



IMPACT SCORING AND AGGREGATION FOR SEA

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PAPER

- 1.1 This paper focuses upon the work of a European collaborative research action – COST 350 - Integrated Assessment of Environmental Impact of Traffic and Transport Infrastructure. The main objective of the COST 350 Action is to establish an operational concept, integrating at regional scale, all the environmental aspects of traffic and land-transport infrastructure to assist policy makers in an earlier stage of their decision making on transport and mobility.
- 1.2 Following an introduction to COST and COST 350, the paper highlights the scope of the research examining best practice in relation to impact scoring and aggregation methods for transport planning at a sub-regional scale. Although the focus is transport, the issues of impact scoring and aggregation are common to all plans/programmes involving multiple actions. Some of the issues to be addressed in the research comprise:
 - a) Significance criteria – a standard set for consistency or local flexibility?
 - b) Dealing with uncertainty
 - c) Equivalence across impact topics through scoring
 - d) What different scales are applicable
 - e) Transparency in the assignment of impact scores
 - f) The role of the public in impact scoring – who sets the criteria
 - g) How to deal with future values in impact scoring
- 1.3 Aggregation methods can be defined as the means by which individual impact scores are combined to arrive at an overall score or summary of the environmental performance of a transport strategy or its component measures. Among the issues are:
 - a) Loss of environmental information;
 - b) Introduction of bias;
 - c) Level of quantification;
 - d) Trading beneficial and adverse impacts;
 - e) The precautionary principle;
 - f) Dealing with show-stopper or red flag impacts;
 - g) Averaging and weighting of impacts;
 - h) How aggregating environmental topics interfaces with other transport/community topics.
- 1.4 This presentation will explore the issues that have been explored through the COST350 initiative seeking to draw upon the experiences of delegates wishing to contribute to this research topic.

Keywords

Significance criteria, SEA, Impact aggregation, EU research, Transport.



COST350

INTEGRATED ASSESSMENT OF ENVIRONMENTAL IMPACT OF TRAFFIC AND TRANSPORT INFRASTRUCTURE

What is COST

Founded in 1971, COST is an intergovernmental framework for European Co-operation in the field of Scientific and Technical Research¹, allowing the co-ordination of nationally funded research on a European level. Its goal is to ensure that Europe holds a strong position in the field of scientific and technical research for peaceful purposes, by increasing European co-operation and interaction in this field.

COST has a geographic al scope beyond the EU and most of the Central and Eastern European countries are members. In total, institutions from 44 countries participate in COST under different forms. COST also welcomes the participation of interested institutions from non-COST member states without any geographical restriction. The member countries participate on an "à la carte" principle and activities are launched on a "bottom-up" approach. One of its main features is its built-in flexibility.

COST has developed into one of the largest frameworks for research co-operation in Europe and is a valuable mechanism co-ordinating national research activities in Europe. Today it has almost 200 Actions and involves nearly 30,000 scientists from 32 European member countries and more than 46 participating institutions from 11 non-member countries and Non Governmental Organisations.

COST is based on Actions that are networks of co-ordinated national research projects in fields, which are of interest to a minimum number of participants (at least 5) from different member states. The Actions are defined by a Memorandum of Understanding (MoU) signed by the Governments of the COST states wishing to participate in the Action which usually last for 4 years.

COST covers a wide range of 17 scientific and technological domains including transport and represents an estimated volume of national funding of more than €1.5 billion per year with an average of €60 000 per Action. This funding covers co-ordination costs such as contributions to workshops/conferences, travel costs for meetings, contributions to publications and short term scientific missions of researchers to visit other laboratories.

An Introduction to COST 350

During 2001 preparations for a project "Integrated Assessment of Environmental Impact of Traffic and Transport Infrastructure" were developed under COST and the project commenced in October 2001 as COST 350 and is due to last into 2006.

The main objective of the Cost 350 Action is to establish an operational concept, integrating at regional scale, all the environmental aspects of traffic and land-transport infrastructure in order to assist policy makers in an earlier stage of their decision making on transport and mobility.

¹ <http://cost.cordis.lu/src/whatiscost.cfm>



Secondary objectives are:

- To optimise use of existing research results regarding environment and transport
- To formulate new, integrated parameters which have a certain universality (e.g. all different environmental analyses around a certain project expressed in a road capacity parameter)
- To achieve a common understanding of the importance and concept of integration of environmental aspects and the transport modes
- To identify further research requirements

COST350 is being taken forward with the co-operation of thirteen countries (so far) through the following seven Working Groups:

- WG 1: Defining the Cost Action
- WG 2: Definition of infrastructure planning situations
- WG 3: Identification of impacts, indicators and assessment methods
- WG 4: Specification of transport planning options and assessment methods
- WG 5: Impact scoring and aggregation
- WG 6: Synthesis and specification of research needs
- WG 7: Tests and illustrations of COST 350 methodology

Work to-date has focused upon Working Groups 1 and 2 with preparatory work being undertaken for Working Groups 3-5. The results of research will be presented in a final report and at a conference. The final report is seeking to be of use to policy makers and project managers in delivering a more sustainable transport infrastructure.

Working Group 5: Impact Scoring and Aggregation

The task of Working Group 5 is to explore best practice in relation to impact scoring and aggregation methods for transport planning at a sub-regional scale. The Working Group is to first prepare an inventory of impact scoring and aggregation methods before considering the relative merits of each approach and their applicability to different transport planning situations. The extent to which modelling procedures can assist is also to be explored. At the end of the investigations, the Working Group is to come forward with a series of recommendations for future research.

Before exploring the activities of the Working Group, it is appropriate to establish an understanding of methods for impact scoring and aggregation.

Impact Scoring

Impact scoring is taken as the process of assigning a quantitative or qualitative value to environmental impacts arising from the transport measures that reflect their significance using a pre-defined structured framework. Such frameworks or significance criteria can be prepared for most, if not all, environmental topics. Essentially, the criteria can be established using regulatory norms, distance to target and other qualitative or quantitative description of the environmental impact.

The Working Group is seeking to bring together existing guidance across the countries participating in the COST initiative. This will allow the approaches to say defining biodiversity impacts within a SEA to be examined on a consistent basis. It is clear that a variety of techniques exist, such as those that employ GIS techniques to judge impact, and others that are based upon expert judgements. Some techniques are



closed to external examination being an equation within a model, where as others are more transparent with the scores being critically examined by external organisations.

Key to the issue of impact scoring is the selection of decision orientated indicators that reflect the DIPSR framework. State of the Environment type indicators are not necessarily appropriate to the task of assessing competing strategies within a transport plan since they are not always focused upon the real trade-offs and decisions that need to be made between alternative strategies.

Some of the issues to be addressed comprise:

- Significance criteria – a standard set for consistency or local flexibility?
- Dealing with uncertainty
- Equivalence across impact topics through scoring
- What different scales are applicable, for example 3(positive, neutral, adverse), 5, 7 point scales
- Transparency in the assignment of impact scores
- The role of the public in impact scoring – who sets the criteria
- How to deal with future values in impact scoring

Aggregation Methods

Aggregation methods can be defined as the means by which individual impact scores are combined to arrive at an overall score or summary of the environmental performance of a transport strategy or its component measures.

Aggregation methods can be applied at the following scales:

- **Aggregation within a Transport Measure:** Multiple impacts along the length of a linear transport measure within an environmental topic. For example multiple land take from wetland habitat or loss of woodland habitat. The issue here is the methods to arrive at an overall score for the transport measure given the multiple impacts on biodiversity.
- **Aggregation within a Transport Strategy:** Combining the impacts of multiple transport measures that comprise the transport strategy being examined to arrive at a set of impact scores for each strategy across a range of environmental topics.
- **Aggregation for Decision-Makers:** The needs of decision-makers are very different from those of technical analysts and hence there may be a process of further aggregating the impact scores so that a reduced or distillation of the key details are presented to the decision-makers. A standardised pro-forma reporting system may be used as in England.
- **Aggregation for the Public:** Communication with the public may require different forms of aggregation in which diagrammatic means are used to present the relative performance of the competing transport strategies.

It is considered that a series of principles can be applied to these different forms of aggregation that reflect the following issues:

- Loss of environmental information
- Introduction of bias
- Level of quantification
- Trading beneficial and adverse impacts
- The precautionary principle
- Dealing with show-stopper or red flag impacts
- Averaging of impacts



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- How aggregating environmental topics interfaces with other transport/community topics

Monetisation techniques form one means of reducing the number of environmental externalities that need to be communicated to decision-makers that also may assist in the making of trade-offs between impacts and benefits. The use of energy or material balances may be other approaches. Work is progressing in several countries on monetisation techniques and the Working Group intends to examine the techniques being developed in Germany and in the UK.

An alternative approach to such a bottom-up approach to aggregation is to consider the issue of how to define environmental capacity for the transport network and then to explore means of defining the ability of that locality to accommodate further change without measures to increase its environmental capacity. Techniques such as the ecological footprint or environmental capacity will also be explored.

A key issue that will be explored is the different state of the transport infrastructure across Europe, and how this affects the application of SEA. Those countries with a well developed transport network are increasingly focused upon enhancing capacity of existing links with relatively few new transport links being proposed. This gives rise to a lower level of uncertainty in the SEA than in those countries where the network is being expanded. Consequently COST 350 will explore whether these differences give rise to alternative approaches to the application of SEA.

Getting Involved

COST 350 is open to all EU, Central and East European nationals provided the country is a signatory to the action. Meetings are held across Europe on a 3-4 monthly basis. The only financial support for participation is to cover travel and accommodation subject to the following rules:

- Only 2 persons per country can be reimbursed for their travel and accommodation
- National networks must be funded from national sources

Working Group 5 is currently establishing a network to support its activities and members are being sought to contribute towards the topics identified above. Ideally, contributions would be in the form of identifying guidance documents, provision of brief reviews/perspectives on the issues, attendance at Working Group meetings, access to the COST 350 website and its working papers.

During Spring 2005, there is to be a 2 day open workshop on COST 350 to be held in Athens. Opportunities exist to submit peer reviewed papers on SEA and sub-regional transport plans as well as to participate in discussion groups. For further details contact:

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