Ex post evaluation of cohesion policy interventions 2000-2006 financed by the Cohesion Fund – Work Package B: Cost-benefit analysis of selected transport projects

INCEPTION REPORT

15th February 2010
# Work Package B: Cost-benefit analysis of selected transport projects

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Executive Summary

Frontier Economics, together with Atkins and the Institute of Transport Studies, University of Leeds, is pleased to present this Inception Report for the “Ex post evaluation of cohesion policy interventions 2000-2006 financed by the Cohesion Fund – Work Package B: Cost-benefit analysis of selected transport projects”.

EU Regulations require the ex post evaluation of all projects co-financed by the Cohesion Fund and ISPA. However, ex post evaluation also offers an opportunity to assess the economic and social impact of such EU policy interventions and to learn from experience gained in practice. Examining the project results using ex post evaluation should help improve project design and appraisal in future cohesion policy programmes.

This study focuses on the ex post evaluation of transport projects. The Terms of Reference (TORs) identify the three key questions that this study should address:

- Question 1: What were the impacts of the examined projects?
- Question 2: How can ex post cost benefit analyses (CBA) contribute to the practice of ex ante cost-benefit analysis?
- Question 3: What are the potential and the limits of ex post CBA as a tool to identify the impact of infrastructure projects?

To address these questions, as specified in the TORs, we will need to carry out three sequential tasks.

- In Task 1, we will select, out of the list of 40 transport schemes provided in the TORs, a shortlist of 20 projects. For each project, we will carry out an initial review. The results of this review will be presented in a three-page project description, which will include an initial overview of the quality of the ex ante CBA, information on the degree of completion of the project, and the identification of the data requirements to complete a full ex post CBA. We will use the results of this review to select ten transport schemes for in-depth ex post CBA analysis.

- Task 2 is the core of the study and focuses on the ten selected transport schemes. In this task, we will first carry out a review of any existing ex ante cost-benefit analysis carried out at the time of the funding application. We will also review any interim progress report where available. This initial review will act as the background material for the in-depth ex post evaluation of these projects, which will provide an assessment of the overall performance of the investment. We will base the ex post evaluations both on the data currently available and, where necessary, on data collected by the project team. We will then compare the results of the ex post evaluations
with any available ex ante evaluations, to assess the appropriateness of this methodology and to identify any cause for possible discrepancies between expected results and actual outcomes.

Finally, in Task 3, we will assess the potential for ex post cost-benefit analysis to become an integral part of the infrastructure funding appraisal and evaluation process. We will identify the lessons that can be drawn from ex post evaluation to help improve the methods of ex ante evaluation. This will offer project sponsors and key decision makers a more robust framework to support their investment decisions. In particular, we will gauge the extent to which the use of ex post CBA can strengthen the evidence base underpinning the ex ante analysis in several areas of project appraisal. We will also focus on identifying methodological strengths and weaknesses of specific areas of ex ante appraisal. When appropriate, we will seek to define ways to address these issues. Finally, we will also consider any strength and weakness of the project evaluation process as a whole.

As part of this Inception Report, we have carried out an initial overview of the economic literature in the field of CBA for the appraisal and evaluation of transport infrastructure projects. The purpose was to introduce a few key themes, which we will explore in detail throughout the study and, more specifically, as part of Task 3. Those key themes are:

- the main roles of CBA in the context of European transport infrastructure planning;
- the strengths and weaknesses of ex ante CBA for appraisal;
- possible methods for appraisal and evaluation alternative to CBA; and,
- the role of ex post CBA.

There are many roles for CBA in transport infrastructure planning. Principally, CBA is used:

- to prioritise projects for funding from given budgets;
- to determine whether a project makes efficient use of resources, yielding benefits that exceed the costs at a given social discount rate;
- to determine whether a project is financially viable – an analysis which rests on much of the same data as the social CBA, but focuses on the financial revenues and costs to the operator;
- to choose between alternative options to carry out a project (e.g. different route options); and,
- to optimise the timing of projects – bringing them forward or postponing them (deferment).

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CBA is often used in transport infrastructure planning as it offers some significant advantages:

- since it was introduced in the late 1950s, it has developed and become well established both in practice and in methodology;
- it relies on what could be objective data, although the objectivity of CBA should not be taken for granted as it depends on the institutional arrangements within which CBA is conducted; and
- it can address project risks and be used to present them to decision-makers in an understandable way.

While it offers some significant advantages, ex ante CBA has some unresolved issues. The literature suggests that two possibly significant weaknesses of ex ante CBA are:

- the treatment of economic performance impacts, for example on GDP and employment; and,
- the comprehensiveness of CBA in relation to the full set of significant impacts, including environmental pollution.

Together, these omissions strongly suggest that ex ante CBA is not a complete representation of the costs and benefits for transport infrastructure projects. However, it is standard practice across the EU to mitigate this concern by setting CBA alongside (or within) another appraisal framework which is able to accommodate quantitative (but non-monetised) or qualitative assessments.

The main alternative methods to CBA are multi-criteria analysis (MCA) and framework approaches. In practice, in many countries a combination of CBA with either an MCA or a framework approach is used to capture a wider set of impacts. Both MCA and frameworks are structured around the objectives of the project (and potentially the wider policy objectives).

The international experience of ex post CBA evaluation of transport projects is relatively limited. England and France are two examples of EU Member States where some form of ex post CBA is currently in place. In England, the Highways Agency (HA) currently evaluates all trunk road schemes implemented as part of the Major Schemes Programme (that is, schemes with a capital investment cost of greater than £10m). This process is known as POPE (Post Opening Project Evaluation). In France, the Internal Transport Act 1982 (Loi d'Orientation des Transports Intérieurs) introduced a new requirement for an ex post evaluation of the economic and social performance of any major transport infrastructure project, five years after its opening. The Act also requires this report to be made public. According to the Act, ‘major’ infrastructure projects are all those costing €82m or more.

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With regards to international experience in general, Flyvbjerg (2007) has found that misinformation about the costs and the benefits of major infrastructure projects is widespread. These results highlight the importance of rigorous ex post evaluation to check and validate the ex ante appraisal approach. We will explore these methodological issues in more detail during Task 3 of the study.

The timetable for this study is as follows:

<table>
<thead>
<tr>
<th>Deliverables</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inception Report</td>
<td>15th February 2010</td>
</tr>
<tr>
<td>Project Description Report</td>
<td>15th March 2010</td>
</tr>
<tr>
<td>Progress Reports</td>
<td>Every month, when no other deliverable is required</td>
</tr>
<tr>
<td>First Interim Report</td>
<td>14th May 2010</td>
</tr>
<tr>
<td>Second Interim Report</td>
<td>15th October 2010</td>
</tr>
<tr>
<td>Seminar with Member States</td>
<td>Early December 2010</td>
</tr>
<tr>
<td>Draft Final Report</td>
<td>15th January 2011</td>
</tr>
<tr>
<td>Final Report</td>
<td>18th March 2011</td>
</tr>
<tr>
<td>Two presentations</td>
<td>To be decided during the course of the study</td>
</tr>
</tbody>
</table>

As shown in the table above, the next deliverable for this study is the Projects Descriptions report. This report will cover the activities required by Task 1 of the study. As indicated in the table above, we will deliver the Project Description Report to DG REGIO on March 15th 2010 at the latest.
1 Introduction

Frontier Economics, together with Atkins and the Institute of Transport Studies, University of Leeds, is pleased to present this Inception Report for the “Ex post evaluation of cohesion policy interventions 2000-2006 financed by the Cohesion Fund – Work Package B: Cost-benefit analysis of selected transport projects”

1.1 Context

The Cohesion Fund was established in 1993 to strengthen the economic and social cohesion of the European Union. Its aim is to help less prosperous EU Member States and accession countries to fully participate in the Economic and Monetary Union from 1999 onwards. The eligibility criterion is that the GNP per capita is 90% or less than the EU average.

During the period 2000-2006, 17 countries have received funding from the Cohesion Fund and ISPA (Instrument for Structural Policies for Pre-Accession, aimed at accession countries) for transport and environment projects.

EU Regulations require the ex post evaluation of all projects co-financed by the Cohesion Fund and ISPA. However, the objective of the ex post evaluation is not just to comply with regulatory requirements but crucially to establish the economic and social impacts of such EU policy interventions, to learn from experience gained in practice, and to reflect on the methods used to select, design and appraise projects. The aim is to use the results of ex post evaluation to try to improve project design and appraisal in future cohesion policy programmes.

1.2 Objectives of the study

This study focuses on the ex post evaluation of transport projects. The Terms of Reference (TORs) for Work Package B identify the three key questions that this study should address:

- Question 1: What were the impacts of the examined projects?
- Question 2: How can ex post cost benefit analyses (CBA) contribute to the practice of ex ante cost-benefit analysis?
- Question 3: What are the potential and the limits of ex post CBA as a tool to identify the impact of infrastructure projects?

The first question is specific to the ex post evaluation of ten major transport projects, chosen from the long-list of 40 projects provided in the TORs. This analysis needs to determine if these projects have achieved the social and economic objectives for which they were designed and financed by the Cohesion Fund.
The analysis also needs to verify whether these objectives were achieved in the most cost-efficient manner, without cost overruns or delays.

Questions 2 and 3 follow on from the outcome of the analysis for Question 1 and are instead methodological. They focus on (i) assessing the potential future role of ex post CBA as an evaluation tool; and (ii) on how ex post CBA can be used to improve the practice of ex ante project appraisal. This assessment should also take into account the institutional capacity of the Cohesion Fund beneficiaries to undertake CBA exercises.

1.3 Structure of this report

This Inception Report is structured as follows:

- Chapter 2 provides a description of the methodology that we will follow in this study.
- Chapter 3 discusses the data requirements for the study, with a focus on the necessary primary data and on our proposed approach for sourcing this information.
- Chapter 4 presents an overview of the existing economic literature, exploring the roles of cost-benefit analysis in European transport infrastructure planning, the strengths and weaknesses of this approach for ex ante appraisal and the experiences and lessons learnt to date.
- Chapter 5 describes the project management aspects of this study, focusing on the allocation of responsibilities between the members of the study consortium, the study timetable, and the key deliverables.
- Chapter 6 provides a brief overview of the immediate next steps of this study.
2 Methodology

Our methodology seeks to address the requirements stated in the TORs and the recommendations tabled by the Evaluation Unit in DG REGIO at the project kick-off meeting held on January 7th 2010 in Brussels.

We note that the success of the study depends crucially on data quality and availability. Chapter 3 discusses the data requirements for this study and the information that we will seek to obtain. It also describes the operational approach that we aim to follow to source the necessary information.

2.1 Task 1: Selecting 10 major transport projects for ex post CBA

The TORs provide a list of 40 transport projects that could be included in this study. The objective of Task 1 is the selection of, ten major transport projects from the original list. These projects will be the subject of a complete ex post cost-benefit analysis.

Three sequential subtasks are necessary to complete Task 1:

- Task 1.1: set criteria to generate a shortlist of 20 projects;
- Task 1.2: prepare, for each of the shortlisted projects, a three-page description; and,
- Task 1.3: select, on the basis of these descriptions, ten projects for an ex post evaluation in Task 2.

We describe each in turn below.

2.1.1 Task 1.1 – Set criteria for short-listing 20 projects

The first subtask will define a set of criteria to generate a shortlist of 20 projects for initial scrutiny out of the original longlist of 40 projects listed in the TORs. Ten of these projects will then be subject to full ex post evaluation. This section illustrates the criteria that we plan to use for shortlisting projects.

We believe the shortlist should be representative of the overall EU funding received, both in absolute terms and in terms of its distribution across types of projects and different countries.

Specifically, the project shortlist should aim at balancing the following key criteria:

- **Size of EU funding:** the project shortlist should try to cover as much as possible the extent of the value committed by the European Community in monetary terms. For example, the three high-speed rail
projects suggested by DG REGIO in the TORs account for more than 32% of the total funding granted to the projects included in the initial 40-project list.

- **Regional distribution of EU funding**: shortlisted projects should be representative of the distribution of funding across various regions. In the 40-project selection, projects in Greece, Ireland, Portugal and Spain account for approximately 66% of total funding, while projects in Central and Eastern Europe countries account for 34%.

- **Transport mode distribution of EU funding**: the project shortlist should also reflect the distribution of EU funding allocation across the various transport modes. While there are 19 road projects and 19 rail projects in the long list of 40 projects proposed by the European Commission, rail projects account for the largest share of EU funding, 63.6%, compared with 32.5% for roads.

- **Availability of information**: when compiling the shortlist, we should be aware of information and data availability issues, including the quality of ex ante project appraisal. As a general rule, the shortlist will tend to include those projects for which information is either available or readily obtainable.

- **Degree of completion of the projects**: finally, we should also prioritise projects that are complete and have been operational for some time. This is needed to ensure that enough post opening data and information are available to complete an ex post CBA and to compare it with the ex ante analysis.

We will compile the 20-project shortlist by balancing these criteria, with the objective of selecting a representative sample.

We next show the steps we plan to follow to select the 20 projects for Task 1.2, applying the criteria listed above.

- **Size of EU funding**: the projects included in the shortlist should try to reflect the amounts of EU contributions received by the 40 projects included in the TORs. The 20 projects with the highest Cohesion Fund contributions account for 80% of the total amount of contributions in the original list of 40 projects during the 2000-2006 period. Therefore, subject to other criteria, we plan to use the amount of EU funding as a first filter to select those projects which account for the largest shares of EU funding.

- **Regional distribution of EU funding**: the distribution of funding across regions in the shortlist of 20 projects should be similar to that distribution in the original list of 40 projects. **Table 1** below shows that, in the original list of 40 projects the number of projects in Greece, Ireland, Portugal and Spain...
is the same as that in Central and Eastern Europe. However, the projects in
Greece, Ireland, Portugal and Spain account for approximately 64% of the
EU contributions, while projects in Central and Eastern Europe countries
account for 36%.

Table 1. Regional distribution in the original 40-project list.

<table>
<thead>
<tr>
<th>Regional distribution</th>
<th>Number of projects</th>
<th>% of CF contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greece, Ireland, Portugal and Spain</td>
<td>20</td>
<td>63.8%</td>
</tr>
<tr>
<td>Central and Eastern European countries</td>
<td>20</td>
<td>36.2%</td>
</tr>
</tbody>
</table>

Source: Own calculations using TORs data for 40 selected projects.

- **Transport mode distribution of EU funding**: the distribution of funding
  across different transport modes in the 20 projects shortlist should be similar
to that distribution in the original list of 40 projects. Table 2 shows that
there are 19 rail projects, 19 road projects, 1 port project and 1 airport
project in the original list of 40 projects included in the TORs. However,
rail projects tend to have larger capital costs than road projects, thus
accounting for 62% of total funding. Road projects account for 34%, while
the only port and airport projects account for 3% and 1% of EU funding,
respectively.

Table 2. Transport mode distribution in the original 40 projects list.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Number of projects</th>
<th>% of CF contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport</td>
<td>1</td>
<td>0.7%</td>
</tr>
<tr>
<td>Port</td>
<td>1</td>
<td>3.4%</td>
</tr>
<tr>
<td>Road</td>
<td>19</td>
<td>34.3%</td>
</tr>
<tr>
<td>Rail</td>
<td>19</td>
<td>61.5%</td>
</tr>
</tbody>
</table>

Source: Own calculations using TORs data for 40 selected projects.

Table 3 brings together the regional and transport mode distributions. It shows
the percentage of funding for each region-transport mode combination. The
funding for rail projects in Greece, Ireland, Portugal and Spain is approximately
three times as large as the funding for road projects. This picture is somewhat
different in Central and Eastern Europe, where a larger share of EU funding is channelled to road projects.

**Table 3. Distribution of funding between regions and modes**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Greece/Ireland/Portugal/Spain</th>
<th>Central and Eastern Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport</td>
<td>0%(0)</td>
<td>0.73%(1)</td>
</tr>
<tr>
<td>Port</td>
<td>3.42%(1)</td>
<td>0%(0)</td>
</tr>
<tr>
<td>Road</td>
<td>14.97%(8)</td>
<td>19.33%(11)</td>
</tr>
<tr>
<td>Rail</td>
<td>45.37%(11)</td>
<td>16.17%(8)</td>
</tr>
</tbody>
</table>

Source: Own calculations using TORs data for 40 selected projects.

We will use this distribution as a guide for preparing the 20-project shortlist. However, as noted above, we need to balance the criteria of representativeness (both for transport mode and for region) with the need to include projects with good and sufficient information to facilitate the successful completion of Tasks 2 and 3. Moreover, by choosing completed projects which are already operational we will increase the likelihood of obtaining the post-opening data necessary to carry out an ex-post CBA.

**Figure 1** below shows a preliminary 20-project shortlist, prepared following the criteria described above. However, we are currently in the process of reviewing the initial 40-project list and we will provide a final shortlist in the second deliverable for this study, the Project Descriptions report.

**Methodology**
Figure 1. Preliminary 20-project shortlist

<table>
<thead>
<tr>
<th>Subsector</th>
<th>EU funds, EUR</th>
<th>EU funds, % of total funds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Greece/Ireland/Portugal/Spain</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 * Spain</td>
<td>Línea de alta velocidad Madrid - Barcelona - Frontera francesa</td>
<td>1,420,390,636</td>
</tr>
<tr>
<td>2 * Spain</td>
<td>Línea de Alta Velocidad Madrid-Levante</td>
<td>541,281,940</td>
</tr>
<tr>
<td>3 * Spain</td>
<td>Autovía de Levante a Francia por Aragón</td>
<td>156,734,306</td>
</tr>
<tr>
<td>4 * Spain</td>
<td>Ampliación del Puerto de Gijón</td>
<td>247,500,000</td>
</tr>
<tr>
<td>5 * Greece</td>
<td>Egnatia Odos</td>
<td>341,449,971</td>
</tr>
<tr>
<td>6 * Greece</td>
<td>Deviation Agiou Konstantinou</td>
<td>146,062,798</td>
</tr>
<tr>
<td>7 * Greece</td>
<td>New Railway Korinthos-Kalo</td>
<td>49,900,000</td>
</tr>
<tr>
<td>8 * Greece</td>
<td>Railway line Thriassio Pedio-Eleusina-Korinthos</td>
<td>128,500,000</td>
</tr>
<tr>
<td>9 Portugal</td>
<td>Modernização da Ligação ao Algarve</td>
<td>352,486,946</td>
</tr>
<tr>
<td>10 Portugal</td>
<td>MODERNISATION DE LA LIGNE DU NORD V</td>
<td>214,227,610</td>
</tr>
<tr>
<td>11 * Ireland</td>
<td>M1</td>
<td>144,604,730</td>
</tr>
<tr>
<td>12 * Ireland</td>
<td>Houston Terminal and South-West Rail Corridor Development</td>
<td>74,970,000</td>
</tr>
<tr>
<td><strong>Central and Eastern Europe</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 * Poland</td>
<td>Construction of A1 motorway, section: So?nica - Gorzyczki</td>
<td>329,057,524</td>
</tr>
<tr>
<td>14 * Poland</td>
<td>Construction of A2 motorway</td>
<td>325,325,094</td>
</tr>
<tr>
<td>15 * Czech Rep.</td>
<td>Modernisation of E30 railway line</td>
<td>178,945,623</td>
</tr>
<tr>
<td>16 * Lithuania</td>
<td>IXB Transport Corridor</td>
<td>121,868,535</td>
</tr>
<tr>
<td>17 * Hungary</td>
<td>Eastern Section of the MO Budapest Ring Road between National Road 4 and M3 Budapest-Cegled-Szombathely</td>
<td>284,659,050</td>
</tr>
<tr>
<td>18 * Hungary</td>
<td>Construction of the Budapest-Cegled-Szombathely Railway line - Modernisation of the Rail Track Szenvice-Orf and Stations Raca-Trnava</td>
<td>119,818,800</td>
</tr>
<tr>
<td>19 * Slovenia</td>
<td>Construction of the Trans-Sava Teachers College - Velenje</td>
<td>53,093,520</td>
</tr>
<tr>
<td>20 * Romania</td>
<td>Rehabilitation of the national road DN6-Section Craiova-Dobrota Tumu Severin</td>
<td>70,061,877</td>
</tr>
</tbody>
</table>

Central Europe Total 20 2,818,366,971 34%

TOTAL 48 7,633,746,946 100%

Source: TORs
2.1.2 Task 1.2 – 3-page project descriptions

As requested in the TORs, we will prepare a 3-page description for each of the 20 shortlisted projects. We will populate these short reports by reviewing the characteristics of each scheme in terms of location, transport mode and number of individual projects contained, existing documents, data, and information gathered from relevant contacts in the Member States.

The 3-page descriptions will include an initial overview of the quality of the ex ante CBA undertaken, information on the degree of completion of the project, and the identification of the data requirements to complete a full ex post CBA. Whenever possible, we will assess any delay and cost overruns (or savings) achieved during the implementation of the project and their possible causes.

The project descriptions will also present the contacts we have established with the responsible people of the various schemes and the information we will receive and plan to receive from them. In addition, the project descriptions will include which documents and data we have already received, which we have received confirmation of their existence but are not yet available to us and those for which we have not received confirmation of their availability.

We believe that the template fulfils the requirements set out in the TORs, specifically:

- it lists the objectives of the scheme (including to which TEN-T priority project or corridor the scheme belongs to, if any);
- it identifies available data and sources for obtaining additional information (both ex ante and ex post) to support ex post evaluation;
- it sets out the needs for additional data collection;
- it summarises early information regarding time and delivery overruns/cost savings during implementation; and,
- based on the assessment above, it makes preliminary recommendations as to whether the scheme could be carried forward to Task 2 for a full ex post CBA.

Project template examples

As part of this Inception Report, it was agreed that the team would provide two examples of templates to investigate and report any relevant issues and potential sources of data. Annex 1 provides two examples of a nearly-completed Project Description Template, namely:

- New Railway Line (Korinthos – Kiato) in Greece; and

Methodology
A2 Motorway (between Konin - Strykow) in Poland

The Greek technical staff in the Atkins’ Athens office provided invaluable support by liaising with existing contacts within ERGOSE, the body responsible for implementing railway improvement projects in Greece. This facilitated the collection of many documents related to the CBA and supporting appraisal. The Feasibility Study for the Scheme contains the Traffic Demand and Economic Assessment Reports, which also includes the CBA calculations. We also established contacts with the Greek Ministry of National Economy (Section of Cohesion Fund Financing), which, following receipt of DG REGIO’s letter, confirmed its willingness to supply further information relating to the financial aspects of the scheme. We have also indentified various post-opening data sources, such as traffic accidents (from ELAS – the Greek police), and rail patronage and freight volumes (from TRAINOSE – the organisation responsible for the operation of the Greek railways), thus reducing the additional data collection requirements should this scheme be taken forward for a full evaluation.

We completed the A2 Motorway template with the assistance of an Atkins in-house Polish speaker. Our enquiries have centred on developing contacts at the Polish highway authority (GDDKIA). These initial discussions have been successful and we have already sourced a number of appraisal-related documents (hard copies are being couriered from Poland where electronic documents are not available). This has been supplemented by the provision of pre-and post opening traffic flow data and accident statistics on the A2 and surrounding local highway network, with the “before-opening” data being particularly comprehensive. Unfortunately only one observed traffic count survey is available on the A2 itself since the scheme opened. It is understood from our contacts that additional count infrastructure is being installed and this will be operational in June/July 2010. However, this may not fit in with the evaluation timescales discussed later in this report. Therefore, we will consider whether to undertake a small number of supplementary traffic surveys to complement existing available data. We have already obtained the Forecasting Report. This will allow us to determine whether any ‘before’ or ‘after’ journey time surveys have been undertaken. Depending on these findings, additional surveys may also include some journey time measurements on the A2 and surrounding highway network.

These Greek and Polish examples illustrate the measures we are taking to ensure that all possible sources of information are utilised for two sample schemes which have been researched in this first instance.

There are some lessons learnt from these first examples.

- Language skills are crucial to investigate relevant data sources and to liaise with local Government offices.
The CBA-related data contained within the CD is of varying quality, but no scheme that we have investigated to date (with the possible exception of the M1 Motorway in Ireland) contains information of the quality required to complete the templates in full.

Our approach has been to liaise with the country-specific contacts to derive CBA material, and in every case looked at so far, this has been successful.

There is a time lag, however, in Government offices releasing relevant documents, but the recent letter supplied by DG REGIO will help in this regard. Furthermore, some relevant documents only exist in hard copy and authorities are reluctant to release them. A local office with good contacts helps overcome this issue.

We have had little success to date with obtaining contacts at the EIB, however, this remains a possibility if our primary search via government contacts is unsuccessful.

We will refine the exact requirements for primary data collection as we receive the reports. We cannot finalise exact requirements at present, hence the weights needed to assist with sifting from 20 schemes down to ten schemes are not complete for the templates included in this Inception Report. We will need to obtain withheld documents to finalise this.

Some schemes have been implemented in phases, which can equate to long timescales (up to five years) for implementation of a project as a whole. Whilst it may be feasible to disaggregate the costs of a scheme by phases, the benefits generated may not be independent of the other phases, and therefore cannot be disaggregated. It is therefore important to consider pre-opening data before implementation of the first phase, and post-opening data following completion of all phases of a project. This may generate a lengthy time lag between suitable pre- and post-opening data. In these cases, the wider context of influences which may affect travel horizons/trip patterns over and above the implementation of the scheme should be considered. The scheme objectives are clearly stated in the EC Financing memorandum for all of the schemes looked at to date, however, given that our data requirements will be focused on CBA purposes, we would like to discuss with DG REGIO the extent to which we will need to collect detailed information about project objectives.

Obtaining existing data post-opening will not be straightforward as few countries have a centralised traffic or passenger count database. We have started to look for data that may have been collected post-opening.

Methodology
However, we may need to undertake new surveys to complement existing information while minimising any duplication of existing data.

We have assigned scores to the templates in Annex 1 based on a qualitative scoring matrix, which is discussed in the next section. However, it is important to note that these are currently indicative scores and may be refined as further information becomes available and as discussions with the key project stakeholders continue.

Since the kick-off meeting on January 7th 2010, in addition to gathering information for the two projects discussed above, we have reviewed existing documentation for most of the scheme under analysis. We have also established contacts with desk officers at DG REGIO’s Geographic Unit, as well as representative of government departments and transport authorities in several Member States including Greece, Hungary, Ireland, Lithuania, Poland, Portugal, Romania and Spain.

2.1.3 Task 1.3 – Selection of ten major transport projects for ex post CBA

In this last subtask, we will use the project descriptions from Task 1.2 to select ten transport projects for ex post cost-benefit analysis.

To guide this selection, we have defined a qualitative scoring matrix. This approach provides a consistent qualitative assessment framework, which will ensure that the selected projects are representative and the availability and quality of their data is comprehensive. This approach will also ensure that the schemes where the availability and quality of data is most comprehensive are prioritised for progression to Task 2 (Ex post project analysis).

Table 4 summarises the criteria that we will use to select projects and the scoring rationale.

The variation in quality and availability of data is likely to influence the level of analysis that can be undertaken in Task 2. We expect that there will be significant data gaps and that not all the information required as part of a funding application will be easily accessible. When possible, we will focus on selecting project schemes for evaluation where data is more widely available and diverse in nature so that we can maximise the lessons learnt from the completion of Tasks 2 and 3. For this reason, schemes where the data quality is highest are most likely to be carried forward to Task 2.

In the next project deliverable, the Project Descriptions Report, we will recommend a selection of ten transport project to be the subject of an in-depth ex post cost-benefit analysis. We will discuss this proposal with the Evaluation Unit in DG REGIO to agree the final list of projects for Task 2.
### Table 4. Date-Related Prioritisation Scoring Matrix

<table>
<thead>
<tr>
<th>Criteria (weights)</th>
<th>High Standard (4 or 5)</th>
<th>Medium Standard (2 or 3)</th>
<th>Low Standard (0 or 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likely level of support from key contacts involved in the evaluation process (10%)</td>
<td>We have established very cooperative and helpful contact(s) who is able to facilitate the data collection and overall evaluation process.</td>
<td>We have been able to establish a contact who can provide most information but there are still a number of outstanding data requirements that will require resolving if we are to proceed with an ex post evaluation</td>
<td>Getting hold of documents and information to support the evaluation process has been very challenging and largely unsuccessful. Unless the EC can assist further this is not a suitable candidate for further evaluation</td>
</tr>
<tr>
<td>Comprehensiveness of ex ante evaluation baseline data that is readily available (55%)</td>
<td>Comprehensive pre-scheme data has either been provided or can be provided easily and is sufficiently detailed to allow a comprehensive scheme evaluation</td>
<td>Sufficient data is available to support an evaluation of the most crucial aspects of the evaluation.</td>
<td>There is no observed information regarding traffic flows, passenger numbers, journey times, accident rates, etc. to function as a baseline.</td>
</tr>
<tr>
<td>Availability of primary/secondary data from existing sources (20%)</td>
<td>The amount of information available to us is likely to allow for a very comprehensive evaluation and comparison with ex ante appraisal in Task 3</td>
<td>The amount of information available to us is variable in quality or has gaps and as such will provide some contribution to the conclusions derived from Task 3.</td>
<td>There is little or no information which provides very little opportunity for us to learn lessons about scheme appraisal or evaluation methods as part of Task 3.</td>
</tr>
<tr>
<td>Amount of new ex post evaluation primary data required to support evaluation (15%)</td>
<td>Little or no extra data is required as it has already been collected through a process of post-opening evaluation</td>
<td>A relatively significant level of primary data is required to support the evaluation. Specific examples might include traffic counts or journey time surveys, passenger surveys, etc.</td>
<td>There is currently no post-opening data available to support an evaluation. New data will need to be collected at significant cost.</td>
</tr>
</tbody>
</table>

NB: The maximum score for any criterion is 5

### 2.2 Task 2: Ex post project impact analysis

The key objective of this task is to answer the first questions asked by the TORs for this study, specifically:

- **Question 1**: What were the impacts of the examined projects?

Methodology
This task is at the core of the study, and its success depends on the ability to carry out in-depth ex post CBA on the ten selected projects. We expect that our project selection approach described in Task 1 will increase the likelihood of successful ex post evaluations in Task 2.

In accordance with the TORs, we will first carry out an in-depth ex post cost-benefit analysis for two pilot projects for the First Interim Report. We will then complete the remaining eight ex post evaluations for the Second Interim Report.

As indicated in the TORs, this task has three subtasks for each of the selected projects:

- Task 2.1 – A review of ex ante cost-benefit analysis;
- Task 2.2 – An ex post cost-benefit analysis; and
- Task 2.3 – A comparison of ex ante and ex post cost benefit analyses.

We discuss each of these sub-tasks next.

2.2.1 Task 2.1 – Review of ex ante cost-benefit analysis

In the first subtask we will undertake a detailed review of the ex ante cost-benefit analysis of each selected project, focusing on

- the quality of the analysis; and
- its usefulness for the decision process.

The review will be carried out using a combination of:

- desk research: focusing on the documents and spreadsheets available for each project;
- structured interviews with stakeholders: in particular Member States’ representatives, project promoters and funding bodies (including IFIs – EIB, EBRD) and members of DG REGIO’s Geographic Unit;
- project visits: will help to understand scheme context, and local developments affecting the transport network – these will usually be combined with stakeholder meetings, and site visits will be used sparingly; and
- other methods: for example, we may pass selected documents to Steering Group members for comment, where they have mode- or region-specific expertise.
Quality of the Analysis

The Project Appraisal Checklist in the EU Guide to CBA\(^1\) provides a detailed breakdown of the key requirements to complete ex ante cost-benefit analysis for EU-funded projects. We will use the Guide’s recommendations for the review of ex ante project CBAs. Specifically, we will examine the ex ante analysis for each project under the following thematic headings:

- **Context and Project Objectives.** Having gathered this information for the Project Descriptions report, an assessment will be made of its completeness and adequacy. For example: is the role of the project in relation to the wider network clear; and are the background assumptions on macroeconomic indicators explicit, such as GDP growth, as well as demographic indicators, such as population and housing growth? This information underpins the demand forecasts and hence the CBA as a whole.

- **Project Identification.** We will assess whether the project is fully defined in the ex ante appraisal, for example: is the completion date clear and the timescale of works transparent; and are all necessary components of the project included (e.g. approach roads/connecting infrastructure; signalling systems); are specifications clear? ‘Gold-plating’ of projects after the ex ante appraisal is one significant source of cost overruns – this will emerge from the comparison of ex post and ex ante CBAs.

- **Feasibility and Option Analysis.** The Guide recommends assessing various alternatives before choosing a preferred option. We will assess whether a thorough analysis of alternative options was made, including lower-cost options and the ‘do-minimum’ (should be properly defined), and whether the feasibility of the preferred option has been adequately examined.

- **Financial Analysis.** Here we will review the methodology and assumptions relating to:
  - costs of the project (capex and opex);
  - funding arrangements;
  - demand forecasts;
  - behavioural values of time – which are a key influence on demand;

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Methodology
pricing – since prices affect both demand and revenue – including road
tolls, rail access charges, fares and other relevant charges;

interaction with other modes/routes – e.g. modal shift or competing
links/services;

In each case, we will carry out this analysis for the do-something and the do-
minimum scenarios.

Study area definition will also be checked (study area too small to capture the
range of responses to the project is a common issue);

• Economic Analysis. Here too we will review the methodology and
assumptions, including in addition to the financial analysis:

- costs to other parties – e.g. to public authorities of connecting
infrastructure;

- user benefits;

- CBA parameters – e.g. appraisal values of time, safety and vehicle
operating cost (VOC); appraisal periods and discount rates;

- unit of account – factor cost or market prices;

- definitions underlying BCR and IRR – e.g. gross/net BCR, BCR
denominator, and treatment of reinvestment in IRR;

- environmental impacts – to what extent are CO_2 emissions and other
environmental impacts monetised, and are the methods satisfactory;

- quality attributes – such as reliability, comfort and mode-specific
attributes (e.g. High Speed Rail);

- GDP and wider economic impacts – these are of particular interest to
policymakers, so to what extent have these been addressed, and how
robust are the methods used;

The CBA results should include the following information for the
preferred project option (compared with the “Do Minimum” option):

- Net Present Value (NPV), using discounted cost and benefit cash flows;

- Internal Rate of Return (IRR); and,

- Benefit/Cost Ratio (BCR).

• Risk Assessment. We will review the project risk assessment undertaken in
the ex-ante CBA. In particular, we will assess whether the assumptions used
for the sensitivity analysis, and the probabilities attached to specific
scenarios, were realistic and well founded.
Other Evaluation Methods. We will assess whether the other elements of the appraisal (e.g. the Environmental Impact Assessment) are adequate to address the range of impacts likely to be caused by the project.

In the stakeholder interviews, we will not only ask questions designed to supplement our knowledge on the issues above, but we will also explore some relevant institutional questions, for example:

- by whom was the analysis carried out? (costs, demand forecasts and CBA);
- what was/were their relationship(s) to the promoter or funding body?;
- was the analysis audited – if so, by whom, and were the results recorded/available?

Usefulness for the Decision Process

We will assess the usefulness of the decision process primarily through the stakeholder interviews, and will address the following areas of interest.

- From the stakeholder’s point of view, what was the key information provided by the CBA?

- What decisions was the CBA designed to support?
  - EU decision on funding or programme entry?
  - Member state’s decision on:
    - choice between route options?
    - choice between alternative projects?
    - prioritisation among many projects?
    - timing?
    - go ahead or not?
    - value for money?

- At what stage(s) in the development of the project was CBA used, and what was it used for at each stage?

- What performance indicators were most important for the decision maker? (NPV, BCR, IRR, Financial/Economic...)

- Overall, how useful was the CBA in developing the project and reaching decisions about it?

Methodology
• How could the CBA have been improved to make it more useful in decision-making?

2.2.2 Task 2.2 – Ex post cost-benefit analysis of selected projects

This is the central component of this study. Given the complexity of this subtask, we have identified the key steps that we plan to follow for its completion:

• **Step 1: Preparation of Scheme Evaluation Plans (SEPs).** The SEPs will set out the approach that we will follow to evaluate the key impacts of each project. In particular, they will define the type of impacts that we will consider and identify the data requirements to support their ex post evaluation. The SEPs will also set the context for possible discussions with project promoters and for site visits.

• **Step 2: Pilot Projects ex post evaluations.** The TORs require Task 2 to be first carried out for two Pilot Projects. We will choose one rail and one road project, possibly one of them from Greece, Ireland, Portugal or Spain, and another one from CEE countries. In carrying out these ex post evaluations we will include all the elements identified in the EU Guide to CBA and those listed in page 7 of the TORs. Whenever the cost data available are sufficiently granular, we will use the methodology developed in Work Package 10 (*Ex post evaluation of the ERDF in the 2000-06 programming period*) to disaggregate costs. In any case, we will use this methodology to categorise costs at all levels. The ex post evaluation of the two Pilot Projects will be the subject of the First Interim Report.

• **Step 3: Internal workshop.** After completing the two Pilot Projects, we will undertake an internal workshop to compare our findings. This will inform the Project Steering Group and the Expert Panel meetings.

• **Step 4: Steering Group and Experts Panel meetings.** At these meetings we plan to discuss the outcome of the pilots, to understand and discuss the strengths and weaknesses of these evaluations, and to draw lessons for the rest of the study. Based on these findings and the discussion at the meeting, we will revise the methodology for the evaluation of the remaining projects.

• **Step 5: Evaluation of remaining eight projects.** We will complete the remaining eight ex post CBA evaluations in line with the revised methodology and recommendations following the delivery of the First Interim Report. The results of these ex post project evaluations will be presented in the Second Interim Report.

Methodology
With regard to Step 1, we will prepare the Scheme Evaluation Plans on a project-by-project basis, depending on each project’s characteristics and objectives. However, we have already identified the key elements of the CBA that we would review for the following types of schemes.

- **High-speed rail line sections**: the key elements of the high-speed CBA which we will review and evaluate are:
  - construction and operating cost (we would expect a significant ‘optimism bias’);
  - time savings of pre-existing rail travellers;
  - net time savings of air travellers, car users or bus passengers transferring to rail; and,
  - environmental benefits of air travellers transferring to rail (although these may not be as significant as generally assumed).

As this is new infrastructure, new patronage can be relatively easily identified, although we will also look to existing surveys of passengers to understand how many transferred from conventional rail, bus, car and air modes.

- **Conventional rail upgrade schemes**: the key elements of the conventional rail CBA that we will consider are:
  - construction cost (we expect this to be relatively accurate, as usually familiar and well-tried technology is involved; nonetheless, we still expected there to be some ‘optimism bias’);
  - reduced maintenance / operating costs;
  - improved reliability;
  - journey time savings (for both passenger and freight transport); and,
  - modal transfer from road to rail.

Typically, this type of project is often the most difficult to justify in CBA terms, as historically maintenance may well have not been carried out correctly (often due to budget constraints) – this type of project is often described dismissively as ‘maintenance by renewal’.

- **New motorway schemes**: the main elements of a CBA for a new motorway schemes that we will review and evaluate are:
  - construction cost (we expect significant ‘optimism bias’ for major structures such as river crossings and the need for local access over/under bridges);
time savings and vehicle operating cost savings from pre-existing road users; and,

- accident savings, due to improved road engineering.

We note that motorway construction in the countries that benefited from the Cohesion Fund and ISPA has often been accompanied by a rapid expansion in car ownership, meaning that traffic levels have often increased faster than forecast. This may have led to a systematic underestimation of certain benefits in the ex ante CBA.

For all schemes, the ex post CBA will include a sensitivity analysis to identify the critical factors or parameters of each scheme as part of its risk assessment. We will follow the procedures recommended in the DG REGIO’s Guide to Cost Benefit Analysis of Investment Projects to identify the critical variables and perform the sensitivity analysis. The standard range of critical variables includes price dynamics (e.g. inflation rate, wage costs, energy prices); demand factors (e.g. traffic volumes); capital costs (e.g. land costs, time delays); operating costs (e.g. wage costs, fuel costs) and others.

In addition to all the elements in the Guide, as requested by the TORs, the analysis will specifically address:

- Utilisation;
- Validity of assumptions made during the ex ante analyses;
- Risk mitigation measures, including consequences of mitigated and (both foreseen and unforeseen) non-mitigated risks;
- Costs and benefits that cannot be expressed in monetary forms;
- Meeting environmental requirements;
- The contribution of accompanying actions which are outside the project but intended to enhance the project success (qualitative approach only);
- Unintended effects; and,
- The calculation of the margin of error of the ex post cost benefit analysis.

2.2.3 Task 2.3 – Comparing ex ante and ex post cost benefit analysis

In Task 2.3 we will compare the results of the ex post evaluations with the available ex ante project evaluations reviewed in Task 2.1. In carrying out this Task, we will explicitly address:

- the appropriateness of both the financial and economic discount rates used in the ex ante CBA;
the reasons for any difference between ex ante and ex post financial and economic net present values or rates of return;

- the possible reasons for delays and cost overruns, taking into account the methodology and findings identified in Work Package 10; and

- the ex ante risk assessment, in the light of the actual project outcomes.

The outcome of the analysis in Tasks 2.2 and 2.3 will be the Second Interim Report, covering the eight remaining project evaluations, any required amendments to the initial Pilot Projects evaluations, and the results of the comparison between the ex post assessments and the original ex ante CBAs.

### 2.3 Task 3: Assessing CBA as method

In this final task we will assess the potential for ex post cost-benefit analysis to become an integral part of the infrastructure funding appraisal and evaluation process. We will seek to provide an answer to the remaining two key questions asked by the TORs, specifically:

- **Question 2:** How can ex post cost benefit analyses contribute to the practice of ex ante cost benefit analyses?

- **Question 3:** What are the potential and limits to carry out an ex post cost-benefit analysis to identify and/or analyse the impact of projects? Is it an appropriate tool for impact analysis?

The lessons that can be drawn from ex post evaluation can help improve the methods of ex ante evaluation, thus offering project sponsors and key decision makers a more robust framework to support their investment decisions. As the sample of projects subjected to ex post evaluation increases over time, conclusions will become more robust and statistically significant. It will increasingly be possible to use ex post evaluations to enhance the formal guidance methods set out in documents such as the EC Guide to CBA. These enhancements to ex ante evaluation should, in turn, result in more accurate future ex post evaluations.

The possible lessons learnt and the improvements to ex ante CBA methods can be broadly classified under the following three headings:

- **Strengthening the evidence base:** the use of ex post CBA can contribute to develop a more solid evidence base in several areas of project appraisal, including costing, demand responses to infrastructure enhancements, risk analysis of future projects, and environmental impacts.
• **Identifying and responding to specific methodological strengths and weaknesses:** the use of ex post evaluation can, for example, help unearth issues with the approaches used to assess specific cost or benefit items. It can also help identify alternative approaches or techniques to respond to these issues and rectify them in future assessments.

• **Identifying and responding to strengths and weaknesses in the evaluation process as a whole:** as well as addressing specific issues, ex post evaluation can be used to generate a positive feedback loop to fine tune the ex ante evaluation exercise and make sure that it meets the needs of the intended users, that is the project promoters, governments and transport authorities in the Member States and the European Commission.

The last heading is the broadest and introduces issues about the role of CBA in decision-making and ways of mitigating its known weaknesses. The inclusion of some environmental impacts and wider economic impacts in CBA, for example, are often challenging and there is a need for practical ways to take account of them.

In line with the TORs, in Task 3 we will assess:

- the strengths and the weaknesses of the ex ante CBA methods used by funding applicants;
- the effectiveness of CBA as a tool supporting the decision-making process of Member States and the Commission;
- the utility of ex post CBA from the point of view of project promoters, Member States and the Commission;
- the extent to which ex post CBA analysis is an appropriate tool for evaluation of impact assessment; and
- the relevance and potential utility of data obtained from ex post CBA as an input for detailed transport models, to be used to underpin ex ante CBA analysis.

Some of these methodological elements have already been assessed in previous studies and programmes. We will take the results of these studies into account and build upon them to address the TORs requirements.

Our work for Task 3 will draw mainly upon the results of Task 2 described in the Second Interim Report. However, we will integrate those findings with internal working group discussions with our QA academic advisors and the independent experts who will support us throughout the study.

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2 Including HEATCO (building on EURET), TENASSESS and TRANSTALK and IASON.
In addition, as requested in the TORs, we will prepare a seminar with Member States’ authorities to discuss the preliminary findings of the evaluation. We recognise the importance of including Member States in the ex post evaluation process. Stakeholders can add value to the evaluation process in a number of ways, in particular:

- they can offer feedback and challenges that will help us verify the emerging findings from the study;
- through direct experience of working with specific schemes, they may be able to provide a contribution towards the explanation of anomalies; and,
- they can help inform the preparation of realistic and relevant recommendations as part of the final reporting process.

Following completion of the above, we will submit a short technical note setting out key messages and feedback. This is not an explicit requirement of the study brief, but we feel it is important to ensure that the key messages from the seminar are taken on board during the preparation of our Final Report.

The outcome of our analysis will be presented in the Draft Final Report and, following any feedback received from DG REGIO and the Experts Panel, in the Final Report.

Methodology
3 Data requirements

The success of this study depends crucially on data quality and on their availability. This Chapter discusses the data requirements for this study and the information that we will seek to obtain. It also describes the operational approach that we aim to follow to source the necessary information.

3.1 Data needed for the analysis

There are two main sets of information that we will seek to obtain for the projects considered in this study:

- **Information on the ex ante CBA.** This information should have been prepared for each project at the time of the EU funding application. We will use this information to review the ex ante CBA of each project. Specifically, we will seek to obtain information on:
  - core CBA;
  - risk assessment;
  - feasibility studies;
  - environmental impact assessment;
  - planned resources and required financial contributions;
  - the timetable for implementation; and,
  - the main justifications for public contribution to the scheme

This information, or lack thereof, will allow us to judge the quality of the ex ante CBA and its usefulness for the decision-making process.

- **Data for ex post CBA.** The types of information required for ex post CBA are similar to those needed to carry out ex ante appraisal, with the difference that, whenever possible, forecasts will be replaced by actual historic data. Specifically, we will seek to collect information on:
  - Revenues from tolls or rail services;
  - Maintenance and operating costs;
  - Traffic data (for example, traffic count data);
  - Journey times and patronage;
  - Any modal shift information to rail
  - Accidents;
Environmental impacts information, including emissions

In order to collect this information, we will use a variety of sources, ranging from existing public databases of traffic, journey times and passenger numbers, to discussions with authorities and government departments at Member State level. We provide more details on available sources in the next section. The next deliverable, the Project Descriptions report will, for each of the 20 shortlisted projects, provide details on the viable sources that we will consider for data gathering purposes.

3.2 Approach to data collection

Together, Frontier Economics, Atkins and ITS have a wide reach into EU Member states. This will facilitate the process of collecting information and holding discussion with the relevant stakeholders throughout the study.

Specifically, Frontier and Atkins have a number of offices in European capitals that are well placed to offer support to this study in terms language skills, relevant technical expertise, and perhaps most importantly, a network of local contacts to facilitate the evaluation process. We will leverage this capability to establish the necessary contacts and obtain information. The key offices of particular relevance to this study are:

- Athens, Greece (Atkins);
- Bucharest, Romania (Atkins);
- Dublin, Ireland (Atkins and Frontier);
- Lisbon, Portugal (Atkins);
- Madrid (Frontier); and
- Warsaw, Poland (Atkins)

In addition, ITS have regular contacts with academics throughout Europe. This provides a further channel for obtaining information and details of relevant contacts at the Member State level.

In addition to the offices listed above, the consortium can also draw upon the collective language skills of its staff. The available language skills which will be of particular use for the purpose of this study are as follows:

- Greek;
- Hungarian;
- Polish;
- Portuguese;

Data requirements
Romanian;
Slovak (and Czech); and,
Spanish.

Thanks to these language skills, we will be able to collect and process most of the information necessary for the study. In the absence of the relevant language skills (notably, for the Baltic Member States) we will attempt to establish contacts in English. We have noticed that some of the reports available for some projects are written in English. Should this fail, we will consider alternative options on a case-by-case basis.

Finally, as noted in the previous section, we intend to utilise existing sources of information where possible. A number of Member States maintain databases of traffic counts and/or journey times which will be utilised when determining the availability of primary data. A summary of some of the services available is given below, but this list is by no means exhaustive.

- **Ireland:** The NRA (National Roads Authority) has a network of traffic count sites with public access to the data available through the following link: [http://www.nra.ie/NetworkManagement/TrafficCounts/](http://www.nra.ie/NetworkManagement/TrafficCounts/);
- **Poland:** GDDKIA (Polish Highway Authority) website contains summary reports (in Polish) detailing traffic volumes on key routes: [http://www.gddkia.gov.pl/](http://www.gddkia.gov.pl/);
- **Greece:** Traffic data is generally collected and available for the privately owned roads. However, there is no such provision for the state roads. Railway passenger numbers and origin-destination statistics are collected and available via official approach through ticketing information. The Atkins office in Athens can readily access this information; and,
- **Portugal:** Traffic count data is collected and published by EP (Estradas de Portugal) for the RRN (National Road Network).
4 Literature review

In this chapter we provide a brief review of the literature on cost-benefit analysis (CBA) for the appraisal and evaluation of transport infrastructure projects. The purpose is to introduce a few key themes, which we will explore in detail throughout the study and, more specifically, for Task 3. Those key themes are:

- the main roles of CBA in the context of European transport infrastructure planning;
- the strengths and weaknesses of ex ante CBA for appraisal;
- possible methods for appraisal and evaluation alternative to CBA; and,
- the role of ex post CBA.

Annex 2 provides an initial list of literature references that we will use throughout the study.

4.1 The main roles of CBA in European transport infrastructure planning

There are many roles for CBA in transport infrastructure planning. Principally, CBA is used:

- to prioritise projects for funding from given budgets;
- to determine whether a project makes efficient use of resources, yielding benefits that exceed the costs at a given social discount rate;
- to determine whether a project is financially viable – an analysis which rests on much of the same data as the social CBA, but focuses on the financial revenues and costs to the operator;
- to choose between alternative options to carry out a project (e.g. different route options); and
- to optimise the timing of projects – bringing them forward or pushing them back into the future (deferment).

CBA plays a prominent role in the resource allocation systems of many Member States (ECMT, 2005; Odgaard, Kelly and Laird, 2005), and the European Commission (DG REGIO, 2008). The HEATCO project found that the role of CBA differs somewhat from country to country in the EU25: in most countries the CBA is used to help choose between alternative options; to determine whether a project is efficient and/or viable; and for prioritisation (Odgaard, Kelly and Laird, 2005: 18).
However, other Member States do not use CBA in such a pervasive way. In the eastern members states of the EU25 (CZ, EE, HU, LT, LV, PL, SK, SL), CBA was used mainly to make the case for EU co-funding, under the DG REGIO guidelines, but has started to be incorporated into practice for nationally-funded schemes as well (Odgaard, Kelly and Laird, 2005: 18).

‘HEATCO’ also addressed the modal coverage of CBA. Table 5 shows the approaches used by EU25 Member States for the appraisal of projects across the various modes of transport. In general, road is more widely covered by CBA than any other mode (25/25 countries). Rail is almost as widely covered (21/25 countries), whilst CBA is less common for air (9/25), inland waterway (10/25) and sea (10/25).

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3 HEATCO found no information on project appraisal methods was available for Luxembourg, but it included Switzerland. Even though the latter is not an EU Member State, there are some important commonalities of methodology with that country.

Literature review
Table 5. Use of CBA by transport mode in EU25 + Switzerland

<table>
<thead>
<tr>
<th>Region</th>
<th>Country</th>
<th>Road</th>
<th>Rail</th>
<th>Air</th>
<th>Inland waterway</th>
<th>Sea</th>
</tr>
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Codes:
1. Cost-benefit analysis (CBA) 4. Qualitative assessment/Not covered (QA/NC)
2. Multi-criteria analysis (MCA) 5. No information/not relevant
3. Quantitative measurement (QM)

Source: Odgaard, Kelly and Laird (2005). Note: Luxembourg – no project appraisal method was found.

Across countries and modes, ex ante CBA can take the following roles:

- **Prioritisation of projects.** In theory, social CBA can be used for prioritisation. Projects can be ranked either on the basis of their benefit-to-cost ratio (BCR) or their internal rate of return (IRR). Both of these indicators provide a comparison of the benefits arising from the project with its costs. Both are relevant when funds are constrained and there is large number of competing projects. When funds are unconstrained, the net present value (NPV) may be the key indicator. Table 5 suggests that in some of the countries considered by this study, pure CBA may be used as the basis for prioritisation. However, in the majority of countries, this technique is combined with another form of analysis.
• **Testing the efficient use of resources.** In this case, a positive social NPV indicates that the benefits that a project will generate are expected to justify its costs. From a socio-economic point of view, a project with a positive NPV is said to be ‘acceptable’ in cost-benefit terms. For example, this approach is used in England, where the benefit-to-cost ratio is required to be at least equal to one (DfT, 2009), and in Japan, where “CBA is used for acceptance or rejection” (PIARC, 2004: 67).

• **Testing the financial viability of a project.** In this context, a project is said to be ‘acceptable’ in financial terms if the financial NPV is positive. The financial NPV is calculated using a financial discount rate instead of a social one. The HEATCO guidelines (Bickel et al, 2006: 3) advocate reporting a financial test alongside the social CBA results. This is commonplace in national-level appraisal. It is also a requirement of the international financial institutions (IFIs) for funding transport projects (e.g. EC & EIB, 2005; TINA Secretariat, 1999).

• **Choosing between alternative project options.** The choice between mutually exclusive project options – for example, alternative routes for surface infrastructure facility – can be informed by incremental analysis, that is, by examining the changes in the benefit-to-cost ratio implied by each option. Once again, there is a range of practices among EU Member States and other countries.

• **Timing and deferment of projects.** Note TRN-6 of the World Bank’s transport evaluation toolkit discusses Timing/Deferment of projects (The World Bank, 2005). PIARC (2004: 61) states that Norway and New Zealand, for example, both use First Year Rate of Return (FYRR) to optimise the timing of projects. Mackie and Kelly (2007: 11) indicate that France also uses FYRR for this purpose. The World Bank guidance and the English method both use NPV to optimise timing.

Finally, although we have so far discussed infrastructure projects – the main focus of this study – many countries apply CBA to area-wide assessments of alternative transport strategies and policies, not only projects.

### 4.2 Strengths and weakness of CBA applied to ex-ante appraisal

In this section, we draw on the analyses presented in Giorgi *et al.* (2002) and Pearman *et al.* (2003), arising from the TRANS-TALK research. This research considered appropriate appraisal methods for European transport infrastructure investment, taking into account the views of a wide range of experts and
stakeholders through a series of workshops where specially-commissioned papers were presented and discussed.

**Strengths**

Firstly, ex ante CBA was introduced in the late 1950s and it has since developed and become well established both in practice and in methodology. As a result, the understanding of CBA is fairly consistent across Europe, as identified by HEATCO, and by earlier studies such as Giorgi *et al.* / Pearman *et al.*, or the EUNET and EURET studies in the 1990s. CBA is therefore a mature method, with a shared knowledge of techniques across national borders.

Another potential strength of CBA is that much of it relies on what could be objective data. We use the qualifications ‘potential strength’ and ‘could be objective’ because the objectivity of ex ante CBA has been challenged several times over the history of CBA, most effectively by the recent literature on optimism bias and ‘misinformation’ (Flyvbjerg, 2007). It is now widely recognised that the objectivity of CBA should not be taken for granted, and that it depends in particular on the institutional arrangements within which CBA is conducted. During the study, we will explore the potential sources of subjectivity for these estimates, including demand forecasts, and the solutions that have been suggested in the literature.

A further potential strength of CBA, which we will explore in our study, is its ability to address project risks and to present them to decision-makers in an understandable way. This is possible thanks to the development of Quantitative Risk Analysis (QRA) tools which are available as spreadsheet add-ins (e.g. @RISK and CrystalBall). Using these tools, the deterministic inputs to the model – construction cost, for example – can be replaced by their probability distributions. A simulation can then be run to estimate the probability distribution of outputs such as the NPV, the benefit-to-cost-ratio and the IRR. These results can then be used to provide the decision-maker with a better understanding of the likelihood of different outcomes from the project.

**Weaknesses**

Ex ante CBA has some unresolved issues. The literature suggests that two possibly significant weaknesses of ex ante CBA are:

- the treatment of economic performance impacts, for example on GDP and employment; and,

- the comprehensiveness of CBA in relation to the full set of significant impacts, including environmental pollution.

Improving economic performance is a key motivation for investing in European transport infrastructure (EC DG REGIO, 2008: 13; EC DG TREN, 2001: 6). Measures of economic performance which are of interest to policymakers
typically include GDP and employment, and wider welfare measures. Policymakers are also concerned with the spatial patterns of GDP and employment, and not simply with their aggregate EU or even national-level impacts.

The main issue with the conventional ex ante CBA in this context is that user benefits are measured with respect to the transport sector, without any explicit modelling of the wider economy. In theory, one can defend this approach with the assumption of perfectly competitive transport-using sectors. In practice, however, in the presence of imperfect competition, the transport-related benefits become only an approximation to the total economic benefits. For decision-making purposes, it is important to gauge the extent of the divergence between total economic benefits and the narrower measure limited to the transport sector. In our study we will review the extent of this divergence as identified in the literature, in both theoretical work and empirical studies. In carrying out such review, we will consider the role of general equilibrium economic models and their ability to capture the total economic benefits of a transport project.

Another potential weakness of ex ante CBA is that, in practice, it is not a comprehensive statement of all the costs and benefits of transport infrastructure investment. For example, with regards to environmental effects, the main focus of the CBA appears to be on noise, air pollution and global warming (Odgaard, Kelly and Laird, 2005) but very few countries regularly value other environmental impacts. Only half of the surveyed countries included these impacts at the time of the HEATCO review. Many of the values in use are based on willingness-to-pay for noise reductions or air quality improvements at home, however other locations are not covered – including workplaces, schools, shops, main streets and recreational land.

Finally, we should note that Laird et al. (2009) have identified significant option value and non-use value for rail projects, over and above the expected use value usually measured in CBA. These option values are not yet found in regular CBAs for infrastructure projects.

Together, these omissions strongly suggest that ex ante CBA is not a complete representation of the costs and benefits for transport infrastructure projects. However, it is standard practice across the EU to mitigate this concern by setting CBA alongside (or within) another appraisal framework which is able to accommodate quantitative (but non-monetised) or qualitative assessments. We explore these alternative methods in the next section. Therefore, the core role of CBA is to monetise a consistent set of impacts, hopefully including the most important impacts in welfare terms. A set of other impacts can consistently be left outside the CBA, as long as it is considered within the appraisal as a whole.

Finally, to conclude this brief review of weaknesses identified by the literature, we list the following minor issues which can cause inaccuracies in the results, and which are best treated with caution and consistency in practice.

**Literature review**
• Definitions of the BCR are a potential source of confusion and inconsistency. For example, the Department for Transport in England has just changed its definition (DfT, 2009) by removing indirect tax from the present value of costs (PVC) and including it in the present value of benefits (PVB). Other issues to be managed are the choice between gross versus net BCRs and the treatment of recurring costs.

• Switching between factor costs and market prices as the unit of account can alter the NPV by approximately 20%, so it is recommended that all appraisals be carried out in the same unit of account (HEATCO, 2006, recommends factor cost as the default);

• The IRR implicitly assumes reinvestment of the benefits each year. While this is probably realistic for revenues, it is not so for some non-marketed benefits such as non-working time savings or environmental improvements, For this reason, for example, the World Bank (2005) uses of a Modified IRR.

• The definition of the geographic area under analysis must be sufficiently wide to fully capture the network effects associated with the transport projects, such as agglomeration economies (Laird, Nellthorp and Mackie, 2005).

4.3 Alternative methods

The main alternative methods to CBA are multi-criteria analysis (MCA) and framework approaches. In practice, in many countries a combination of CBA with either an MCA or a framework is used to capture a wider set of impacts (Odgaard, Kelly and Laird, 2005). Both MCA and frameworks are structured around the objectives of the project (and potentially the wider policy objectives).

Multi-criteria methods are described in depth in CLG (2009) and were used to prioritise TEN investments by UNECE (2006), for example.

The principal strengths of MCA are:

• Involvement of decision makers. This can produce greater buy-in and therefore agreement over the ranking generated by the MCA exercise.

• Flexibility. MCA can be run using greater expert judgement, and less analysis, in less time than CBA;

• Comprehensiveness. Any impact deemed relevant can be included in the analysis, although the objectivity with which it is included still depends on the quality of data.
The principal weaknesses of MCA are:

- **Vulnerability to changes of weights and ex post adjustments.** For example, the CLG (2009) describes the case of a nuclear waste storage project for which the planning inquiry inspector was able to overturn the ranking some years after the MCA exercise by exercising his own judgement on the weights;

- **Judgement.** The use of expert judgement in scoring as well as weighting, while good for flexibility, is bad for robustness;

- **Poor treatment of time.** Asset lives, planning horizon, growth trends and discounting issues tend to be minimised;

- **Evidence base and/or the objectivity of CBA is often stronger in practice.**

Many countries (e.g. Austria, Czech Republic, Spain) use a CBA nested within an MCA framework in order to get the best of both approaches (Odgaard, Kelly and Laird, 2005, Annex II).

‘Framework’ approaches, while they offer an objectives-led approach like MCA, they do not require the definition of explicit weights. Thus, the decision-make is left to weigh up the impacts (as shown, for example, in Nellthorp and Mackie, 2000).

The main strengths of framework approaches are:

- **Openness to inclusion of any impacts deemed important.** ‘Framework’ approaches can therefore be as comprehensive as MCA;

- **They provide an organising framework for evidence, even when scoring and weighting are not desirable or not possible.** For example, many countries choose to report the Environmental Impact Assessment alongside the CBA.

The main weakness of ‘framework’ approaches is that they do not produce and overall numerical result like BCR or Total Weighted Score, hence the burden of ranking alternative projects remains with the decision-maker.

Whilst most EU Member States are currently using a mix of CBA and MCA or CBA and ‘Framework’ approaches for transport investment appraisal, in many countries there appears to be a general tendency towards a more complete valuation. Some countries, instead, are moving towards Value for Money measurement using BCR assessments (e.g. OEEI, 2000; DfT, 2009).
4.4 Experience with ex post CBA of transport infrastructure

This section provides a brief introduction to the international experience of ex post CBA evaluation of transport projects with a summary of the English and French practices. For Task 3 of the study we will provide a more detailed overview of the international experience with ex post CBA of transport infrastructure projects. We will examine the lessons learnt to date and compare them with the findings of our study.

In England, the Highways Agency (HA) currently evaluates all trunk road schemes implemented as part of the Major Schemes Programme (that is, schemes with a capital investment cost of greater than £10m). This process is known as POPE (Post Opening Project Evaluation). Atkins has been carrying out this assessment on behalf of the HA since 2001.

The key objectives of POPE are:

- to identify whether the expected impacts of individual highway improvement schemes actually occur;
- to combine the individual results in order to examine the programme as a whole; and,
- to use this information to inform the appraisal process and the HA’s prime objectives.

POPE provides the key mechanism by which the HA determines:

- the extent to which investment in major schemes offer good value for money;
- the level of accuracy associated with forecasts of costs and benefits emerging from major schemes;
- the main factors affecting the accuracy of forecasting of scheme costs and benefits; and,
- How appraisal methods can be improved to help offer a greater degree of accuracy.

The POPE process broadly consists of 4 key stages:

- **Stage 1 (Collection of Pre-opening Baseline Data)** – Collection of baseline data for key roads within the schemes area of influence e.g. Annual Average Daily Traffic; Journey Times; Accident Data; Environmental Baseline reports; ex ante evaluation documentation.

Literature review
• **Stage 2 (One Year After Study)** – Preparation of a “one year after” report which sets out a comparison of the forecast and out-turn impacts of a scheme against the five Department for Transport objectives for one year after opening.

• **Stage 3 (Five Year After Study)** – Preparation of a “five year after” report expanding on the outcomes of the one year after report also based on the 5 Department for Transport Objectives.

• **Stage 4 (Meta Reporting)** – The last stage consolidates the findings of individual scheme evaluations to identify common themes in the data that can be used to examine the relationship between scheme predicted and out-turn impacts across each of the Department for Transport Objectives.

The POPE of Major Schemes programme is complemented by the POPE evaluation for Local Network Management Schemes (LNMS), which includes all schemes costing less than £10m to implement. In this category, Atkins has evaluated more than 400 schemes. As with the Major Scheme evaluation programme, the objectives of the LNMS POPE are to identify the extent to which expected benefits and project objectives materialise, whether any particular type of improvement gives best value for money, and whether any aspects of the HA’s current appraisal (PAR) methodology could be enhanced to become more reflective of outturn impacts. An annual report is prepared annually. Its purpose is analogous to that of the Major Schemes Meta Report.

In France, the Internal Transport Act 1982 (Loi d’Orientation des Transports Intérieurs) introduced a new requirement for an ex post evaluation of the economic and social performance of any major transport infrastructure project, five years after its opening. The Act also requires this report to be made public. According to the Act, ‘major’ infrastructure projects are all those costing €82m or more. It was rare in France at that time, and still is, to compare the outturn with forecasts made at the decision-making stage (Chapulut, Tarout and Mange, 2005).

The deadline for production of reports was set at 3-5 years from opening, hence is some cases up to 15 years from the date of decision. In the early 2000s, it was found that the ex post evaluations were difficult to compare with the ex ante appraisals. In particular, monitoring committees tended to concentrate on environmental issues and any change in economic activity rather than a recalculation of the ex ante CBA.

This issue was addressed by a Working Group in 2001, who recommended a dual approach:

- an ex post evaluation, using outturn cost and benefit performance, but using the same methods and the unit values as used in the original ex ante CBA; and,
and examination of how the evaluation changes when conducted to present standards using Boiteux (2001) values. This sometimes had a significant effect, for example increasing the appraisal period from 20 to 40 years added 2% to the IRR for TGV Nord.

Another issue identified was the difficulty of establishing a reference situation in an ex post report. At present, expert consensus based on various trend and control corridor data is the favoured method in France. This feedback on the reference situation can be used subsequently in other appraisals.

Some ex post studies in France have led to the creation of economic observatories to monitor and evaluate the opening of motorways and other major infrastructure. Again, the lack of a counterfactual is practical issue.

Finally, with regards to international experience in general, Flyvbjerg (2007) found that misinformation about the costs and the benefits of major infrastructure projects is widespread. From an international sample of projects, he obtained quantitative evidence of cost overruns (on average 44.7% for rail and 20.4% for road) and demand forecasting inaccuracies (on average 9.5% for road and -51.4% for rail), suggesting a systematic failure to learn from experience and indeed strategic behaviour by project promoters.

These results highlight the importance of rigorous ex post evaluation to check and validate the ex ante appraisal approach. In the light of Flyvbjerg’s findings, tools such as optimism bias adjustments and improved risk analysis methods (including QRA) are now being used more widely in ex ante CBA, and appraisal processes are being designed to offer suitable incentives to project promoters (as discussed in Section 4.2).

We will explore these methodological issues in more detail during Task 3 of the study.
5 Project management

This section details the project management plan that we plan to follow for this study. Specifically, it provides an overview of the project team identifying roles and responsibilities. It also confirms the study timetable as agreed with DG REGIO at the project kick-off meeting on January 7th, 2010 in Brussels. Finally, it describes our approach for dealing with potential conflicts of interest. For a discussion on expected data requirements and our proposed approach for sourcing primary data, see Section 3 above.

5.1 Roles and responsibilities of the consortium

The study will be carried out by a consortium led by Frontier Economics, with Atkins and the Institute of Transport Studies (ITS), University of Leeds.

Both for the completion of the three-page project descriptions and for the ten ex post evaluation case studies, we plan to share the work and responsibilities between the members of the consortium. In principle, each member of the consortium will take lead responsibility for a number of projects taking into account our respective capabilities (for example, in terms of geographical presence across Europe) and relative experience and familiarity with road and rail issues. Specifically, with regards to the ten ex post evaluation case studies, Frontier and Atkins will take lead responsibility for four projects each while ITS will take lead responsibility for the remaining two. Lead responsibility includes data gathering and first analysis. Other team members will be responsible for double-checking and challenging the results based on their experience and the findings from their case studies.

Figure 2 below lists the Consortium’s team members and quantifies their inputs to each task of the study.
### Figure 2. Number of days per team member and task

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<th>Task 2 - Ex post project analysis</th>
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Source: Frontier Economics, Atkins and ITS
5.2 Organisation of the study

The final output of Task 1 is the selection of ten transport projects to be subjected to an in-depth ex-post CBA in Task 2 of this study. Section 2.1 above describes the approach that we are going to follow for this task. Frontier Economics and Atkins will prepare the description of eight schemes each, while ITS will be responsible for the description of four schemes.

For Task 2, the Consortium will carry out an in-depth ex post cost-benefit analysis of ten projects. Frontier Economics and Atkins will undertake this analysis for four schemes each, while ITS will have primary responsibility for the remaining two schemes.

To ensure consistency in the use of assumptions and analytical framework, the team will agree on specific methodological issues in advance of the analysis and coordinate routinely with regular progress update meetings throughout the implementation of the study and in preparation for meetings with the Evaluation Unit of DG REGIO.

In addition to the distribution of the study and implementation of the ten case studies, please note:

- Frontier Economics will contribute its analytical and economic capabilities for infrastructure project appraisal; knowledge of the transport policies in Europe; and presence in selected European capitals. It will be responsible for the overall quality of the outputs and their timely delivery. It will coordinate the inputs of the other consortium members and ensure that the lessons learnt from the Work Package 10 of the ERDF evaluation study are taken into account.

- Atkins will contribute its vast experience in the field of applied CBA, in particular its experience with the Post Opening Project Evaluation (POPE) approach used by the UK Highways Agency and access to multidisciplinary human capital working in Atkins Global. In addition, the team will benefit from the presence of Atkins across a large number of European capitals and its network of local offices and contacts, especially in those countries which will be the subject of the detailed ex post CBA.

- ITS will support the team with its extensive knowledge of the CBA methodology, both in theory and in practice; its familiarity with CBA study findings across modes and their applicability to the ten case studies, and its participation and, therefore, intimate knowledge of European initiatives in the field of transport impact evaluation exercises, including CBA, which the European Commission has carried out.
Frontier Economics, Atkins and ITS will work together in all phases of this study. Throughout the study, we will cooperate, share information and review each other’s work to ensure the consistency and highest quality of all our outputs.

### 5.3 Finalised timetable and deliverables

As agreed at the project kick-off meeting, we confirm that we will produce the required deliverables for this study according to the following timetable:

<table>
<thead>
<tr>
<th>Deliverables</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inception Report</td>
<td>15th February 2010</td>
</tr>
<tr>
<td>Project descriptions</td>
<td>15th March 2010</td>
</tr>
<tr>
<td>Progress reports</td>
<td>Every month, when no other deliverable is required</td>
</tr>
<tr>
<td>First Interim Report</td>
<td>14th May 2010</td>
</tr>
<tr>
<td>Second Interim Report</td>
<td>15th October 2010</td>
</tr>
<tr>
<td>Seminar with Member States</td>
<td>Early December 2010</td>
</tr>
<tr>
<td>Draft Final Report</td>
<td>15th January 2011</td>
</tr>
<tr>
<td>Final Report</td>
<td>18th March 2011</td>
</tr>
<tr>
<td>Two presentations</td>
<td>To be decided during the course of the study</td>
</tr>
</tbody>
</table>

In addition to the deliverables listed in Table 6 we will also attend the following meetings.
Table 7. List of Steering Group and Expert meetings

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steering Group meeting</td>
<td>3rd March 2010</td>
</tr>
<tr>
<td>Meeting with DG REGIO to discuss selection of projects for Task 2</td>
<td>23rd March 2010</td>
</tr>
<tr>
<td>Steering Group meeting and Expert Meeting</td>
<td>26th May 2010</td>
</tr>
<tr>
<td>Steering Group meeting and Expert Meeting</td>
<td>27th/28th October 2010</td>
</tr>
<tr>
<td>Steering Group meeting and Expert Meeting</td>
<td>26th/27th January 2011</td>
</tr>
</tbody>
</table>

In addition to the meetings listed in Table 7 we will also attend progress meetings, which will be organised if necessary.

5.4 Conflicts of interest

We confirm that, at the time of writing this Inception Report, and to the best of our knowledge, we do not have any conflicts of interest that would prevent or compromise our ability to undertake the tasks identified in the TORs.

Some of our team members may have been involved in the submission of funding applications or the preparation of appraisals for some of the projects identified in the TORs’ 40-project long-list. In most cases, this involvement was procedural, rather than analytical. Generally, we understand that the involvement of team members with the economic analysis of the included schemes was minimal.

We will continue to monitor this issue under review throughout the study. In particular, we will ensure that our team members will not be put in the position of having to comment on projects in which they had a significant technical involvement. Should any issues arise, we will inform DG REGIO promptly.
6 Next steps

As shown in above, the next deliverable for this study is the Projects Descriptions report. This report will cover the activities required by Task 1 of the study. Namely, it will provide:

- a finalised shortlist of 20 projects, selected by balancing the criteria of size of EU funding, its regional distribution, its distribution across transport modes, and, importantly, the availability of information;

- for each of the shortlisted projects, a three-page description which will include an initial overview of the quality of the ex ante CBA undertaken, information on the degree of completion of the project, and the identification of the data requirements to complete a full ex post CBA; and

- a proposed selection of ten transport project to be the subject of an in-depth ex post cost-benefit analysis; we will discuss this proposal with the Evaluation Unit in DG REGIO to agree the final list of projects for Task 2.

To prepare the Projects Descriptions report we will continue to review existing documentation and gather additional information on the shortlisted schemes. We will also continue to establish and reinforce contacts with staff that the DG REGIO Geographic Unit as well as government and transport authorities representatives at the Member States level.

As indicated in Table 6, we will deliver the Project Description Report to DG on March 15th 2010 at the latest.

In the meantime, we will also share this Inception Report with the Expert panel advising this study. We will gather comments and observations from the panel and report them to DG REGIO at the first Steering Group meeting on March 3rd 2010.
Annex 1: Draft project description templates

As part of this Inception period, it was agreed that the team would undertake two examples of templates to investigate and report any relevant issues and potential sources of data. Annex 1 provides two examples of a nearly-completed Project Description Template, namely:

- New Railway Line (Korinthos – Kiato) in Greece; and
- A2 Motorway (between Konin - Strykow) in Poland
## New Railway Line (Korinthos – Kiato) in Greece

<table>
<thead>
<tr>
<th><strong>Scheme Title / Project Ref Number</strong></th>
<th>Construction of the new railway line KORINTHOS – KIATO and studies for the section KORINTHOS – PATRAS / CCI 2000GR16CPT003.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scheme Location (Country)</strong></td>
<td>Greece</td>
</tr>
<tr>
<td><strong>Mode (Road / Rail)</strong></td>
<td>Rail</td>
</tr>
<tr>
<td><strong>Project Contact Name(s)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Key Contact(s) (Member State)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Key Contact (DG REGIO)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Lenders Contact</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Scheme Value (£m)</strong></td>
<td>€108,335,695.81 Actual expenditure according to Final Report. The difference between the actual expenditure and the eligible expenditure was covered through the Public Investments Programme of the Ministry of Economy and the Investments Programme of the Greek Trains Organisation (OSE). €99,800,000.00 - Maximum eligible budget, according to Commissions Decision and its Amendment.</td>
</tr>
<tr>
<td><strong>EU Contribution (£m)</strong></td>
<td>€49,900,000.00</td>
</tr>
</tbody>
</table>
Scheme Description, Objectives and Map

**Scheme Context and Requirements for Scheme**

The scheme involved the construction of the new railway between the towns of Korinthos and Kiato located in the Region of Peloponese (south Greece) as well as the completion of all required studies for the left railway part between Korinthos and Patras.

The implementation of this scheme was assumed necessary for various reasons including:

- The improvement of transportation between Athens and Patras port, which is a gateway to EU markets;
- Car use and traffic minimisation in the National Road Network; and
- Car accidents and pollution minimisation in the National Road Network.

The scheme forms part of the TEN-T network. It is parallel to priority motorway axis 7 (Igoumenitsa/Patras – Athens – Sofia – Budapest)

The TEN-T corridor on which this scheme sits links Patras and Athens. Both of these towns sit on priority axes. Athens is situated on rail priority axis 22 (Athens – Sofia – Budapest – Vienna – Prague – Nuremberg/Dresden). Patras is situated on rail priority axis 29 (Ionian/Adriatic international corridor.)

**Description of Scheme Implemented**

- Infrastructure works for the new double railway line of 21km and in particular technical works such as bridges and roundabouts and the construction of Kiato Train Station;
- Filling works including the installation of a rail line between Korinthos and Kiato and lines at Kiato Train Station;
- Land expropriations; and
- Elaboration of necessary studies for the railway part between Korinthos and Patras.

**Scheme Promoter and Implementation Details**

**Description of Forecast Costs and Benefits**

In the CBA, the forecast construction cost of the scheme is €81,000,000. According to the Commissions decision and its amendment, the scheme value is €99,800,000.

Operating costs for the entire Thriasio-Patras railway project, which includes the Korinthos-Kiato railway section are described in Section 7 of the Revised Standard Application Form for Funding (September 2000). Benefits as follows:

- The improvement of transportation between Athens and Patras port, which is a gateway to EU markets;
- Car use and traffic minimisation on the National Road Network;
- Accidents and pollution reduction on the National Road Network;
- Regional development along the railway corridor;
- Creation of 1,288 jobs during the 11 year overall construction period, and 226 positions over a 30 year period for the entire Thriasio-Patras railway project which includes the Korinthos-Kiato section.

**Degree of Project Completion**

According to Final Report, the project has been open since July 2007, with all foreseen works completed.

**Evidence of Time and Cost Over-run / Savings**

In the initial Commission’s Decision of 29-12-2000, the scheme’s eligibility timetable was set to 31-11-2005. However, the scheme was delayed due to archaeological findings and the scheme’s Promoter requested the prolongation of works up to December 31, 2007, which was approved through the Commission’s Decision of 03-10-2006.

The new railway has been operational since July 2007. However, a series of finishing works took place between the period 01-08-2008 and 30-09-2009 including hydraulic works and other technical interventions along the line, and Kiato Train Station’s landscaping and technical works.
The actual scheme’s expenditure amounted to €108,355,695.81, while the eligible scheme’s budget was € 98,800,000.00. The difference in expenditures is attributed to some new sub-projects, which assumed necessary following the approval of the EU Contribution in 2000. All these sub-projects were executed through mere National Resources (more detailed information is included in Tables 2.4 and 5 and Sections 3.1 and 3.2 of the Final Report).

The duration of the journey Athens-Kiato expected to decrease by 50 min. Following completion of the new line to Patras the duration of the journey Athens-Patras will be at 1.5 hours.

Combined with the new railway Triassio-Elefisina-Korinthos the scheme is expected to minimise the duration of the journey Triassio-Kiato by 45 min.

Improvement of combined transports between Greece and the EU (through Italy).

Road network relief, energy consumption & pollution minimisation through the shift of traffic load to the rail transportation.

Improvement of trains circulation and operating conditions, increase of railway capacity, improvement of itineraries’ credibility and regularity.

Safety improvement through installation of temporary auto signals & suspension of level crossings.

### Data Availability Checklist

<table>
<thead>
<tr>
<th><strong>Ex ante data availability (Criterion 2)</strong></th>
<th><strong>Summary of Ex Ante and Ex Post Data Availability and Suitability for Ex Post Evaluation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Feasibility Study</td>
<td>A feasibility study dated 07-09-2000 covering the entire Thriasio-Patras railway was carried out by TRADEMCO for ERGOSE.</td>
</tr>
<tr>
<td>CBA and Supporting Documentation (including Traffic Demand Forecasting Reports, Economic Assessment Reports etc.)</td>
<td>The CBA including Traffic Demand Forecasting Report, Economic Assessment Report and Socio-Economic Report are included in the Feasibility Study.</td>
</tr>
<tr>
<td>Risk Assessment Documentation</td>
<td>A high-level risk analysis for the financial model is included in Section 7.10 of the Revised Standard Application Form for Funding (September 2000).</td>
</tr>
<tr>
<td>Environmental Impact Assessment</td>
<td>Available. EIA is necessary for the scheme’s “maturation” and prerequisite to the issuing of the relevant Environmental Permit (approved by Ministerial Decision 67057/26-5-1999) and the approval of the Standard Application for Funding (September 2000). Reference to the EIA carried out is included in Appendix 1 of this document.</td>
</tr>
<tr>
<td>Justification for Public Contribution to the Scheme</td>
<td>This information could be retrieved from Sections 7 and 8 Standard Application Form for Funding (September 2000). For Greek schemes, Public Contribution is ensured through the Public Investments Programme of the Ministry of Economy.</td>
</tr>
</tbody>
</table>
| Planned Resources and Financial Contribution | This information could be retrieved from the following sources:  
- Standard Application Form for Funding;  
- Annual Progress Reports; and  
- Final Report (Table 1A & 4). |
| Standard Application Form for Funding Contribution | According to the Commission Decision of 29-12-2000 for this scheme, the Application for Funding was submitted in October 2, 2000. |
| Timetable for Project Implementation       | This information could be retrieved from the following sources:  
- Standard Application Form for Funding;  
- Commission Decision and its Amendment; and  
- Final Report (Table 2 & 3). |
<table>
<thead>
<tr>
<th>Ex post data availability (Criterion 3)</th>
<th>Scheme Monitoring Information (traffic, accidents, rail patronage data, freight volumes, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This information should be available from the following authorities:</td>
</tr>
<tr>
<td></td>
<td>• Traffic accidents – ELAS (Greek police);</td>
</tr>
<tr>
<td></td>
<td>• Rail patronage data – TRAINOSE (organisation responsible for the operation of the Greek railways); and</td>
</tr>
<tr>
<td></td>
<td>• Freight volumes – TRAINOSE.</td>
</tr>
<tr>
<td>Environmental Surveys / Monitoring</td>
<td>This information should be available from EDISY (national manager of railway infrastructure) which is a subsidiary of OSE (Greek Railway Organisation).</td>
</tr>
<tr>
<td>Traffic / Demand Forecasting Report</td>
<td>This information should be available from EDISY (national manager of railway infrastructure) which is a subsidiary of OSE (Greek Railway Organisation).</td>
</tr>
</tbody>
</table>

**Other data available to support ex post evaluation**

| Recent Traffic Count Data (Automatic / Manual Traffic Count Data, Journey Time Analysis) | Included in the Feasibility Study (Section 5). Historical data for passenger loads from 1990-1999 and cargo loads from 1987-1999 is provided. Forecast passenger and cargo loads are provided for 1999-2035. |
| Other Source of Qualitative and Quantitative Data Supporting Ex-Post Evaluation | Not applicable. |
| Relevant Contact Details to Support Evaluation | Ministry of Economy, Competitiveness & Shipping, Ministry of Infrastructure, Transportation and Networks, ERGOSE, EDISY and TRAINOSE. |
Summary of Outstanding Data Requirements (Criterion 4)

Primary Data
Ticketing information should be available from TRAINOSE and will provide comprehensive statistics on passenger numbers, including origins and destinations. Therefore there should be no need to collect additional primary information.

Secondary Data
Rail journey times are available from timetable information and TRAINOSE.
Accident data should be available from ELAS.

Conclusions on Outstanding Data Requirements

Recommendations for Progression to Task 2 (score as appropriate – all scores are out of 5)

<table>
<thead>
<tr>
<th>Criteria (Weighting)</th>
<th>High Standard (4 or 5)</th>
<th>Medium Standard (2 or 3)</th>
<th>Low Standard (0-1)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Likely level of support from key contacts involved in the evaluation process (10%)</td>
<td>✓</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>2) Comprehensiveness of ex ante evaluation baseline data readily available (55%)</td>
<td>✓</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>3) Availability of primary / secondary data from existing sources (20%)</td>
<td>✓</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>4) Amount of new ex post evaluation primary data required to support evaluation (15%)</td>
<td>✓</td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Total Weighted Score out of 100 75
Rank out of 20 ?

Note: A project should score at least a medium in criteria 1 for progression to stage 2
This scheme should be subjected to ex post evaluation (Stage 2 and 3)
# A2 Motorway (between Konin - Strykow) in Poland

<table>
<thead>
<tr>
<th>Scheme Title / Project Ref Number</th>
<th>Construction of A2 Motorway: Section Konin-Strykow (Lodz) (104.5km) Measure Number: 2003/PL/16/P/PT/020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheme Location (Country)</td>
<td>Poland</td>
</tr>
<tr>
<td>Mode (Road / Rail)</td>
<td>Road</td>
</tr>
<tr>
<td>Project Contact Name(s) (Criterion 1)</td>
<td></td>
</tr>
<tr>
<td>Key Contact(s) (Member State)</td>
<td></td>
</tr>
<tr>
<td>Key Contact (DG REGIO)</td>
<td></td>
</tr>
<tr>
<td>Lenders Contact</td>
<td></td>
</tr>
<tr>
<td>Scheme Value (€m)</td>
<td>Phase 1 – €54.8 Phase 2 - €346.6m</td>
</tr>
<tr>
<td>EU Contribution (€m)</td>
<td>Phase 1 – €41.1m Phase 2 - €284.2m</td>
</tr>
</tbody>
</table>
**Scheme Description, Objectives and Map**

### Scheme Context and Requirements for Scheme

The A2 Motorway runs through central Poland and is part of European Route E20. When completed, the A2 will run from the Polish-German border to the Polish-Belarus Border.

The section between Konin and Strykow suffered from heavy traffic, had a poor safety record and adversely affected local towns and villages before the A2 was completed.

### Description of Scheme Implemented

The scheme involved the construction of a dual 2 lane motorway between Konin and Strykow. The scheme was developed in two phases which include a segment between Emilia- Strykow II (18.1 km) - Phase 1 and between Konin- Emilia (85.8 km) - Phase 2.

### Scheme Promoter and Implementation Details

**Description of Forecast Costs and Benefits**

The principal benefits identified are savings in vehicle operating costs (60%), time (32%), accidents (7%) and costs due to reduced emissions. This resulted in a predicted BCR of 3.23.

### Degree of Project Completion


### Evidence of Time and Cost Over-runs / Savings

No evidence of any time or cost overruns.

**Stated Schemes Objectives**

- Provide a fast and convenient connection between the existing A2 motorway section with Lodz, and with Warsaw via existing national roads.
- Relieve the existing national road and local towns and villages No2 Konin-Lowicz from heavy traffic.
- Improve safety
- Allow use by heavy trucks up to 115kN axle load.
<table>
<thead>
<tr>
<th>Data Availability Checklist</th>
<th>Summary of Ex Ante and Ex Post Data Availability and Suitability for Ex Post Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ex ante data availability (Criterion 2)</strong></td>
<td></td>
</tr>
<tr>
<td>Feasibility Study</td>
<td>A Feasibility Study has been completed and is available from GDDKiA.</td>
</tr>
<tr>
<td>CBA and Supporting Documentation (including Traffic Demand Forecasting Reports, Economic Assessment Reports etc.)</td>
<td>Forecasting Report obtained from GDDKiA (in Polish). Economic and Financial Analysis has also been provided (in English) which provides details of the CBA approach.</td>
</tr>
<tr>
<td>Risk Assessment Documentation</td>
<td>Risk assessment could not be located.</td>
</tr>
<tr>
<td>Justification for Public Contribution to the Scheme</td>
<td>Possibly included with the Standard Application Form for Funding Contribution.</td>
</tr>
<tr>
<td>Planned Resources and Financial Contribution</td>
<td>EU Contribution: Phase 1 – 75% and Phase 2 – 82%.</td>
</tr>
<tr>
<td>Standard Application Form for Funding Contribution</td>
<td>Available in English (3 forms for the different sections of the scheme).</td>
</tr>
<tr>
<td>Timetable for Project Implementation</td>
<td>Obtained from GDDKiA.</td>
</tr>
<tr>
<td><strong>ex post data availability (Criterion 3)</strong></td>
<td></td>
</tr>
<tr>
<td>Scheme Monitoring Information (traffic, accidents, rail patronage data, freight volumes, etc.)</td>
<td>No evaluation report appears to have been produced. However, there is before and after data available (see below)</td>
</tr>
<tr>
<td>Environmental Surveys / Monitoring</td>
<td>Availability uncertain – but its noted in other reports that it is an obligation of the scheme.</td>
</tr>
<tr>
<td>Traffic / Demand Forecasting Report</td>
<td>Forecasting Report has been provided (in Polish) which includes forecasts for opening year and numerous future years. No evidence of journey time comparisons.</td>
</tr>
<tr>
<td><strong>Other data available to support ex post evaluation</strong></td>
<td></td>
</tr>
<tr>
<td>Recent Traffic Count Data (Automatic / Manual Traffic Count Data, Journey Time Analysis)</td>
<td>Before opening traffic surveys were undertaken in 2005 on the existing section of A2 and other local roads in the vicinity of the scheme and have been provided. A single post opening traffic count on the A2 (near Konin) is available (2007 &amp; 2008) and has been made available. Count equipment is currently being installed at other locations on the new route. Data should be available June/July 2010.</td>
</tr>
<tr>
<td>Other Source of Qualitative and Quantitative Data Supporting Ex-Post Evaluation</td>
<td>Accident data for the A2 and other alternative local roads has been made available for from 2004-2008.</td>
</tr>
<tr>
<td>Relevant Contact Details to Support Evaluation</td>
<td></td>
</tr>
</tbody>
</table>


Summary of Outstanding Data Requirements (Criterion 4)

Primary Data

- Only one post opening traffic count is available on the A2 scheme section – More to follow but may not fit in with evaluation timescales.
- Availability of post opening traffic surveys on the local routes is currently being determined. However, it’s highly likely that few exist.
- No evidence of any pre or post opening journey times being undertaken.

In our view, there would be a requirement for additional counts and journey times in this corridor. The number of additional counts required would not be significant (less than 5) and would be focused on the A2 and existing local roads. Journey time surveys would also focus on the A2 and other alternative routes.

Secondary Data

- Predicted revenues from tolls are listed in the final report. However, the availability of actual revenues is currently being determined.
- Accident data has been supplied along with description of the severity and the location. No map references have been provided so will be requested.

Conclusions on Outstanding Data Requirements

- Post opening traffic data on local roads; and
- Before and after journey time surveys (if available).

Recommendations for Progression to Task 2 (score as appropriate – all scores are out of 5)

<table>
<thead>
<tr>
<th>Criteria (Weighting)</th>
<th>High Standard (4 or 5)</th>
<th>Medium Standard (2 or 3)</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>4) Amount of new ex post evaluation primary data required to support evaluation (15%)</td>
<td>✓</td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Total Weighted Score out of 100 75

Rank out of 20 ?

Note: A project should score at least a medium in criteria 1 for progression to stage 2

This scheme should be subjected to ex post evaluation (Stage 2 and 3)
Annex 2: References for literature review


- Department for Transport (2006b), *TAG Unit 3.5.9: The Estimation and Treatment of Scheme Costs*. London: DfT.


• Laird JJ, Geurs C and Nash CA (2009), ‘Option and non-use values and rail project appraisal’, *Transport Policy*, 16, 173-182.

• Macdonald N (2009), ‘The POPE programme that has been undertaken for the last 5 years on historic projects’, In: Proceedings of the European Transport Conference, 6-8 October, Leeuwenhorst Conference Centre, The Netherlands.


• Odgaard T, Kelly CE and Laird JJ (2005), *Current practice in project appraisal in Europe*, Deliverable 1, HEATCO Project (Developing Harmonised European Approaches for Transport Costing and Project Assessment). Stuttgart: IER.


• The World Bank [http://go.worldbank.org/TEN2WQJDN0](http://go.worldbank.org/TEN2WQJDN0)
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