Technical report No 18

Towards a transport and environment reporting mechanism (TERM) for the EU

Part 1: TERM concept and process

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1. Purpose of this document

It has been recognised for many years that transport contributes significantly to several environmental problems, and in particular to climate change, acidification, air pollution, noise, land take and disruption of nature habitats[1]. These problems could be alleviated by a better integration of environmental concerns into transport policies and decision-making.

Strategies for the integration of environmental and sectoral policies were first outlined in the EU's Fifth Environmental Action Programme (5EAP)[2]. Integration has been given a higher political priority following the Treaty of Amsterdam, which underlines its importance and defines it as a way to achieve sustainable development. As part of this process, the concept of an indicator-based transport and environment reporting mechanism (TERM) for the EU was initiated during the UK Presidency in early 1998. In June of that year, the Joint Transport/Environment Council invited the Commission *'in conjunction with the European Environment Agency, and taking account of work done in other international organisations and in Member States, to develop a comprehensive set of indicators of the sustainability of transport (…) and to report on them regularly to the Council.'* Only a few days later, this request was reiterated when the European Council at its Summit in Cardiff (UK) invited '*all relevant formations of the Council to establish their own strategies for giving effect to environmental integration and sustainable development within their respective policy areas.'*

For more than a year now, the Commission and the EEA have been co-operating intensively in the setting up of TERM. A Steering Group, comprising participants from the Directorate-General of Transport (DG VII) and of the Environment (DG XI), Eurostat and the EEA, was created at the beginning of 1998. This group has:

- developed a preliminary list of 27 indicators;
- reviewed data availability for each indicator;
- developed a conceptual framework for the analysis of those indicators;
- conducted preliminary consultations with the Member States; and
- established co-operation with other international organisations working in the area of indicators for sustainable transport, including the OECD, ECMT, UNECE, WHO and the IEA.

The technical implementation of TERM is very much a co-operation between the EEA and Eurostat. An annual transport and environment indicator report will be produced by EEA, and will be supported by a statistical compendium issued by Eurostat. A 'zero version' of the indicator report will be published in autumn 1999, and will serve as an input to the Helsinki Summit. The indicator report will furthermore be complemented with a series of focus reports on specific topics that require a more detailed approach and analysis.

Currently, the preliminary TERM indicator set is being reviewed in order to adapt it to the needs of its main users (i.e. the Commission and the Member States). This might involve some reduction in the number of indicators, or alternatively the identification of subsets of the indicators for specific users.

The present report has been compiled in close co-operation with and with input from Eurostat and the European Topic Centres (ETCs) and in consultation with DGXI and DGVII. It is intended to publicise the conceptual and methodological approach and to allow the users and the various interest groups to contribute additional information and ideas to the TERM process and to the proposed indicator list. This **Part 1** deals mainly with the TERM concept and

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[1] European Environment Agency (1998), Europe's Environment: The Second Assessment

[2] European Commission (1993), Fifth Environmental Action Programme 'Towards sustainability' (OJ C 138, 17.5.93)

process. In **Part 2**, some preliminary indicator fact sheets are presented, which give an insight to the main data and methodological issues.

Comments on this report are welcome. They should be sent to Ann Dom, EEA project Manager Transport and Environment (ann.dom@eea.eu.int, tel. +45-33.36.71.31).

2. TERM context and process

2.1. Integration instruments

Various instruments and tools can be used to integrate environmental concerns in transport policies. Traditionally, regulations have been the main instrument for reducing e.g. vehicles air and noise emissions, often in the form of EU Directives. The technological improvements of the vehicle fleet these regulations induced have during the past years led to certain improvements in the environmental performance of the transport sector. For example the introduction of catalysts on new petrol-engine cars and stricter regulations for emissions from diesel vehicles have led to reductions in the emissions of NO_x, CO and NMVOC from road vehicles. However, in most countries, environmental measures failed to keep pace with growing transport volumes, and trends show that under current policies, the transport sector will not be able to achieve all the EU's objectives for sustainability. For example, CO_2 emissions from transport are still growing despite vehicle efficiency improvements[3]. Furthermore, traffic quality, efficiency and the accessibility to basic services are more and more hampered by the growing congestion problems due to (road and air) traffic growth.

Improving the sustainability of the transport sector clearly requires a more comprehensive and integrated transport and environment policy approach, combining legislation and economic instruments in a transparent way across all transport modes, and including traffic management and demand management measures. Thus, integration implies a change in policy-making focus from the 'end-of-pipe' actions typical of environment ministries to a greater focus on preventative actions being taken by the sectoral (transport) ministries responsible for the 'driving forces'.

The five-year action programme on the Common Transport Policy (CTP), which was initiated in 1995,[4] constituted a first step in the direction. The actions towards environmental integration that are included in the programme are however limited. Some additional initiatives (for the period 2000-2004) were outlined in a recent Commission Communication[5]. This states that *'the Commission will give particular attention to measures designed to reduce the dependence of economic growth on increases in transport activity and any such increases on energy consumption, as well as the development of less environmentally damaging energy alternatives for transport.'* Making the best use of available infrastructure and achieving a shift to less environmentally damaging modes of transport are the main objectives. The measures that have and are being implemented through the CTP action programme are aimed amongst others at the development of a fair and efficient transport pricing system, the revitalisation of railways, the promotion of inland waterways, maritime transport and combined transport, and the improvement of public transport systems.

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[3] European Environment Agency (1999, forthcoming), Environment in the European Union at the turn of the century, Copenhagen

[4] Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee of the Regions – The Common Transport Policy – Action Programme 1995-2000 (COM/95/302 final, 12.07.1995)

[5] Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee of the Regions. The Common Transport Policy. Sustainable Mobility: Perspectives for the Future. COM (1998) 716 Final/2, 21.12.1998)

2.2. TERM concept and outputs

To support the EU policy and decision-makers in the development of a sustainable transport system, the effectiveness of the various integration measures and policies will need to be carefully monitored and evaluated. Since the early 1990s, Eurostat and international organisations such as OECD have regularly published certain transport and environment statistics and indicators. However, there is still a need for a more comprehensive reporting system – tailored to the specific needs of EU transport policy-making and which would enable monitoring of the progress of transport towards sustainability.

One of the main TERM outputs will therefore be an **annual indicator report on transport and environment in the EU**, published by the EEA. This report will include a set of indicators most relevant to EU policy needs and decision-making. The aim is to develop an indicator set that will enable to measure the degree of environmental integration in the transport sector and the effectiveness of the various policy measures. In addition, indicators will be included that allow to evaluate whether transport develops in line with the objective of sustainable mobility (e.g. contributes to the objectives in the 5EAP). The report will also provide a common basis for countries to compare outcomes.

In addition to the indicator report, Eurostat will publish a **statistical compendium**, containing the transport and environmental data that underlie the indicator compilation.

Indicators only provide a very aggregated and simplified view on often complex systems, and additional information will be needed to put the information they provide in perspective. The annual indicator report will therefore be complemented by a series of **focus reports** which will be developed on specific policy topics that require a more detailed approach than is possible in the annual report.

Furthermore, to support the gradual improvement of specific indicators and methods, a series of more in-depth investigations will have to be conducted, the findings of which would be reported in **technical reports and papers**.

The number of focus reports and technical papers undertaken will depend on policy priorities at the time and the resources available at the EEA and the Commission.

2.3. Institutional co-operation required to operationalise TERM

TERM is steered jointly by the Commission (DG XI, DG VII and Eurostat) and the EEA. The technical implementation is very much an EEA-Eurostat co-operation. The EEA is mainly responsible for the indicator assessment and reporting, with input from the Commission services. The collection and harmonisation of the statistical data (that underpin the indicators) is a task in which Eurostat has the lead (with support by EEA and its European Topic Centres for certain environmental and land cover data).

In the first instance, the geographical coverage of TERM will be confined to the 15 EU Member States. However, within the context of the Accession process and the UNECE Regional Conference it is likely that the mechanism would in time be extended to provide a pan-European outlook.

As the reporting system at EU level should build on the experience already gained on indicators in some countries (e.g. the United Kingdom[6], Austria[7], Sweden[8]), regular consultation with the Member States and co-ordination with national initiatives will be a

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[6] Department of the Environment, Government Statistical Service (1996), Indicators of Sustainable Development for the United Kingdom

[7] Federal Ministry for the Environment, Youth and Family Affairs (1997), Environmental Balance of Transport Austria 1950-1996

[8] Swedish Environmental Protection Agency (1996), Towards an environmentally sustainable transport system: final report from the Swedish, EST-project, Stockholm
Naturvårdsverke Swedish Environmental Advisory Council (1999), Key indicators for ecologically sustainable development

prerequisite. Amongst others for this purpose, the EPRG[9] has recently set up an expert group on indicators. This expert group will act as a steering body for the process of the development of the sectoral reporting systems. It will at the same time take a role in the co-ordination with other indicator initiatives in Europe and elsewhere. Another forum of consultation is the DG VII-DG XI expert group on transport and environment (which consists of experts from the Ministries of Transport and of the Environment).

At the technical level, EEA and Eurostat will use and gradually improve their existing networks to obtain the necessary data and information from the various Member States. Thus, EEA will fully involve its European Information and Observation Network (EIONET)[10], whereas Eurostat will liaise with the statistical offices. The use of these existing data and information exchange channels should prevent overlaps and duplicatation of work.

2.4. Link with other indicator reporting systems of the Commission and EEA

In line with the conclusions of the Cardiff and Vienna Summits, the Commission is currently also investigating, with support of the EEA, the modalities for setting up indicator-based reporting systems for the energy, industry and agriculture sectors. These mechanisms are at different stages of development, but it is clear that a streamlining of the various systems will be necessary.

Another Commission initiative which is (to a certain extent) of relevance for TERM is the ongoing Pressure Indices Project (conducted by Eurostat and DGXI)[11], which aims at 100 pressure indicators for 10 policy fields based on the themes of the EU's Fifth Environmental Action Programme. Work is underway to aggregate 60 of these indicators to create a set of 10 pressure indices. The EEA contributes to several of these indicators.

In addition, the revised EEA Regulation proposes that the Agency compiles a regular indicator-based report or 'signals' report. The first of this series is currently being set up, and a first edition is expected to be available at the end of 1999. It will focus on the various environmental themes, and will contain short sectoral sections, which will draw on material produced by the sectoral indicator systems (i.e. for transport, energy, agriculture and industry). The intention is not to develop a new set of indicators, but rather to use the best and the most feasible indicators, developed by others, in a report that also contains an assessment of the developments in the environment and the factors influencing it. The regular indicator report will incorporate the main outcomes of the post-Cardiff sectoral reporting mechanisms (including TERM) and probably include ideas for a set of 'headline' indicators (i.e. a very limited selection of highly policy-relevant indicators). It will be one of the main outcomes of the EEA/EIONET.

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[9] The Environmental Policy Review Group, consisting of the secretary generals of national environmental ministries together with DG XI

[10] The European Information and Observation Network (EIONET): is the main vehicle of the European Environment Agency to collect data, information and knowledge for the process of reporting on the state of environment. It includes 9 European Topic Centres, 18 National Focal Points, 124 National Reference Centres and 334 other Main Component Elements.

[11] Eurostat (1998), Towards Environmental Pressure indices for the EU, draft

2.5. Co-ordination with other international organisations

As requested by the Council, TERM will also need to be co-ordinated with other indicator initiatives that are being developed by the other international organisations. Ongoing initiatives that are of relevance are (amongst others):

- the OECD core set of indicators and sectoral indicators[12] ;
- ECMT studies on transport and environment;
- the UNECE follow-up activities to the Vienna Declaration[13];
- work on health indicators by WHO;
- CO_2 and energy indicators by IEA;
- the UN-CSD Indicators for sustainable development;
- the Environmental Data/Nordic Indicator Group (Nordic Council of Ministers);
- etc.

As a first step in this co-ordination process, EEA organised a workshop with international organisations and some NGOs on 20 November 1998. The purpose was to exchange information and to establish a basis for future co-operation. In addition to the EEA and the European Commission (DG VII, DG XI, Eurostat), participating organisations were ECMT, IEA, OECD, UNECE, WHO and the European Federation for Transport and Environment (T&E), together with a limited number of independent experts.

The minutes of the workshop can be found in Annex 1. In general, the TERM initiative and concept was welcomed and supported by the various organisations. Harmonisation of national data sets was identified as a priority, and co-ordination actions will be developed in order to avoid overlaps. It was furthermore emphasised that an early publication of a 'zero version' of the TERM report – even within the limitations of current data availability – would help to get broad discussion on the exercise and would provide a driving factor for data improvement. Further co-ordination meetings will be organised on a regular basis.

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[12] OECD (1998), Indicators for the Integration of Environmental Concerns into Transport Policies

[13] UNECE (1997), Regional Conference on Transport and the Environment (Vienna, 12-14 November 1997), Vienna Declaration

3. Framework for indicator selection and assessment

3.1. Approach

The first step in the identification and selection of indicators is the establishment of a comprehensive reporting and policy framework.

For reporting, the EEA uses the DPSIR approach (Driving forces, Pressures, State, Impact and Responses) as a generic tool to support understanding of these complex relationships and reporting on them across the whole range of environmental issues.

The choice of indicators should furthermore be closely related to the various leverage points where transport and environmental policies can intervene e.g. through technical improvements or through the use of economic instruments. The indicators should help to measure the success or otherwise of the various policy interventions and of their combination. They should provide a better insight into the complex relationship between economic activities, society's behaviour and the effect on environmental quality.

3.2. DPSIR reporting framework for transport and environment issues

The DPSIR model shows the connections between the causes of environmental problems, their impacts and society's responses to them in an integrated way. Figure 1 shows the DPSIR model applied to transport and the environment. According to this model there is a chain of causal links from Driving forces, over Pressures to States and Impacts, finally leading to Societal Responses. For example, in the field of transport the actual amount of passenger and freight kilometres is:

- **D**riven mainly by activities (e.g. production of goods and services, leisure activities, etc.) and factors (e.g. disposable income, market prices, trade patterns, etc.) outside the transport sector. The movement of persons and goods then give rise to
- **P**ressures on people and the environment through emissions to the air, materials movement and land take for infrastructure, etc. As a result of the pressures,
- the **S**tate of the environment is affected. Changes in air quality and noise levels and increased fragmentation of habitats are examples relevant for transport. These changes in state may than lead to
- **I**mpacts such as ill health (e.g. due to accidents and respiratory diseases), biodiversity loss, etc. These impacts finally lead to societal
- **R**esponses in the form of for example technical standards, speed limits, economic instruments, investment in public transport, etc.

Until recently, mainly technological improvements have been used to contain the environmental Pressures resulting from increased demand, with the Driving force of increased mobility being regarded as a 'given'. It is now increasingly recognised that the driving forces underlying growing transport demand may have to be addressed (i.e. demand-management measures), as well as how transport volumes are managed (through e.g. modal choice).

Special attention needs to be given to the linkages between the different DPSIR elements (Figure 2), since this helps understanding of the dynamics of transport and the environment and, in doing so, may help identify possible areas for policy intervention. For example, the Pressures resulting from a given volume of demand for mobility depend on load factors,

Figure 1: The DPSIR framework for reporting in the environmental impact of transport

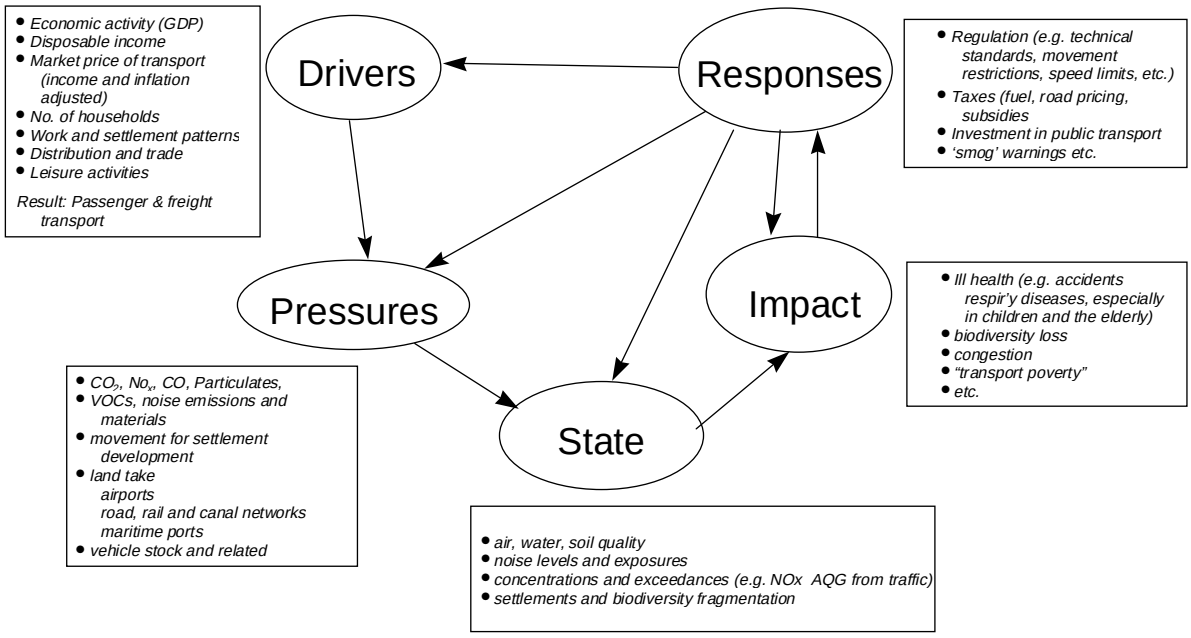
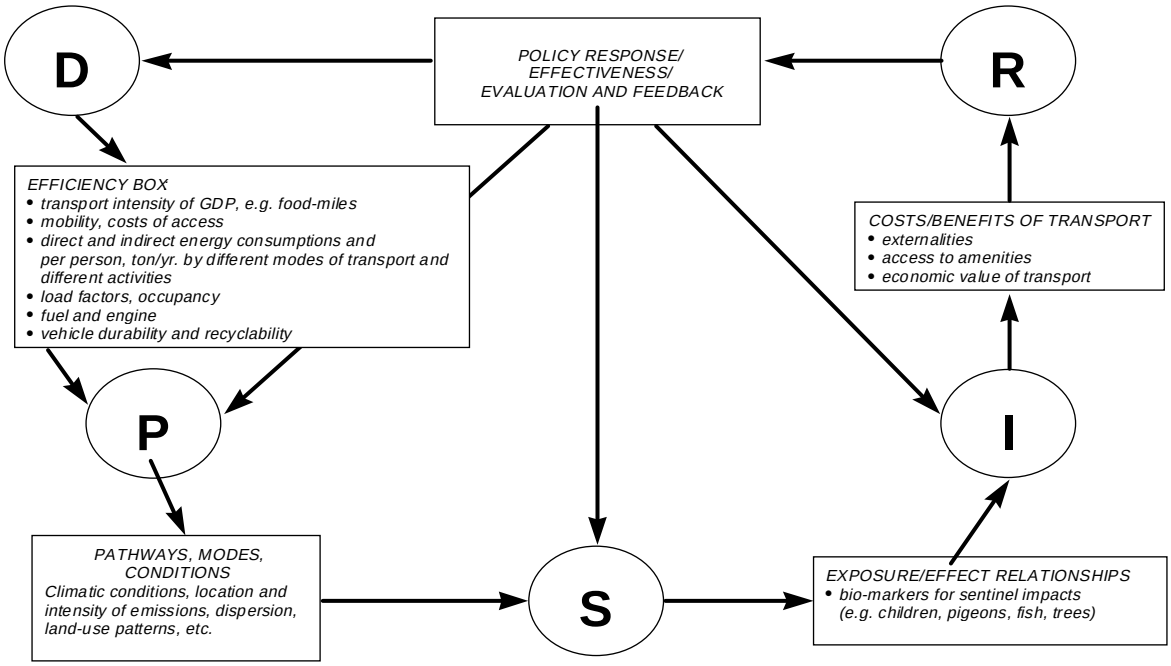


Figure 2: Key interlinkages between DPSIR and related information flows for transport



occupancy rates, emissions per kilometer, vehicle durability, etc. In other words, the pressures depend on the efficiency with which energy, materials, and land is used in the transport system and society's behaviour. Economic and behavioural efficiency can be actively encouraged through policy intervention, for example, through the use of economic instruments including taxes and subsidies, regulation or awareness-raising.

3.3. TERM policy framework

Given the integration issues outlined previously, **three key questions** are particularly relevant for policy-makers and therefore need to be addressed by TERM:

- What is the progress in the use of technical measures (e.g. cleaner vehicles and fuels) which reduce the impacts on the environment and human health?
- Are we getting better at using transport both within modes (e.g. improved occupancy, better driving practice) and between modes (e.g. by switching to less damaging forms of transport)?
- How are the factors, such as land-use planning, economic activity and access to basic services, driving the growth in overall transport and in its different modes?

The 'best' indicators will be those which help to answer these three policy questions and at the same time help to monitor the effectiveness of policy intervention via certain **key policy leverage points**, i.e.:

Transport and land-use planning: land-use patterns have a strong impact on the distances travelled by people for different purposes. Land-use planning can help minimise the need to travel and maximise the access to basic services and to more environmentally friendly forms of transport.

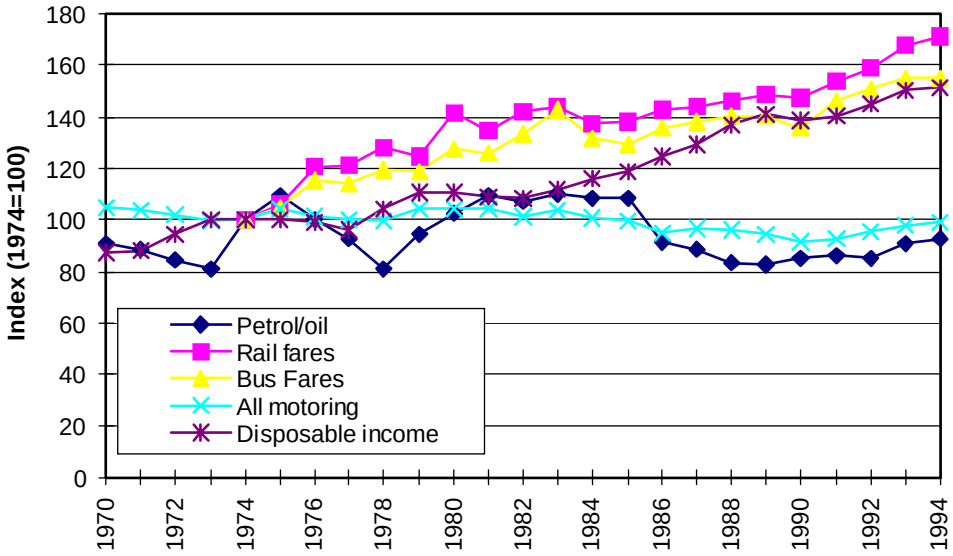
Modal split: increased investment in and availability of public transport, traffic management (e.g. using telematics) and restrictions on the movements of other vehicles are examples of how policy measures can shift the modal balance towards less damaging forms of transport.

Transport prices and economic instruments: these are instruments which can be used to shift the balance between modes towards an increased use of less damaging forms of transport, and to influence transport demand and efficiency in general by ensuring users pay the full cost of transport (including externalities). Important issues include: transport prices in 'real' terms (i.e. adjusted for inflation), relative pricing between transport modes and real transport prices relative to other economic parameters such as disposable income, purchasing power, prices of basic goods (see Figure 3), etc. Direct and indirect subsidies and taxation are also important factors.

Economic integration and transport: making production and distribution systems more efficient can help to reduce the amount of transport (in particular the freight transport intensity) needed to support the economic activity linked to economic integration.

Technological improvements: improving the efficiency in the use of resources can help to minimise the environmental impacts of transport. Smaller engine sizes, improved fuel efficiency, the use of cleaner fuels and developments such as catalytic converters are examples where technology can contribute to producing less damaging forms of transport.

Figure 3: Example of pricing indicators: real changes in cost of transport in the UK



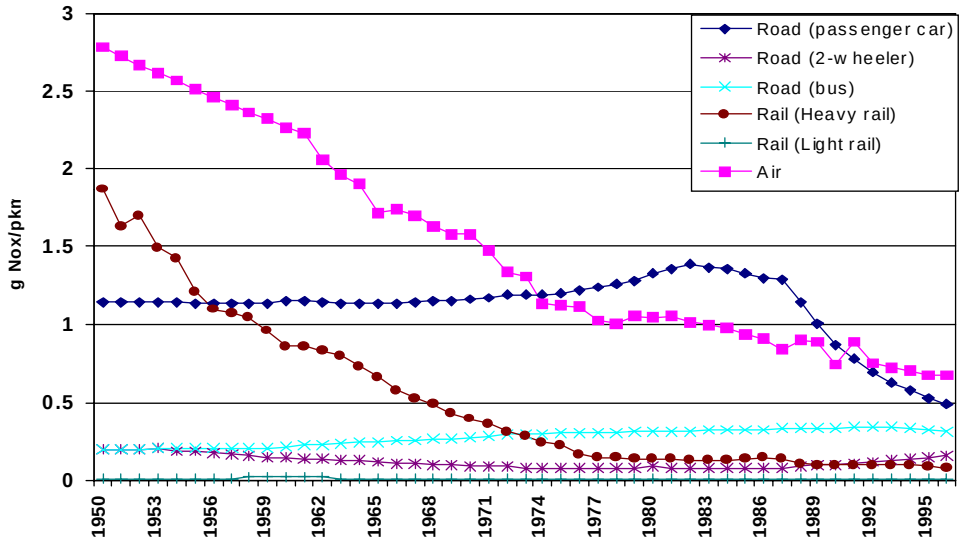
Source: Department of the Environment, Government Statistical Service (1996), Indicators of Sustainable Development for the United Kingdom, London

3.4. Indicator types currently used for transport and environment reporting

Most indicators that are currently used and reported (e.g. by Eurostat and OECD) at EU level have been compiled using datasets from one or other of the elements of the DPSIR Framework. Examples include passenger kilometres travelled/capita (D), NO_x emissions from transport/capita (P), and air quality concentration in urban areas (S). These indicators explain what is happening to the environment and are referred to as Type A or 'Descriptive' indicators in the EEA Typology of Indicators (described in Box 1). Most currently available indicators at the EU level, for example from Eurostat, are 'Descriptive' indicators.

Although descriptive indicators are essential, it is increasingly recognised that indicators also need to focus on the interlinkages between all the elements of the DPSIR framework. For example, by combining NO_x emissions and passenger kilometres travelled (to give a C-type P/D 'Efficiency' indicator), we get a measure of the efficiency of passenger transport with respect to NO_x pollution (see Figure 4). Such an indicator helps policy-makers to see whether the technological advances to reduce pollution are keeping pace with the growth of transport and vehicles. The overall efficiency of transport with respect to other environmental issues can be assessed using similar efficiency indicators.

Figure 4: An example of a type C 'efficiency' indicator: NO_x emissions per passenger-km (Austria)



Source: MOLITOR R., et al. (1997), Environmental Balance of Transport, Austria 1950-1996, ed. Federal Ministry for the Environment, Youth and Family, Vienna.

Box 1: The EEA typology of indicators

The EEA 'Typology of Environmental Indicators' classifies indicators into four simple groups which address the following questions:

'What is happening to the environment?' (Type A). For example, 'SO_2 emissions', 'water quality in lakes', etc. These are Type A or 'Descriptive Indicators'. They are useful but whatever trend they show provokes the question:

'Does it matter?' (Type B). It does matter, if the numbers are near to, or above, some kind of reference value, like a 'critical load', a 'carrying capacity' or a health standard, or if they are far from policy target values. Examples include numbers of citizens exposed to above the Air Quality guideline for NO_2, or the removal rate for Nitrogen from sewage treatment plants compared to a national target rate. These indicators are called Type B, or 'Performance Indicators'. They are particularly valuable for 'distance to target' analysis. However, they cannot be generated if there are no 'sustainability reference values'(SRVs), which are mainly determined scientifically, or policy target values (PTVs), which are mainly politically determined steps along the way towards SRVs. The EEA has recently compiled a database of SRVs and PTVs for 14 environmental problems which is accessible on http://salmon.eea.eu.int/star/. If the performance indicator shows there to be a problem, or, in the absence of any SRVs or PTVs (as with much of biodiversity), if the Type A indicator suggests there could be a problem, the next question from the policy-makers, or the public, would be:

'Are we improving?' (Type C). This is mainly answered by indicators that measure the 'efficiency' of production and consumption processes with respect to environmental issues, e. g. energy use/GDP; emissions/vehicle km; kg building waste/family house'; 'water use/litre beer'; or Material Input per unit of Service etc. These are called Type C or 'Efficiency Indicators'. They can often be compiled by merging two type A indicators, such as NO_x output and passenger kilometres to give NO_x/passenger kilometre, which is a measure of the eco-efficiency of transport with respect to NO_x pollution.

Finally, some measure of overall sustainability is needed in order to answer the question:

'Are we on the whole better off?' (Type D). For example, a kind of 'Green GDP', such as the Index of Sustainable Economic Welfare (ISEW) etc. These are called Type D, or 'Total Welfare Indicators' and are currently outside the EEA's work programme.

Datasets on driving forces, pressures and state can also be combined with a policy target or other reference value to give indicators of progress towards policy goals and hence the effectiveness of policy measures. These are 'Performance' or Type B indicators under the EEA Typology.

Although all types of indicators are required in order to give a complete picture of the transport/environment interactions, performance and efficiency indicators are generally of most use to policy-makers. However, in current EU indicator systems, type C, or 'Efficiency' indicators, are often lacking. TERM aims to overcome this limitation and to develop a well-balanced set of indicators which addresses all indicator types.

3.5. Some practical considerations when selecting indicators

Once a definition of the desirable indicators has been established, the practical problems of developing the indicators have to be addressed. Among the considerations to be borne in mind when selecting the most relevant indicators are: a) the needs of the audience being addressed, b) the level of aggregation needed to provide meaningful messages, c) the availability of data to compile them and d) the required resources.

3.5.1. Audience

The proposed indicators are intended for use primarily by the European Community institutions, Ministers and policy-makers in the Member States. It is recognised that policy-makers alone cannot influence transport trends, many of which depend on the behaviour of individuals, businesses, local authorities, planning authorities and other sectors. However, a large number of detailed indicators covering all these groups is beyond the scope of this exercise, which is intended to help to provide a reporting mechanism on key policy issues at the national and European levels.

3.5.2. Level of aggregation

Presenting indicators at a very high level of aggregation (e.g. whole economy fuel used in transport in relation to GDP) gives an overview of transport efficiency in relation to fuel consumption (in this example), but does not clearly illustrate the effects of particular policy levers. It may also mask important underlying trends, which may be moving in opposite directions. Also many transport policies are local (e.g. urban pricing), and aggregated indicators may not enable the identification of causal links between trends and policy measures. However, a very detailed set of indicators related to each of the policy levers and key actors would give a very long list of indicators, making it difficult to get an overview, hence a balance needs to be struck.

In TERM, it will be necessary to find an appropriate balance, presenting indicators which illustrate the key policy issues at a fairly broad level of aggregation, appropriate for reporting on a regular basis at EU level. It must be clear, however, that the broad, high-level indicators will be supported by a pyramid of more detailed, often sectoral, information and indicators. An example could be overall transport price as a high-level indicator, which could be supported by detailed indicators on fuel prices, transport taxes and transport subsidies.

Even so, the presentation of the indicators will represent a considerable amount of information to absorb, and some presentational devices will need to be developed, to synthesise and reduce the number of indicators.

Depending on data availability, the indicators will be presented at EU and at national level, and will show modal and urban/rural splits where applicable and possible.

3.5.3. Combination and making best use of existing data

Any new system of indicators must make the most effective use of existing data as well as encourage cost-effective innovations that are needed to meet the new data needs of policy-makers. Another first challenge is to combine and aggregate data so as to provide the audience with an overview of how things are changing while at the same time ensuring that key underlying messages and trends relevant to the areas where policy can intervene or has intervened are not lost.

Integrating environmental and socio-economic data to provide added-value messages over and above those which can be derived from looking at the environmental and socio-economic trends separately is a further challenge. This requires good understanding of the economic/environmental/social interactions and of techniques to combine datasets in a statistically sound way.

3.5.4. Resources

Resource constraints at the international level and in the countries will have a bearing on the extent of new data collection initiatives which can be undertaken. It will also be necessary when considering new data collection to identify possible redundancies in existing data collection so that existing resources could be refocused to meet new needs at no additional cost.

Finally, to comply with the various TERM objectives, the EEA and Eurostat also require additional resources. Negotiations in this respect are ongoing with DG VII and DG XI.

3.6. Preliminary list of TERM indicators

Using the reporting and policy frameworks outlined above, the TERM steering group drafted a first working list of TERM indicators in March 1998. This list was since improved through consultation with the Commission services, national experts, other international organisations and researchers. The result of this preliminary consultation is the list of 27 indicators that is presented in Box 2. This proposed set of indicators gives particular emphasis to the efficiency interlinkages within the DPSIR framework but descriptive and performance indicators are also included. The indicators have been divided into six groups which have been chosen to link to the key questions and leverage points outlined above. A short explanation on the thinking that underpins the choice of indicators under each of the six groups is given in Box 3. Within each group, one to two illustrative indicators have been highlighted in bold to reflect their importance for measuring the success of policy levers.

The current TERM indicator set is still to be considered as a preliminary and flexible list; it will be improved gradually to adapt it to the needs of users (i.e. the Commission and the Member States). This might involve some reduction in the number of indicators, or alternatively the identification of subsets of indicators for specific users. The list is also a long-term objective; it still includes indicators which can as yet not be quantified, as data limitations still impose several restrictions.

The EEA is currently conducting a feasibility study, in which a more in-depth review is made of the current data availability and of links with other indicator reporting systems (at the national and international level). This study should result in a multi-year TERM action plan.

It also the intention to optimise and concretise the indicator list (and the supporting data) through a participatory process, i.e. by conducting broad consultation with (amongst others) the Member States. This publication intends to facilitate this process. **The TERM steering group welcomes all suggestions to improve the present indicator list.**

Box 2: Preliminary TERM indicator list and their data availability

GROUP	NO	INDICATORS	DPSIR TYPE (EEA TYPE)	ASSESSMENT OF DATA AVAILABILITY			
				LEADER	WHEN	QUALITY	PROBLEMS / COMMENTS
ENVIRONMENTAL PERFORMANCE OF TRANSPORT							
ENVIRONMENTAL CONSEQUENCES OF TRANSPORT	1.	Transport final energy consumption and primary energy consumption, and share in total (fossil, nuclear, renewable) by mode	D (A)	Eurostat	++	+	Inconsistent definitions for maritime and aviation. Primary consumption of transport not available.
	2.	**Transport emissions and share in total emissions for CO_2, NO_x, NMVOCs, PM_{10}, SO_x, by mode**	**P (A)**	Eurostat/ EEA	++	++/- -	PM_{10} data poor.
	3.	Exceedances of air quality values	S (B)	EEA	++	+	Data only available for all emission sources: transport share being modeled in Auto-Oil II.
	4.	Exposure of population to traffic noise	S/I (B)	EEA	- -	- -	No harmonised methodologies or data available.
	5.	Infrastructure influence on ecosystems and habitats ('fragmentation') and proximity of transport infrastructure to designated sites	P/S (A)	EEA	-	-	Needs to be estimated – no harmonised methodologies or data available.
	6.	Land take for transport by mode	P (A)	EEA	+	+	Basic data needed, can be calculated according to land cover type.
	7.	Number of transport accidents, fatalities, injured, polluting accidents (land, air and maritime)	I (A)	Eurostat	++	-	Definitions and confidentiality. Data on polluting accidents are poor.
DETERMINANTS OF THE TRANSPORT/ENVIRONMENT SYSTEM							
LAND USE AND ACCESS TO BASIC SERVICES	8.	Average passenger journey time and length per mode, purpose (commuting, shopping, leisure) and territory (urban/rural)	D (A)	Eurostat	-	-	No data for most countries, although some data might be available from national household surveys. Additional research is needed.
	9.	**Access to transport services e.g.:** • number of motor vehicles per household • % of persons in a territory with access to a public transport station within e.g. 500 m	**D (A)**	Eurostat	-	-	For vehicles data are available at Eurostat. Some data on e.g. access to public transport may be available from national household surveys. Additional research is required.
TRANSPORT DEMAND AND INTENSITY	10.	**Passenger transport (by mode and purpose):** • total passengers • total pkm • pkm per capita • pkm per GDP	**D (A)**	Eurostat/ DG VII	++	-	Passenger and pkm data poor. Travel purpose data probably not available.
	11.	**Freight transport (by mode and group of goods)** • total tonnes • total tkm • tkm per capita • tkm per GDP	**D (A)**	Eurostat/D G VII	++	+	Value of goods or of transport services and GDP (according to PPP) to be considered. Goods group split of veh.-km poor.
TRANSPORT SUPPLY	12.	Length of transport infrastructure by mode and by type of infrastructure (e.g. motorway, national road, municipal road, etc.)	D (A)	Eurostat	++	-	Definitions: no bicycle lanes. Possibility of including number of passenger and freight nodes (i.e. airports, ports) needs to be investigated.
	13.	**Investments in transport infrastructure/capita and by mode**	**D/R (A)**	Eurostat/ DG VII	++	+	Latest data 1989.
PRICE SIGNALS	14.	**Real passenger and freight transport price by mode**	**R (A)**	Eurostat	++	+	Indices available: not real prices.

GROUP	NO	INDICATORS	DPSIR TYPE (EEA TYPE)	ASSESSMENT OF DATA AVAILABILITY			
				LEADER	WHEN	QUALITY	PROBLEMS / COMMENTS
	15.	Fuel price	D (A)	Eurostat	++	+	Missing fuels; other data needed. General operating costs should also be considered.
	16.	Taxes	R (A)	Eurostat/ EEA	-	-	Basic data needed.
	17.	Subsidies	R (A)	EEA	-	-	Environmental costs needed.
	18.	Expenditure for personal mobility per person by income group	D (A)	Eurostat	++	+	No split by income group. Could be combined with Indicator 14.
	19.	Proportion of infrastructure and environmental costs (including congestion costs) covered by price	R (A)	EEA	-	-	Basic data needed. Problem of identifying external costs (methods and data). Information on % of infrastructure with pricing systems should be examined.
EFFICIENT USE OF TRANSPORT	20.	Overall energy efficiency for passenger and freight transport per km travelled (per vehicle type)	D/P (C)	Eurostat	-	-	Goods/passenger split of energy; pkm data poor.
	21.	**Emissions per pass-km and emissions per ton-km for CO_2, NO_x, NMVOCs, PM_{10}, SO_x by mode**	**D/P (C)**	Eurostat/E EA	-	-	Split pkm/tkm.
	22.	Vehicle occupancy	D (A)	Eurostat	-	-	Poor data.
	23.	Uptake of cleaner fuels (unleaded petrol, electric, alternative fuels) and numbers of alternative fuelled vehicles	D/R (A)	Eurostat	++		Missing fuels.
	24.	Load factors for road freight transport (LDV, HDV)	D (A)	Eurostat	+	+	Data not available for international vehicle-km. No breakdown of the tkm by type of vehicle available.
	25.	Average age of the vehicle fleet	D (A)	Eurostat	+	+	Data only available for few years, and not for all MS. Could be combined with Indicator 26
	26.	Proportion of vehicle fleet meeting certain air and noise emission standards (by mode)	D/R (A)	Eurostat	-	+	Needs to be estimated on basis of vehicle age. Requires date on which legislation came into force by country.
	27.	Public awareness	R (A)	Euro-barometer / DGXI	-	-	Survey needed.

Source: Eurostat; EEA

Key: **Bold type** indicates priority indicators
When: ++ now; + soon, some work needed; - major work needed; - - situation unclear.
Quality: ++ complete, reliable, harmonised; + incomplete; - unreliable/unharmonised; - - very serious problems
Overview: 27 indicators (7 priority): 12 available now (5 priority), 3 available soon (0 priority), 12 need major work or clarification (2 priority). However, all priority indicators need some quality improvement.

Box 3: TERM indicator groups

Environmental consequences of transport: This is a core area where indicators are needed to help understanding of the environmental 'costs' of the different modes of transport and the associated economic and social activities which influence demand. The group contains contextual indicators (which demonstrate the relative share of transport compared to other socio-economic sectors) as well as absolute indicators for the main environmental and health themes.

Land use and access: Land-use planning measures influence the location of basic services and hence have a direct impact on access for people to these services and hence on transport demand. Access to services is also determined by consumers' ability to pay for using transport.

Transport demand and intensity: Demand is the basic driving force. Intensity and modal split are important for understanding the efficiency of transport with respect to economic activity, in particular for trade and the distribution of goods like food.

Transport supply: The supply of transport infrastructure is linked to transport demand. Investment levels are useful when looking at infrastructure quality and modal split.

Price signals: Pricing mechanisms, taxes and subsidies can impact on transport activities and are therefore effective policy tools that can be used to influence transport demand and efficiency, through changing consumers' behaviour, business logistics and location decisions. It is useful to understand, over time and between countries, the extent to which such tools are effective.

Transport efficiency: There are two types of efficiency covered here: technical efficiency such as better fuels and engines, and efficient use of the transport system (e.g. occupancy rate).

3.7. Current data availability

Several of the basic data sets required for the proposed indicators are already collected from Member States by Eurostat, other Directorates-General of the Commission, the EEA and its ETCs. However, a preliminary survey of data availability conducted by Eurostat and EEA has shown that data gaps will impose limitations on the system. Given current data (and as indicated in Box 2) 15 indicators can be considered feasible in the short-medium term; 12 need substantial work. However, all indicators need some or substantial quality improvement.

In the longer term, urgent action is required to improve data, and the EEA and Eurostat are consciously working at identifying the gaps and how to fill them. Continued support by Member States will be essential to maintain the momentum that all partners have managed to build up.

Specific action is required to improve harmonisation of reporting and to avoid unnecessary duplication of work arising from requests for data from the Agency (and ETCs), the Commission policy DGs (based on legislation requirements), Eurostat (based on statistical legislation and agreements), international conventions, and OECD, UNECE, ECMT and WHO. Solutions to this problem are not straightforward, partly because of the different coverage and end-uses of the different data (transposition/enforcement for the Commission, and information for the Agency, Eurostat, OECD and international conventions). For example, many of the data collected for compliance assessment are not suitable for indicator development because of insufficient and inappropriate geographical and parametric coverage. However, changes are under discussion and already in the review of the Agency Regulation the Council is proposing that the Agency be fully integrated into the process of drawing up questionnaires seeking compliance data in order to achieve closer correspondence with indicator and assessment reporting needs. The reporting requirements of future legislation should be defined with a view to achieving more consistency with the existing monitoring systems and indicator needs as well as with the basic EU data classification and nomenclature systems.

Through the above mentioned feasibility study, the EEA and Eurostat (and with their respective partners in the Member States) are currently examining the actions to be

undertaken to improve data quality in the longer term. Meanwhile, even though data gaps still impose various limitations to TERM, it is the intention to launch a 'zero version' of the report as soon as possible. Therefore, TERM will initially be set up with a limited scope of indicators, but would over the years be gradually extended, as data and methods are improved.

3.8. Assessment methodology

3.8.1. Objectives and targets as an essential assessment framework

Concrete targets are necessary to evaluate the significance of the TERM indicator trends and to assess progress towards sustainable development. Sectoral environmental targets (e.g. emission-reduction targets) would also help to focus the efforts of the transport sector on its key environmental impacts.

The implementation of sustainability principles requires the identification of clearly outlined sustainability objectives and targets. International targets can be found in the 5EAP, the Commission's White Paper on the CTP, and various other international conventions and agreements. At national level, objectives and targets are formulated in national regulations and in transport and environmental policy documents and plans.

Targets can address the various areas of the transport and environment system:

- **transport targets** can be formulated as, for example, traffic-reduction targets, targets related to the modal share of the transport system, regional targets (e.g. reduction of road traffic in cities, reduction of transit road traffic in sensitive areas such as the Alpine crossings), etc.;
- **technological targets** include: the uptake of cleaner fuels, emission standards (noise and gases) for vehicles, phase-out of older technologies (e.g. car scrappage schemes, phase-out of Chapter 2 aircraft),
- **environmental targets** include the reduction in emissions of greenhouse gases, reduction in population share subject to noise nuisance, conservation of ecologically important areas.

An example of national target-setting in various areas is shown in Box 4. The EEA recently finalised an 'Inventory of European Policy Environment Targets and Sustainability Reference Values', the findings of which have been brought together in the STAR database. This will serve as a first information tool on targets. STAR covers the European countries in the EEA area, and is accessible via the Web (http://star.eea.eu.int/). For the purpose of TERM, the EEA is currently extending the STAR database with a more in-depth review of targets related to the transport sector.

Box 4: Example of target-setting: the Netherlands

AIR

SO_2	NO_x	VOCs/HCs	Other

Government target[1]:
Emissions in ktonnes for total traffic: 14 (2000); 12 (2010).
	Government target[1]:
	Emissions in ktonnes (targets for 2000):
	• Total traffic: 158
	• Road traffic:
	  • passenger cars: 40
	  • lorries: 72
	• Non-road traffic: 46
	Dutch Government (1986 base year)[5]:
	Road vehicles emissions: -20 % (1995); -75 % (2010);
		Government target[1]:
		Emissions in ktonnes for VOCs:
		• Road traffic
		  • passenger cars: 35 (2000); 35 (2010)
		  • lorries: 30 (2000); 12 (2010)
		• non-road traffic: 15 (2000); 10 (2010)
		Dutch Government (1986 base year)[5]:
		Road vehicles, unburnt hydrocarbon emissions: -20 % (1995); -75 % (2010)
			Government target[1]:
			Odour:
			• Stabilise at 1985 level for all sources (including non-traffic) by 2000;
			• No severe nuisance, all sources together (including non-traffic) by 2010.

CLIMATE CHANGE	NOISE	BIODIVERSITY	OTHER
Government target (1986 base year)[1]: For Road traffic emission: by 2000 stabilise at least at 1986 levels (i.e. 23 Mtonnes); -10 % by 2010 (20.7 Mtonnes)	*Government target*[1]: • Stabilise at 1985 levels for all sources (including non-traffic) by 2000; *Dutch Government* (1986 base year)[5]: • The total area exposed to noise levels in excess of 55 dB(A) as a result of through traffic will not be greater than in 1986. • The number of homes whose external walls are exposed to noise levels in excess of 55 dB(A) will be cut by half.	*Government target* (1986 base year)[2]: Short-term aim is to prevent further fragmentation of the countryside and the natural environment; the longer-term aim is to reverse the process.	*Government target*[2]: • **Road safety** goals (1986 base year): -15 % fatalities (1995) -50 % (2010); -10 % injuries (1995), -40 % (2010). • **Accessibility**: By 2010 public transport will comprise a coherent system of railway, bus, tram and taxi services capable of carrying 50-100 % more peak-hour passengers in the main corridors (1986 base year). • **Accessibility**: The ratio of travelling times by public transport and private car for home-to-work journeys of over five kilometres on the main commuter routes in the urban nodes will be 1.5 or less (by 2000 in the four metropolitan areas). • **Accessibility**: Target figures for the probability of congestion in 2010 will be 2 % on the hinterland links of Rotterdam and Schiphol and 5 % on the rest of the trunk-road network. • **Goods transport by rail**: Trunk routes will be able to carry axle loads of 22.5 tonnes. *Goals in 'Transport in Balance' for 1994-2010:* • **Transport volume:** to limit the increase in car-km driven to 135 % of the 1986 value; 5 % less road tonne-km in long-distance domestic freight; 10 % less import/export road traffic freight; 40 % less lower transit traffic tonne-km by road; 10 % lower growth in vehicle-km, e.g. through modal shift.

Source: ERM (1999), Evaluation of STAR transport sector targets, draft

Swedish Environmental Protection Agency (1998), Inventory of environmental goals for obtaining a sustainable society and a sustainable transport system

1. Third National Environmental Policy Plan, 1998. Government of the Netherlands.

2. Second Transport Structure Plan, 1989-1990. Government of the Netherlands.

3.8.2. Assessment of the indicators

Interpretation of the indicators is not always easy. Extreme care must be taken to analyse the results correctly, using expert knowledge to do so and taking account, in particular, of the limitations of the statistical data. There are also time lags between when a policy is implemented and when the impact of that policy is reflected in the indicator trends.

Assessment of the indicators and their inter-linkages will be undertaken in three steps:

1. Assessment of each of the indicators individually: for each indicator a sheet will be developed following a standard format (see Box 5). The indicator sheets will be presented corresponding to the six indicator groups.
2. Group assessment: this assessment should link the different elements of DPSIR in an integrated way and should provide the reader with messages which are not discernible from the analyses provided previously for each indicator individually. For example, the assessment would highlight where indicator trends which are of benefit to the economy and/or the environment are offset by other indicator trends which have a negative impact on the economy/environment. The assessment would also link these trends to the wider policy framework and in doing so provide the reader with conclusions on where policy is having a beneficial effect on trends and where more action might need to be considered to reverse the direction of the trends.
3. Overall assessment: this should provide overall conclusions across the six groups drawing together common themes and messages from the conclusions presented for the six groups previously. Again, efforts should be made to identify/analyse where positive trends for, say, one group of indicators are offset (either wholly or partly) by negative trends for another group.

Box 5: TERM indicator sheet outline

a) description of **why the indicator is important**, i.e. policy priority, key element of DPSIR to be described, tracked and analysed, etc;

b) the main **objectives and targets** that are related to the indicator;

c) the past and present **picture** of the indicator (i.e. graph and/or table with trends for EU);

d) a **key message** highlighting the key trends discernible from the picture and how these link to targets, policy, eco-efficiency, etc.;

e) a **fuller analysis of the indicator trends** with more facts (%s, absolutes, ratios) on temporal changes and on country comparisons which are not immediately discernible from the picture presented;

f) a description of the **links** with other indicators;

g) an identification of **data gaps and methodological shortcomings** for the present indicator;

h) an outline of **future work** needed to improve indicator methodology, quality and coverage.

3.9. Preliminary compilation of some indicators

In the other partof this publication (*"Part 2: Some preliminary indicator sheets"*) some concrete examples are given of how EEA and Eurostat envisage to put into practice the TERM methodology outlined above. Part 2 consists of a number of indicator sheets, which outline the methodological issues and requirements for future work, and which also include a very **preliminary** compilation of certain indicators (based on current data availability).

The indicator sheets on energy consumption, accidents, transport demand, vehicle fleet characteristics, fuel and transport prices, and uptake of cleaner fuels, were compiled based on data provided by Eurostat. The EEA/ETCs provided the data for the indicator sheets on noise, fragmentation, land take, air quality, emissions and recovery rates. The latter indicator sheets

were compiled mainly using material for the forthcoming EEA report *Environment in the EU at the turn of the century* and for the EEA's contribution to the Global Assessment of the 5EAP.[14]

The examples show that the compilation of certain indicators is already feasible, i.e. the current statistical data availability is already sufficient to make a compilation at EU level or for certain countries (e.g. energy consumption, transport volume, emissions).

Other indicators require more work and will need to be developed in the longer term. Examples are the indicators related to noise, biodiversity impacts (fragmentation) and accessibility. These are all themes which have an important policy relevance, but for which multi-year actions have to be undertaken to set up and/or improve data delivery, to develop methods or to conduct more in-depth research. For these indicators, the preliminary indicator sheets mainly outline the existing data and methodological problems and provide suggestions for future work. **Comments on the TERM indicator sheets are welcome.**

[14] EEA (1999), Monitoring progress towards integration , a contribution to the Global Assessment of the Fifth EAP, Interim report, (30 March 1999)

4. Ongoing and planned actions – milestones 1999

4.1. Publication of the 'zero version' of the indicator report

Box 7 summarises the current TERM working plan. The reporting cycle has been developed to coincide with the cycle of the Transport and the EU Councils.

A 'zero version' of the transport and environment indicator report will be published in autumn 1999, and serve as an input to the Helsinki Summit (December 1999) under the Finnish presidency of the EU. It will be a first try-out of the indicator report, and will be based on existing data availability and knowledge. Since data gaps still impose major limitations, the 'zero version' will have a limited indicator scope. However, it will provide a useful basis for further consultation and for optimising the system.

A decision on the indicators to be included in the 'zero version' will be taken in spring 1999, in close consultation with the Commission.

4.2. Gradual improvement of data and indicators

As already indicated previously, a multi-year action programme will need to be set up to gradually improve data availability and methods. To prepare such a long-term action programme, EEA is currently conducting a feasibility study in which a more in-depth investigation of data availability is being made. The study will also investigate the links between TERM and the existing national and international indicator reporting systems on transport and environment.

In parallel, broad consultation on the preliminary TERM indicator list is ongoing (which will be facilitated by this document). This, together with the findings of the feasibility study, should help improve the current indicator list.

Also, to gradually improve the quality and scope of TERM, in-depth thematic investigations will be conducted on certain indicators and assessment methods. The findings of such investigations will be compiled in a series of **technical papers**. Themes where indicator development requires additional methodological investigation are amongst others:

- noise nuisance (also related to the ongoing work on the Common noise policy);
- accessibility (also related to the ongoing development of a European Spatial Development Perspective);
- impacts on biodiversity (e.g. fragmentation);
- health impacts of transport (e.g. in co-operation with WHO);
- indicators related to the use of non-motorised transport;
- 'social' impacts such as attitudes, awareness and behaviour.

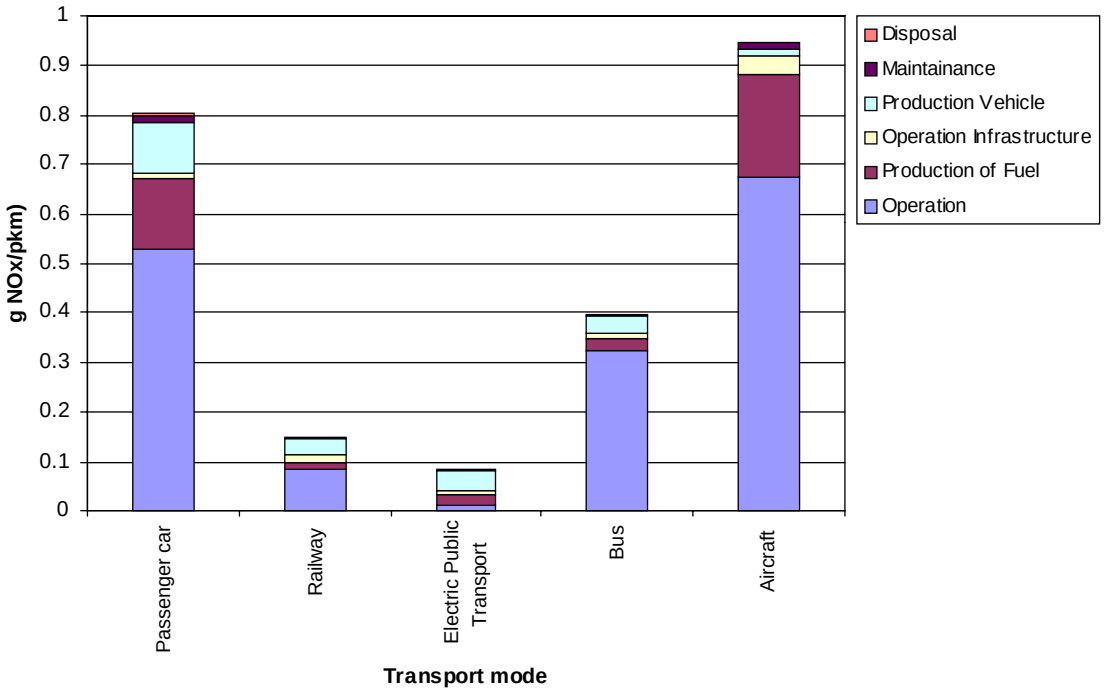
An example of method improvement could be an investigation as to how life-cycle assessment (LCA) can be applied. Impacts of transport are not only caused through the operation of transport means. The different life-cycle processes such as manufacturing (vehicles, infrastructure, power plants, etc.), operation, maintenance and disposal of vehicles and infrastructure also consume energy and materials and have certain environmental impacts, which could be considered in LCA (see Box 6). The purpose of a LCA of the transport system is to provide a more comprehensive evaluation of the environmental impacts of transport and to enable an environmental comparison between the different transport modes. However, LCA

still involves various spatial or temporal methodological problems. For a broad application of the LCA principles in TERM additional research is required.

Box 6: Environmental balance of transport in Austria

An example of an indicator report where LCA has (to a certain extent) been applied is the environmental balance of transport in Austria. In this analysis the major environmental impacts are related to the process 'operation' as well as to the process 'production of fuel'. The indirect environmental impacts caused by the maintenance and the production of vehicles, the construction and the operation of the infrastructure (e.g. lighting of roads), usually add up to less than 20 % of the total environmental impacts of transport.

Figure 5: Emissions of NO_x per passenger-kilometer and for the various process steps (Austria 1995)



Source: MOLITOR R., et al. (1997), Environmental Balance of Transport, Austria 1950-1996, ed. Federal Ministry for the Environment, Youth and Family, Vienna.

4.3. Focus reports

As explained earlier, it is also proposed that the TERM indicator report would be supplemented by in-depth focus reports on particular transport/environment policy issues. Such reports should focus on issues which help policy-makers to better understand the need for and the effects of certain policies. Some suggestions that were already brought forward include: EU enlargement, transit traffic (e.g. trans-Alpine traffic), urban health-related issues, perception and attitudes, maritime transport and the environment. The focus reports will (amongst others) build on the findings of past and ongoing research work, of state-of-the-art reviews and of expert workshops. They will (where appropriate) be conducted in co-operation with other international organisations.

Box 7: Ongoing and planned actions – milestones '99		
Oct. 98 till date	Data review and preliminary compilation of some indicators	Compilation – on the basis of existing data and material – of certain TERM indicators.
Jan.- April 99	Inventory and review of transport/environment targets	Database and evaluation of existing national and international targets. This should provide a framework for the TERM indicator assessment.
Jan.–May 99	Feasibility study	The study investigates data availability and links with existing (national and international) indicator systems. This should result in more concrete longer term work programme (including resource needs) and recommendations for improvement of the list of indicators.
May–June 99	Decision on indicator scope of 'zero version' of the indicator report	Limited selection of indicators which will be included in 'zero version' of the indicator report at the end of '99.
June 99	Identification of topics for focus reports	Topic reports need to be linked with policy needs and requests. Topics are to be decided in consultation with the Commission.
June 99	1st draft Eurostat transport and environment compendium	Including statistical data which have been used in the compilation of the indicators.
June 99	First outline of the 'zero version' indicator report	Input to the EPRG group.
July–Sept 99	Consultation and finalisation of the 'zero version' indicator report	Broad consultation with Commission, MS, other international organisations and interest groups
Aug/Sept 99	Publication of Eurostat statistical compendium	In co-operation with EEA.
Oct. 99	Publication of the 'zero version' of the indicator report	
Dec. 99	'Zero version' submitted as input to Summit	Input to the Helsinki Summit under the Finnish presidency of the EU

Glossary

CO	carbon monoxide
CO2	carbon dioxide
CTP	Common Transport Policy
dB(A)	international sound pressure level unit meaning 'decibel with an A frequency weighting' which reflects the sensitivity of the human ear
DG VII	Directorate-General VII (Transport) of the European Commission
DG XI	Directorate-General XI (Environment, Nuclear Safety and Civil Protection) of the European Commission
DPSIR	Driving forces, Pressures, State, Impact, Responses
EAP	Environmental Action Programme (5EAP is the Fifth Environmental Action Programme of the European Union)
ECMT	European Conference of Ministers of Transport
EEA	European Environment Agency
EIONET	European Information and Observation Network
ETC	European Topic Centre
EU	European Union
Eurostat	Statistical Office of the European Union
GDP	gross domestic product
IEA	International Energy Agency
km	kilometers
ktonnes	thousand tonnes
LCA	life-cycle assessment
MS	Member State (of EU)
Mt	million tonnes
NGO	non-governmental organisation
NMVOC	non-methane volatile organic compound
NO_x	nitrogen oxides
OECD	Organisation for Economic Cooperation and Development
PM10	respirable Particulate Matter with aerodynamic diameter between 2.5 and 10 µm
PPP	purchasing power parities
SO_2	sulphur dioxide
TERM	Transport and Environment Reporting Mechanism for the EU
UN	United Nations
UNCSD	United Nations Commission on Sustainable Development
UNECE	United Nations Economic Commission for Europe
VOC	volatile organic compound
WHO	World Health Organization

Annex 1: Minutes of the Expert Workshop with International Organisations European Environment Agency, Copenhagen, 20 November 1998

Copenhagen 25 January 1999

TERM - TRANSPORT ENVIRONMENT REPORTING MECHANISM FOR THE EU

Expert Workshop with International Organisations
Copenhagen, 20 November 1998

Final Minutes

1. TERM Background (introduced by David Stanners and David Gee, EEA)

In June 1998, the Joint Transport/Environment Council invited the Commission 'in conjunction with the European Environment Agency, and taking account of work done in other international organisations and in Member States, to develop a comprehensive set of indicators of the sustainability of transport ... , building on useful work already done, and to report on them regularly to the Council.'

Only a few days later, the European Council at its meeting in Cardiff invited 'all relevant formations of the Council to establish their own strategies for giving effect to environmental integration and sustainable development within their respective policy areas.' They should monitor progress taking account of the Commission's guidelines and identify indicators. The Transport, Energy and Agriculture Councils were invited to start this process.

The Transport/Environment Reporting Mechanism (TERM) is currently being set up and is steered jointly by DG XI (Environment), DG VII (Transport), Eurostat and EEA. The main product of TERM will be an annual indicator-based report on transport and environment in the EU. In addition, focus reports will be developed on specific topics that require a more detailed approach than is possible in the annual report.

The concept of the reporting system was presented in a background paper prepared for the Joint Council mentioned above (and which was provided to all workshop participants). The paper included an illustrative set of indicators, the feasibility of which is currently being evaluated by the EEA and the Commission.

The TERM concept can also serve as a model for similar reporting systems for other sectors (i.e. energy, agriculture) as requested by the Cardiff Summit.

As requested by the Council, TERM will need to be co-ordinated with relevant indicator initiatives that are being developed by other international organisations. The present workshop is a first step in this co-ordination and consultation process.

The workshop's aims were:

(i) to exchange information on relevant ongoing activities;

(ii) to discuss the proposed methodology and selection of indicators for TERM; and

(iii) to establish a programme for longer term co-operation.

2. Organisations participating in the workshop

EEA (host), European Commission (DG VII, DG XI, Eurostat), ECMT, IEA, OECD, UN-ECE, WHO, T&E; independent experts (see list of participants in the annex).

3. Presentations by the European Commission

DG XI (Günther Hörmandinger)

In a short introduction of DG XI's point of view the importance given to the integration of environmental concerns into sectoral policies esp. transport, energy and agriculture by the European Summit in Cardiff in June 1998 was mentioned. The following three main initiatives will contribute to the follow-up of Cardiff Summit:

- The setting up of a T/E expert group by DG VII and DG XI as a forum for discussion and information exchange for experts from MS Transport and Environment ministries;
- TERM (and similar initiatives for energy and agriculture);
- EPRG Indicator expert group: (responsible for co-ordination at community level of overall indicator development).

DG VII (Richard Deiss)

DG VII is very interested in TERM as the implementation and monitoring of the various recent and currently ongoing policy initiatives relevant to sustainable transport (White paper on the Common Transport Policy, The Common Transport Policy Action Plan 1995 - 2000, Green paper on fair and efficient pricing, Auto Oil programme, CO_2-communication, etc.) need a strong statistical information base. Therefore, DG VII is also willing to support relevant work financially.

DGVII is conducting an internal review of the current illustrative list of TERM indicators in order to provide suggestions for improvement. DG VII is also launching studies to improve certain transport statistics. Furthermore, DG VII also has a growing interest in non-motorised modes and is collecting and publishing statistics on cycling.

Eurostat: Review of TERM data availability (Graham Lock)

The illustrative list of indicators was largely driven by policy needs rather than data availability. The emphasis is now shifting to data. A first analysis has shown that about half of the indicators are feasible in the short run whereas the others need more work. But the quality of some data make them unsuitable at present for producing good indicators. Reliable statistics are available for freight transport but the situation for passenger transport is not good. Current statistics focus on international traffic and more work is needed on short-distance travelling. Vehicle fleet data also need improvement. Accident statistics are not well harmonised. Consistent international definitions for types of road are lacking. Furthermore, when transport is covered by other fields of statistics (e.g. energy) it is often not covered in an appropriate way. For example 'final energy consumption' is defined so that it excludes maritime and pipeline transport. New definitions are needed for the purposes of TERM.

4. Presentations by the other international organisations

The invited international organisations presented their work in the area of T/E indicators. Their respective written contributions will be put on EnviroWindows, the EEA's IT Interest Group on Transport and Environment, once its scope is extended.

ECMT (Mario Barreto)

ECMT's information needs regarding transport and environment are very similar to those of DG VII'. ECMT has carried out various studies related to environmental issues. Three main poles of activity could be of interest to the TERM:

- **Transport and the Environment**

  Specific surveys are carried out as a base for publications on topics such as: CO_2 emissions, external costs, car-scrapping studies, sustainable urban travel

- **Investment in transport infrastructure**

  An ad-hoc group has been created to carry out in-depth studies on these investments. A questionnaire was designed to collect information. This questionnaire is the basis for the publication 'Investment in transport infrastructure in the early 1990s', which should be available at the beginning of next year. The collecting exercise is done every five years and covers 10 years of time series. It is the third exercise of its kind and the ECMT has now 30 years of historical series on investments in the transport sector.

- **Statistical information**

  Questionnaires are sent out regularly to provide data for the following statistical publications: Statistical Trends in Transport, Statistical Report on Road Accidents, Trends in the Transport Sector, Short-Term Trends Survey

ECMT would like to see data on the environment collected on a regular basis. Therefore ECMT strongly supports initiatives such as TERM and will support the development and improvement of the work done in this sector. Mr Baretto pointed out that TERM will be a good opportunity to develop the following five important points:

1) More efforts (financial) to collect core statistical information of better quality;
2) Collect statistical data disaggregated by market;
3) Start measuring data on emission of particles, in numbers and not according to their weight;
4) Harmonise the taxation methodology in member countries;
5) Harmonise accounts for infrastructure investments.

IEA (Lee Shipper)

Of most relevance to TERM is IEA's work on energy and CO_2 indicators, the motivation of which was a reality check on energy and CO_2 plans. Specifically, IEA conducts an analyses into how much the various factors (efficiency/technology, behaviour, structure, policies, modal shift) contribute to changes in energy use. Energy-GDP ratios were seen as no longer providing useful information. Extending the analysis to CO_2, the questions were which factors would increase emissions and what policies could change trends.

IEA considers indicators to be a vital part of CO_2 negotiations 'You can't change what you can't see'). At present, few countries have a transparent CO_2 strategy, and only three use indicators. Of particular importance is that the indicators can demonstrate changes due to modal shifts.

The role of IEA in international data collection was discussed. IEA's main role is seen as pushing to improve national data sets. This role is also seen for TERM. In addition, the role of TERM can also be to help to extend the indicator work to all European countries.

In April 1999, a workshop will be organised on transport, environment and energy, which will be relevant for TERM and to which the group will be invited.

Mr Schipper expressed his reservations regarding international compilation of data. Data contain huge uncertainties, are often compiled using different methodologies and the underlying assumptions are rarely reported. It is important to be aware that officially submitted data do not always cover all available data sources and needs.

OECD (Myriam Linster)

OECD work on transport/environment indicators started in 1989 and is being carried out in close co-operation with ECMT. In 1989, concern over the environmental impacts of transport led to the recognition by both environment and transport ministers of the need to integrate transport and environment policies.

The OECD's aim is to monitor progress and promoting integration of environmental issues into transport policies. Even though all modes are included, the focus of OECD work in this area is currently on road transport, as road transport has been identified as having by far the largest repercussions for the environment.

OECD is currently updating its report on 'Indicators for the Integration of Environmental Concerns into Transport Policies', which was first issued in 1993 as an OECD Environment Monograph. The report is part of the OECD work on sectoral indicators and deals with transport-environment indicators. The report builds on the OECD's long-standing experience in developing environmental indicators and in using indicators in environmental performance reviews. It also provides an input to the ongoing OECD work on environmentally sustainable transport and to the horizontal OECD project on sustainable development indicators. Three levels of integration are addressed: vehicles and fuels; travel management; infrastructure.

Ms Linster emphasised that indicators are but one means of analysing a sector's progress and indicators need to be interpreted in the proper context. At OECD, this is done in the Environmental Performance Reviews for the member countries. Missing, however, are international targets to interpret the indicators. So far, mainly national targets are used for this exercise. There is more and more need for information on non-motorised means of transport. It is important to keep in mind, however, that indicators are but one tool and only make sense if embedded in a set of policy instruments. Also, several sets of indicators can be developed to serve different purposes.

There appears to be a considerable 'overlap' between OECD work and the proposed TERM (same objectives, common member countries, though TERM focuses on EU transport policies). Therefore, there could be much useful input from OECD and in general scope for mutual benefit from the synergies. Ms Linster furthermore emphasised the need to start early with the work, even with very incomplete data and not to wait for perfect data.

UN/ECE (Brinda Wachs Shimizu)

The UN/ECE Regional Conference on Transport and the Environment held at ministerial level in Vienna in 1997 provided the main political mandate for the current work on transport and environment statistics and led to a much closer co-operation between the UN/ECE Transport and Environment Divisions.

Relevant ongoing activities that are currently being developed by UN/ECE are: air emission data collected under the CLRTAP based on EMEP/CORINAIR Guidelines (jointly developed with EEA); air pollution modelling and effects (maps of critical loads, etc.); integrated assessment modelling of air pollution effects of transport; UNECE/UNEP database on road transport and the environment combining data on transport of passengers and freight by road with pollution data.

UN/ECE is also undertaking a survey of road tax structures (taxes and charges) on the AGR network in order to tackle the question of the (lack of) harmonisation in road tax (internalisation of external costs), which is also a priority transport and environment objective for the EU.

Of additional relevance is the implementation of recommendations from the UN/ECE workshop on Urban Passenger Transport and Environmental Statistics held in Washington in 1997 calling for the improvement of statistics on environmental and health impacts of transport.

One of UN/ECE's strengths is the geographical coverage: currently 55 countries including a number of central Asian countries. Data are published annually although much of the data is still poor or missing.

An important element for TERM is the Joint Questionnaire for transport statistics which UN-ECE develops together with Eurostat and ECMT.

WHO (Carlos Dora)

WHO has extensive experience in data collection at national level (e.g. mortality) and for cities (health indicators). It has also experience with health indicators for cities. Its methodological work on environmental health indicators is based on the DPSEEA framework which is closely linked to the DPSIR concept used for TERM.

The main focus of WHO work in the area of transport and environment currently is on the London 1999 Ministerial Conference on Health and the Environment which includes as a major topic transport, health and the environment. A number of scientific papers are being developed as a background information for that conference which is expected to adopt a Charter on Transport, Health and Environment. This Charter is being prepared in a series of intergovernmental meetings of 51 Member States of WHO European Region, with the involvement of EEA and other international organisations. In this context, the WHO is also investigating the benefits of walking and cycling.

The Charter contains commitments by Member States to transport systems sustainable for health and environment. It includes targets for transport-related health impacts, a plan of action and a request for WHO in co-operation with other international agencies to support the development of monitoring of the health impacts of transport, including by proposing necessary indicators. These are logically the points of interaction with TERM.

T&E (Frazer Goodwin)

Three basic issues were raised by T&E:

1) Comparability and quality of data need to be addressed in order to be able to continuously improve them. The fact that some interesting indicators may raise some politically sensitive questions should not be a reason to not consider them.
2) Targets and political commitments are needed to make indicators meaningful.
3) Type of indicators: It should not only be environmental but sustainability indicators meaning that social aspects need to be covered (e.g. accidents, access, …).

Mr Goodwin furthermore underlined the importance for TERM to capture the dynamic between transport growth and economic growth, and of the relative importance of the absolute GDP figure. This aspect could be addressed by two sets of indicators, each of which would be applicable to passenger and freight tonne kilometres by mode:

- km / [GDP per capita];
- ratio between per capita annual GDP growth and per capita km growth.

5. Discussion

As an introduction to the discussion, Ann Dom (EEA) gave a brief outline of the TERM concept and state of play.

There are three **key questions** which are particularly relevant for policy-makers and therefore need to be addressed by the proposed reporting mechanism:

- What is the progress in the use of technical measures (e.g. cleaner vehicles and fuels) which reduce the impacts on the environment and human health?
- Are we getting better at using transport both within modes (e.g. improved occupancy, better driving practice) and between modes (e.g. by switching to less damaging forms of transport)?
- How are the factors, such as land-use planning, economic activity and access to basic services, driving the growth in overall transport and in its different modes?

Indicators are needed to answer these questions which would also be relevant to some key policy leverage points. The **key leverage points** are:

Technological improvements: Improving the efficiency in the use of resources can help to minimise the environmental impacts of transport. Smaller engine sizes, improved fuel efficiency, the use of cleaner fuels and developments such as catalytic converters are examples where technology can contribute to producing less damaging forms of transport.

Transport prices and economic instruments: These are effective instruments which can be used to shift the balance between modes towards an increased use of less damaging forms of transport and to influence transport demand and efficiency in general by ensuring users pay the full cost of transport, including transport externalities. Important issues include: transport prices in 'real' terms (i.e. adjusted for inflation), relative pricing between transport modes and real transport prices relative to other economic parameters such as disposable income, purchasing power, prices of basic goods, etc. Direct and indirect subsidies and taxation are also important factors.

Modal balance: Increased investment in and availability of public transport, traffic management and restrictions on the movements of other vehicles are examples of how policy measures can shift the modal balance towards less damaging forms of transport.

Transport and land-use planning: Land-use patterns have a strong impact on the distances travelled by people for different purposes. Policies and programmes in this area could help to

minimise the need to travel and hence help reduce transport demand and to ensure access to more environmentally friendly forms of transport.

Economic integration and transport: Transport supports economic development and the operation of the Single Market, providing access to the best and cheapest components and raw materials, enabling efficient production and distribution to take place. These factors help contribute to increased freight transport intensity, which is the amount of transport required to deliver a unit of economic activity (e.g. GDP).

The 'best' indicators will be those which help to answer the three policy questions above and at the same time help to monitor the effectiveness of policy intervention via the leverage points just described. It is important however to recognise that for those indicators used to measure progress against a particular policy objective, there will be a delay between the implementation of a policy measure and its impact as reflected in indicators.

The three major issues that emerged from the various presentations during the first half of the workshop were identified as being the TERM

1. process
2. concept
3. data.

The above listed key policy questions and leverage points of the TERM background paper served as a framework for the discussion.

Process:

- The newly installed EPRG expert group on indicators was seen as an opportunity for co-ordination of work and of the consultation with the Member States.
- An early publication of a first draft version of a TERM report was encouraged because it would then stay on the international agenda and would trigger much more comments than the conceptual paper with the illustrative list of indicators. Such a draft report could be presented as 'work in progress' following the recent example of the EEA work on the TENs.
- Involvement of a research organisation in order to follow how the report is used, esp. which indicator triggers what kind of response or simply was proposed. The question to be addressed being: How are the indicators used by policy-makers and others. However, this was than seen as a task for the new EPRG expert group because DG XII (Science, Research & Development) was also represented there.
- Duplication of work and especially double consultation of Member States should be avoided.
- The importance of a regular date for publication of the report every year was emphasised. Mid-September was seen as probably the best one because it would be just in time for the informal Council and for the Council working groups for the preparation of the December Council(s) and Summit every year.
- EEA will also examine the feasibility of using its ENVIROWINDOWS system as an electronic forum for the purpose of information exchange for this group.

Concept:

- In general, the concept as presented in the paper prepared for the Joint Council in June was accepted and welcomed by the participants.
- It was emphasised that an early start with limited and maybe also to some extent poor data was desirable and would help to get broad discussion on the exercise.
- There were various suggestions for improving the list of indicators. In the course of the process, the exact composition of the list will be re-evaluated and improved. It was clarified that the current list is an illustrative one and was mainly driven by the policy questions and leverage points and not by data availability.
- The importance of policy targets was emphasised by several participants. In that context, EEA mentioned its STAR database (for targets and Sustainable Reference Values) which is being extended to the transport sector.
- There was general agreement that non-motorised modes of transport should also be covered. Furthermore, a clear delimitation of the system covered by the reporting mechanism is important.
- The in-depth studies or focus reports are considered as a very important complementary part to the indicator work within the reporting system. There is also scope for inter-organisational co-operation in this context. Among the topics mentioned as priorities for focus reports were: EU enlargement scenarios, transit traffic (e.g. trans-Alpine traffic), urban health-related issues, perception and attitudes, life-cycle assessment and material intensity of transport.

Data:

- The preliminary analysis of data availability done by Eurostat (see above) showed that 16 indicators can be considered feasible given current data; 13 need more work. More detailed work on this issue will be carried out in the context of a feasibility study to be run by EEA from the beginning of 1999.
- It was discussed that all the existing data sources could be systematically screened for the purpose of TERM. There are already a number of existing studies which can be considered. In addition, participants were invited to list their own sources and see what they can provide for TERM distinguishing between data available for EU15/25 and for other countries. OECD, for instance, is just updating its indicators. These results can be used as an input for TERM once a common core set of indicators is identified so that work can be mutually beneficial. It was also emphasised that it was important to collect additional data needed through existing systems like EIONET and the UN-ECE/ECMT/Eurostat Joint Questionnaire
- Harmonisation of national data sets was identified as a priority. In this context, TERM was seen as a possible driver for improved data collection. Among the data sets that needed improvement were the following: km-data; information on purpose of travel; extent of short-distance travel (so far statistics focused on long-distance travel); vehicle-fleet data (more detailed).

6. Future activities

Given the interest that the various organisations have in TERM, and given TERM's close links with their transport and environment activities, the participants agreed that consultation and co-ordination initiatives such as this workshop need to be continued on a regular basis. A first priority is that the various existing systems of data collection are mapped, and their potential input to TERM established.

Also, this meeting was specifically on TERM, but regular meetings of this type could be considered in order to co-ordinate relevant transport and environment activities of the participating organisations.

The following short-term actions will be undertaken as follow-up to the workshop:

- written comments by participants including information on available data to be submitted within three weeks;
- EEA draft minutes on this workshop circulated for comments;
- April/May 1999: next meeting with these international organisations before compiling the first TERM report.

List of participants

European Commission

- Richard Deiss (DG VII)
- Günter Hörmandinger (DGXI)
- Graham Lock (Eurostat)
- John Allen (Eurostat)

European Environment Agency

- David Stanners (chair)
- Ann Dom
- David Gee
- Martin Büchele
- Jock Martin
- Ulla Pinborg
- Chris Steenmans
- Andre Jol
- …

European Conference of Ministers of Transport (ECMT)

- Mario Barreto

International Energy Agency (IEA)

- Lee Schipper

Organisation for Economic Co-operation and Development (OECD)

- Myriam Linster

UN-ECE

- Brinda Wachs Shimizu

World Health Organisation (WHO)

- Carlos Dora

European Federation for Transport and Environment (T&E)

- Frazer Goodwin

National Environmental Research Institute (NERI, DK)

- Henrik Gudmundsson,

Environmental Resources Management (ERM, UK)

- Olivia Bina

RIVM (Nl)

- Bert van Wee

Centre d'Etudes Economiques et Sociales de l'Environnement (CEESE, B)

- Juliette de Villers

Excused:

European Environment Bureau

- Christian Hey

Liverpool John Moores University

- John Whitelegg

Trafico

- Romain Molitor

Aristotle University of Thessaloniki

- Zissis Samaras