successful for every case study.

Although it is understandable that in the case of involvement of private partners (PPP) the latter will not be willing to publish their private calculations it should be possible to make all transactions, which lead to public expenditures or to public risk, transparent. It could be considered the inclusion of basic data requirements in the list of conditionalities for EU co-finance.

Full transparency would also help increase the confidence of stakeholders in the sincerity of public and private promoters of a project. Possible conflicts would be revealed at an early stage and could be solved either by project modifications with modest consequences for the project costs or by re-configuration of the network plans.



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