

**Incorporating Principles of
Sustainable Development within the
Design and Delivery of Major
Projects: An international study with
particular reference to Mega Urban
Transport Projects
for
the Institution of Civil Engineers and
the Actuarial Profession**

**International appraisal systems for
transport and other projects**

Omega centre
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1.0 Context

This brief paper primarily considers appraisal systems for projects in countries other than the UK, especially for transport. It seeks to identify how they handle environmental and social aspects of sustainability. This reflects the interest in such international comparisons expressed by the RAMP Steering Group at its 29 May meeting.

The report first outlines the UK NATA system for transport appraisal, as a reference base. It then covers four further topics:

- the World Bank system for appraising loans to developing countries
- the European Investment Bank system for appraising investment loans for EU countries
- the EU HEATCO project into environmental and social factor costs in EU countries' transport appraisal CBA processes
- the Leeds ITS 2007 report on the implications of HEATCO findings for UK practice

2.0 The New Approach to Transport Appraisal – NATA

The current British appraisal framework for transport is the New Approach to Transport Appraisal, NATA. This was introduced by the Government in 1998, as part of the package of new measures indicated in that year's White Paper on transport. It was first associated with the multi-modal studies also introduced then. It is now the principal appraisal methodology for new transport projects of all modes in England and other parts of the UK (Scotland has a similar but slightly different process termed ScoTAG). NATA has evolved since its original launch and now takes account of the latest Treasury recommendations in the Green Book (Appraisal and Evaluation in Central Government) which forms the basis of the Government's appraisal process. The principles and processes for NATA are set out within the Department of Transport web-based guidance known as WebTAG¹.

Strategic environmental assessment (SEA) of certain plans and programmes is required under European Directive 2001/42/EC. SEA is broadly consistent with NATA and should be carried out as part of the NATA process.

WebTAG sets out comprehensive guidance on the conduct of transport studies, with advice on how to:

- set objectives and identify problems;
- develop potential solutions;
- create a transport model for the appraisal of the alternative solutions;
- how to conduct an appraisal which meets the Department's requirements.

¹ www.dft.gov.uk/webtag

The website also includes advice on the modelling and appraisal appropriate for major highway and public transport schemes. The guidance should be seen as a requirement for all projects/studies that require government approval. For projects that do not require government approval WebTAG should serve as a best practice guide.

The NATA guidance on WebTAG includes documents on three levels:

- an introductory review of the system, setting out its place within the Green Book principles and a fifteen step structure for transport studies, with the appraisal process at its heart²
- a set of four documents for project managers, providing more information, especially on principles³
- a set of detailed and in some cases substantial documents for transport planning practitioners, describing not only the methodological steps to be taken but also the inputs and systems to be used in the various circumstances encountered⁴

Central to the NATA process is the preparation of a Cost Benefit Analysis (CBA) aimed to identify the net economic value (Benefit Cost Ratio – BCR). Clear guidelines for this are set out. The overall results of the appraisal should be set out in an Appraisal Summary Table (AST), in which the results for a range of factors should be set out against five specified objectives and a number of sub-objectives. Formerly the objectives reflected the Government's common objectives for transport: these have now been replaced by the five objectives set out in the 2008 Government strategy document Towards a Sustainable Transport System.

NATA has been regularly reviewed since its introduction and sections updated as necessary. In 2007/2008 it was completely reviewed in the light of the Government's new white paper Towards a Sustainable Transport System (the 'NATA refresh') with the aim especially of improving the monetary valuation of environmental and social aspects of sustainability. A number of key documents have now been rewritten and published on WebTAG as consultation documents.

While the AST remains the principal end focus of NATA appraisals, the need to make effective use of public funds, in line with the Green Book, means that the BCR plays a dominant role in guiding decisions on transport projects.

3.0 International – the World Bank

The World Bank forms a key source of financial and technical assistance to developing countries around the world. It consists of two main development institutions: the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA), together with other agencies. Its

² www.dft.gov.uk/webtag - TAG Unit 1.1 - **Introduction to Transport Analysis**

³ www.dft.gov.uk/webtag - TAG Unit 2.1 - **The Overall Approach: Steps in the Process**

⁴ www.dft.gov.uk/webtag - TAG Unit 3.2 - **Appraisal**

primary aim is to advance the vision of inclusive and sustainable globalization. The World Bank institutions provide low-interest loans, interest-free credits and grants to developing countries for a wide array of development and investment purposes. The World Bank also supplies analysis and advice on economic and other development topics to member countries. Its clients are the governments of countries wishing to obtain support.⁵

The departments or agencies of governments wishing to borrow World Bank funds for projects are responsible for preparing the project, applying to the World Bank for the funds and then implementing the project. Throughout the process continual dialogue is required. In the preparatory stage, The World Bank generally takes an advisory role and offers analysis and advice when requested. It also assesses the relevant capacity of the implementing agencies, in order to reach agreement with the borrower about arrangements for overall project management. Early screening is also carried out to establish possible environmental or social impacts. This may mean that an Environmental Assessment Report is required. There may also need to be studies into potential social impacts (especially in relation to the effects for indigenous peoples).

In order for a project to be taken forward for funding agreement by the World Bank institutions, a full appraisal is required. This covers economic, financial, institutional, environmental and social aspects in separate but related work streams. This gives stakeholders an opportunity to review the project design in detail and resolve any outstanding questions. The government and the World Bank review the work done during the identification and preparation phases and confirm the expected project outcomes, intended beneficiaries and evaluation tools for monitoring progress. Agreement is reached on the viability of all aspects of the project at this time, as well as on a post implementation monitoring programme. The results of the appraisal process are set out in a publicly available summary project appraisal report, following a standard structure. This incorporates specific results, e.g. for the economic and financial appraisal results, but contains a descriptive review of the processes undertaken, the issues covered and the approach to dealing with them. The environmental and social aspects of sustainability are becoming of increasing importance in appraisal.

The Bank's Independent Evaluation Group assesses the performance of roughly one project out of four (about 70 projects a year), measuring outcomes against the original objectives, sustainability of results and institutional development impact.

The basic criterion for all World Bank lending is that the net benefits from the project should be positive. Beyond that, its policy OP/BP 10.04⁶ states specifically that:

1. Benefits and costs should be measured against the situation without the project.

⁵ www.worldbank.org

⁶ www.worldbank.org - **BP 10.04 - Economic Evaluation of Investment Operations**

2. All projects should be compared against alternatives, including the alternative of doing nothing.
3. If a project is expected to generate benefits in non-monetary terms the analysis has to show that the project represents the least cost way of attaining the stated objectives.
4. Sustainability must be assessed, and this includes analysis of whether stakeholders have the incentives to implement the project successfully.
5. Analysis should consider the courses, magnitude and effects of the risks associated with a project by taking into account the possible range in the values for basic variables and assessing the robustness of the project outcomes with respect to changes in these values.
6. The economic analysis should examine the consistency with the Bank's poverty reduction strategy.
7. The economic evaluation of Bank-financed projects should take into account any domestic or cross-border externalities.

Currently a review is being carried out of the extent to which an economic rate of return is established as part of the project appraisal. This actually declined from 70% of projects in the early 1970s to around 30% of projects in the early 2000s. The reasons are not clear. Issues are being raised over the need and quality of CBA in various circumstances. Carrying out a CBA is generally accepted as very important but it might be that the disciplined analysis and understanding generated by the CBA process are particularly important rather than just generating the figures.

4.0 European – the European Investment Bank

The European Investment Bank is the long-term lending bank of the European Union. Its task is to contribute towards the integration, balanced development and economic and social cohesion of the EU Member States. It also finances investments in future Member States of the EU and EU Partner countries. The EIB operates on a non-profit maximising basis and lends at close to the cost of borrowing.⁷

The EIB finances projects in most sectors, provided the project contributes to EU economic policy objectives. Project promoters are required simply to provide the Bank's Operations Directorate with a detailed description of their capital investment together with the prospective financing arrangements. Early initial contacts to discuss a proposed project are encouraged. The project promoter should provide sufficient information to allow the EIB to assess whether the project adheres to EIB lending objectives and has a well-developed business plan.

Project appraisal is carried out by the EIB's teams of engineers, economists and financial analysts, in close cooperation with the promoter. Criteria for a typical EIB appraisal are tailored to each specific project. Results are included in the project

⁷ www.eib.org

report to the Board of Directors for a financing decision. The appraisal focuses on project quality, which is based on assessment in a number of areas:

- Technical scope:
 - definition of the project's "technical description";
 - technical soundness, innovative technology, risks and mitigation measures;
 - information on capacity for products/services.
- Implementation:
 - promoter capability to implement the planned project;
 - information on timing and employment during implementation;
- Operation:
 - promoter's capability to operate and maintain the project;
 - information on production/service, operating and maintenance costs, employment during operational life.
- Procurement:
 - compliance with applicable legislation and EIB guidelines.
- Environmental impact:
 - compliance with applicable legislation;
 - information on environmental impact assessment.
- Market and demand:
 - analysis of the products/services demand over the project's life, with reference to sectoral studies of the Projects Directorate.
- Investment cost:
 - information on project costs and its detailed components;
 - comparison with cost of similar projects.
- Profitability:
 - information on financial profitability and related indicators (e.g. rate of return);
 - information on economic profitability.

The EIB supports the pursuit of sustainable development through its various financing activities, and tries where practicable to improve the environmental and social outcomes of all projects. Responsibility ultimately lies with the borrower; however, the EIB's internal processes aim to ensure that all financing activities are consistent with its environmental policy. EIB applies a broad definition of the term 'environment', including protection of the natural environment and improvement of the built environment. It also recognises the need to consider related social issues in their own right, with the aim of achieving an integrated environmental and social assessment.

This philosophy is reflected in the approach described in its *Environmental and Social Practices Handbook*.⁸ This refers to the variety of financing instruments deployed by the Bank and its role at various stages in the project cycle, though the focus is on the appraisal of investment loans. The protection and improvement of the natural and built environment are mainstream issues of importance to the EIB when

⁸ <http://www.eib.org/about/publications/environmental-and-social-practices-handbook.htm> - **Environmental & Social Practices Handbook**

considering financing of a particular operation. In addition, a number of specific issues (e.g. climate change, biodiversity and labour conditions), sectors (e.g. waste management) and types of projects (e.g. large dams and mining projects) may require particular attention. These are the subject of a variety of additional internal guidance to help staff identify and appropriately address environmental and social issues and risks according to international good practices. However, the major determining criteria for appraisal remain the identified (monetary) costs and benefits.

5.0 European countries transport project appraisal - HEATCO

HEATCO was a European Union research project, full title 'Developing **H**armonised **E**uropean **A**pproaches for **T**ransport **C**osting and Project Assessment'. It was carried out between February 2004 and December 2006. It followed on from previous EU studies, especially EUNET and UNITE. Its primary objective was the development of harmonised guidelines for project assessment and transport costing at an EU level.⁹

There were seven deliverables in all. The first was a compilation of information appraisal methodologies for all EU countries and Switzerland and a comparative review of their coverage. This found that the principles for project appraisal and transport costing vary considerably across countries and modes. The vast majority of the countries in the North and West region of the EU have comprehensive guidelines for project appraisal, whereas the guidelines in the South and East regions seem less developed. The appraisal framework for rail seems less standardised than for road and only around one third of the surveyed countries have formulated principles for the appraisal of air, inland waterway and sea transport projects.

Based on this, the HEATCO team identified elements of a consistent framework for project appraisal on EU-level and provided a detailed assessment of these in Deliverable 2¹⁰:

- General issues, including non-market valuation techniques, benefit transfer, treatment of nonmonetised impacts, discounting and intra-generational equity issues, decision criteria, the project appraisal evaluation period, treatment of future risk and uncertainty, the marginal costs of public funds, producer surplus of transport providers, the treatment of indirect socio-economic effects,
- Value of time and congestion, including business passenger traffic, non-work passenger traffic, commercial goods traffic time savings and treatment of congestion, unexpected delays and reliability,
- Value of changes in accident risks, including accident impacts considered, estimating accident risks, valuing accident costs),
- Environmental costs, including air pollution, noise, global warming,
- Costs and indirect impacts of infrastructure investment, including capital costs for the infrastructure project, costs for maintenance, operation and

⁹ <http://heatco.ier.uni-stuttgart.de/>

¹⁰ <http://heatco.ier.uni-stuttgart.de/> - **Deliverable 2 - State-of-the-art in project assessment**

administration, changes in infrastructure costs on existing network, optimism bias, residual value.

Where concrete values were available a comparison between countries was sometimes difficult. This was the case particularly for environmental costs, where various reference units (e.g. € per passenger- or tonne-kilometre, € per tonne of pollutant emitted) were used, which impeded comparability. Furthermore the use of different approaches for quantification and monetisation of costs made comparison difficult.

To address these, the project team carried out stated preference surveys across six countries to gain attributed values for several factors and reviewed a number of TEN-T case studies. Their findings on preferred choice of values were set out in Deliverable 5 and their final report in Deliverable 7, which set out 15 general principles for carrying out CBA appraisal.

6.0 The Leeds ITS 2007 report into the UK implications of HEATCO

The University of Leeds Institute of Transport Studies (ITS) prepared a report for the Department for Transport as part of the 'NATA Refresh' process. Entitled 'Transport Appraisal in other countries: lessons for the NATA Refresh', this was based primarily on the HEATCO work (where Leeds ITS were partners) but also drew on other studies, notably two Danish Transport Research Institute studies (in 2002 and 2007) into the use of socio-economic assessments as the basis for decision-making in transport. It particularly addressed the NATA focus on establishing monetary values for as many factors as possible.¹¹

The conclusions drawn by the ITS team were as follows:

- The UK remains at the forefront of the use of CBA to inform decision making. While there are certain technical points on which UK practice differs from the European norm and the HEATCO recommendations, this is not really a problem.
- There has been an element of opaqueness since the revised Green Book in the treatment of benefits to foreign travellers within the UK. These are far more important in European appraisal than in the UK and a degree of consistency with European appraisal practice in this area is desirable.
- There also needs to be consistency among Western European States in the valuation of transboundary pollution and in particular carbon emissions.
- If changes are envisaged to the treatment of financing costs in CBA, these might benefit from discussion with counterparts in Sweden, the Netherlands and the EIB.
- The UK seems to be lagging some other countries by not yet using money values for local and strategic pollutants other than carbon. Addressing this properly will involve significant modelling and valuation challenges.

¹¹ <http://www.its.leeds.ac.uk/> - **Transport Appraisal in other countries: lessons for the NATA Refresh**

- More dubiously, other countries seem to have made progress in areas such as biodiversity and natural resources which have always been considered difficult in the UK because of their context-specificity. It might be worth looking at how convincing the Dutch work is.
- There is scope for cross-fertilisation with the Dutch and Swedish on topics such as the value of travel time with income, distance and purpose and reliability values.
- Continuing to articulate the role of CBA in decision support and policy analysis is essential. This is the strongest signal that appraisal is taken seriously, as an input to decision making.
- Outside the studies reviewed here, we recommend continued liaison with European academics and policy makers in the approaches to estimating and valuing wider economic benefits.

The Leeds ITS team also submitted their views in response to the NATA consultation exercise, drawing on this report as well as other work in responding to the set questions on strategic, environmental and social aspects. This submission stresses the leading role that the UK has in the monetisation of environmental factors but identifies 'challenging' gaps that remain and the need for further research.

7.0 Conclusions

A few relevant points may be drawn out of this brief review:

- The UK transport appraisal system in NATA sets out a whole study process and provides for comprehensive appraisal through the Appraisal Summary Table, itself a form of Multi Criteria Analysis. But it is *very* focused on technical processes and detail inputs, with the economic measure (CBA) playing a determining role in practice.
- The 'NATA refresh' was primarily geared towards better representation of environmental and social factors through monetary values. The Leeds 2007 report was focused on contributing to this.
- The HEATCO project also focused on monetary values. But it found considerable variance in the values applied and indeed in the approach to appraisal across the various EU countries.
- The World Bank processes are fully concerned with obtaining value from their investment loans in a wide range of circumstances and there is a strong focus on the financial outcomes. But the processes now take an increasingly strong account of environmental and social aspects of sustainability; although the nature of how these are fully addressed remains under discussion.
- The European Investment Bank is also strongly focused on obtaining an identifiable value from its investment loans. Environmental and social aspects of sustainability are being taken more into account.
- For both the World Bank and the European Investment Bank, considerable attention is paid to understanding the issues and managing the project to achieve the aims defined for the project. In addition, both organisations encourage promoting countries and agencies to approach their management

teams very early in a project's life to discuss its development and the related application for a loan. This provides a context for them to understand how effectively all aspects, including environmental and social, are being handled.