Council of Ministers

SUSTAINABLE DEVELOPMENT

Quantifying CO2 Abatement Policies
Executive Summary

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The full report will be made available on the ECMT website.
QUANTIFYING CO₂ ABATEMENT POLICIES

EXECUTIVE SUMMARY

The principal objective of this study is to examine the quantification of transport sector measures against attainment of carbon dioxide (CO₂) emission reduction targets. Most countries have identified measures that could, in principle, stem growth in carbon emissions, but questions remain as to how to quantify the impact of these measures and, often equally important, how to assess the probability of success of specific measures. The study, [CEMT/CS (2000)8], seeks answers to these questions primarily by reviewing the attempts made by three countries, France, the Netherlands and the United Kingdom, to develop policies to control transport sector carbon emissions and to quantify their effects. This summary describes the main findings of the study while leaving to the longer paper the detailed description of the national policy approaches of the three countries.

Context

The transport sector is an important contributor to carbon emissions. In the European Union the share of transport CO₂ emissions increased from 19 per cent in 1985 to 26 per cent by 1995. In 1995 cars accounted for about 50 per cent of transport CO₂ emissions, and road freight for about 35 per cent. In Central and Eastern Europe, the transport sector accounts for less of the share of total emissions, roughly 10%, and decreased from 1990 to 1996 because of economic restructuring and declining GDP. Recent trends in a number of these countries, however, indicate that emissions from this sector may now be increasing, with road transport the primary source of emissions in both passenger and freight movement.

In the absence of intervention, carbon emissions from transport look set to rise further for two main reasons:

- Most transport is oil-based, and there are relatively limited opportunities to switch to non-oil-based fuels; and
- Transport, especially car, truck, and air transport, is growing in most, if not all, economies.

Main issues to be considered

There are a number of essential steps in developing and quantifying policy packages. Each must be adequately addressed if meaningful results are to be obtained. They include the necessity to:

1. measure existing carbon emissions from the transport sector;
2. determine the way in which these emissions are generated;
3. forecast carbon emissions from the transport sector in a robust “Business as Usual” (BAU) case, in which present policies are continued in the absence of specific measures to limit carbon emissions.
4. identify specific policy options to limit carbon emissions below the levels they would reach in the BAU case.
5. quantify the impact of particular options both individually and when they are combined in specific packages of different options.
6. assess whether particular policies can be implemented, for practical – including politically feasible – reasons.

**Identifying policy options**

Once emissions levels are projected in the Business as Usual scenario, policy options can be identified. These can be grouped under a number of broad categories:

- Economic instruments (e.g. increases in fuel taxes, road pricing, feebates)
- Regulations and guidelines (e.g. speed limits, traffic management measures, land-use regulation and guidelines, fuel efficiency standards);
- Voluntary agreements and actions (e.g. the 1995 joint declaration on the reduction of CO\textsubscript{2} emissions from new cars signed by ECMT and the automobile industry (represented by ACEA and OICA), and more recently, the voluntary agreement between the European automobile manufactures (ACEA) and the European Commission;
- Information and training initiatives (e.g. fuel-economy labelling of vehicles, driver training, use of econometers and other on-board instruments); and
- Support for research and development.

The full study describes how each of these types of policy options is used in the climate change policy plans of the Netherlands, United Kingdom and France. For the purposes of this summary, the importance of one policy in particular in all three countries – the voluntary agreement of the European Automobile Manufacturers (ACEA) and the European Commission – must be noted. All three countries, and indeed most likely a majority of other European Union countries as well, are relying on the reduction in CO\textsubscript{2} emissions from this measure to help them reach their national CO\textsubscript{2} abatement commitments under the Kyoto Protocol. The complete study identifies the complexities involved in quantifying the emissions reductions from this agreement in individual countries and highlights the importance of coherence in assigning emissions reductions due to improvements in fuel economy between BAU forecasts and emissions reduction scenarios. Countries relying on the agreement to reach their national emissions abatement targets will need to be increasingly aware of these complexities in the development of their national plans.

**Developing policy packages**

Quantification needs to consider not just the impact of individual actions, but also the impact of combinations, or packages, of measures. These policy packages are likely to be concentrated on the most important sources of carbon emissions from the transport sector, which in practice has meant road transport, but should not neglect other sources of transport carbon emissions.

The mix of policies varies between countries. For example, there appears to be relatively more emphasis on economic instruments in the UK and on regulatory policies in France. These differences may reflect general divergences in the emphasis on different policy instruments in different countries, in this case, a greater reliance on market mechanisms in the UK and a greater emphasis on planning measures in France. The policy package for the Netherlands includes a combination of fiscal measures and other non-vehicle related measures targeting traffic management, and on-board instruments to improve fuel economy. Policies to deal with carbon emissions from transport (and from other sectors) must fit within a range of government policies designed to achieve a variety of different policy objectives. As a consequence, it would seem appropriate that the emphasis on certain types of policy instruments in the transport sector will reflect national differences in the use of policy tools economy-wide.
Quantification of policy packages must avoid the danger of “double-counting” estimated impacts of individual policies that would, if combined, have overlapping effects. There is a danger of overstating the overall effects of these policies when combined in a package. This is proving to be a complicated issue in national estimations. For example, interactions mean that CO₂ emissions savings from the ACEA voluntary agreement with the European Commission can not simply be summed with the estimated impact of taxation measures taken in isolation.

Similarly, the importance of the agreement in national CO₂ abatement strategies would imply that countries may need to examine the tradeoffs between the voluntary agreement and policies such as safety regulations and those related to air quality. Changes in taxation relating to types of fuel may have an impact on the ability of industry to meet the requirements of the agreement, for example.

The study highlights the importance of the ACEA/EC agreement and of effective monitoring of the accord. However, it is also important that countries do not delay implementation of other measures. There are inevitably slippages in the implementation of policies, so a “wait and see” option has drawbacks. Consequently, countries may now want to consider accelerating the implementation of policies targeting other types of transport, and developing a specific package of policies to address carbon emissions from road freight, railways, and aviation.

In addition, “non-product” measures, including those addressing driver behaviour, vehicle maintenance, and traffic management have considerable potential for reducing CO₂ emissions relatively quickly and cheaply, though quantification of the impact of these measures remains difficult in some cases. This is particularly important because it is becoming clear that countries are finding it difficult to develop packages of measures in the transport sector that they feel convinced will deliver required savings in practice.

In terms of the actual construction of policy packages, there appears to be a complex iterative process in designing policy packages in each country. This reflects the need to identify options and to secure a consensus as to whether they should be included in the final package, a process that is not yet completed either in Britain or in France. The Netherlands undertook a multi-phase policy development process that involved policy-makers from different government branches. A set of policy options was first defined from which a more complete list of proposals was then made.

One of the most contentious issues is the political acceptability of economic instruments, especially road pricing, a policy that is often proposed, but not implemented in most countries. As delays occur in the process of implementing such policies, the contribution that such policies can make in meeting overall targets for the end of the decade is reduced. Moreover, if the policy is never actually implemented, a search will eventually need to be made for alternatives.

Finally, there are issues of political will to implement policies. Quantification may show that price increases, such as increases in fuel tax or implementation of road congestion charging, will reduce car travel and fuel use. However, these savings will not be realised if the policies are not actually implemented in full because of fears of the political consequences of their adoption.

**Recommendations on quantification**

The full study provides detailed descriptions of the quantification exercises undertaken in the Netherlands and the UK and general information on modelling in France. For the purposes of this summary, the principal recommendations on quantification based on the findings of the study are provided below.
First, there should be efforts to maintain as much transparency as possible in the explanation of how the impacts of different policy options have been quantified. A clear description of how the numerical estimates of potential carbon savings have been derived is essential, despite the inevitable uncertainties in the methods used, and the possible desire not to expose these uncertainties to public scrutiny. Public debate about estimates may, in fact, reveal weaknesses in the components of proposed measures, and consequently improve the make-up of policy packages that are ultimately adopted.

A second recommendation is the need to have a clear definition of the Business as Usual (BAU) scenario forecasts that show what would happen in the absence of a package of specific interventions. The data defining which measures belong to BAU and which to new policies are crucial.

As noted earlier, one of the most serious issues in terms of quantification identified in the study involves the possibility of "double-counting", where potential overall savings are over-estimated because of addition of estimated savings from individual policies whose impact is in fact interrelated.

As regards models available, there are a number of different approaches. In the Netherlands, the need to rapidly produce a policy plan was seen as a justified reason for using a variety of existing models to assess different components of the overall plan. Inevitably, modelling cannot “start from scratch” and must draw on existing experience. It is important, however, that if different models are used, they must be mutually consistent in their overall assumptions and elasticity values.

It is also important that the quantification methods adopted represent “best practice”. The international scientific community has an important role to play here in agreeing what best practice is. This may be a role that will be played by the present OECD/RTR-led study on the evaluation of measures to reduce greenhouse gases from the road transport sector, which is due to be finished by the end of 2000. However, there may be a need for a specific continuing panel of experts to review quantification methods available in all countries and make further recommendations regarding “best practice” modelling techniques.

The best way forward in terms of modelling is to develop disaggregate vehicle stock models, for all modes of transport and types of vehicle, which allow for changes in new vehicle consumption to be fed through into estimates of future vehicle use, fuel consumption and carbon emissions. Data from the Auto-Oil Programme could facilitate building such models in some countries.

In addition, whatever quantification measures are used, it is important that they allow for second round, or “rebound” effects, such as the impact of improved fuel efficiency or switches to lower priced fuels on reducing vehicle operating costs, which in turn increase demand for vehicle use.

In conclusion, while the number of countries examined in the study is no doubt too small to be representative of the quantification experience in all countries, the national modelling exercises undertaken in the three countries highlight some of the strengths and weaknesses involved in a select number of approaches. The experience of the examined countries, which are among the first to undertake comprehensive quantification exercises for their national climate change plans, illustrates the extent to which precise quantification of policy packages remains elusive. Refinement of quantification should continue to improve with further international collaboration to determine best practice in quantifying the impacts of different policies and policy packages. This will be essential to countries faced with the challenge of meeting their commitments to reduce greenhouse gases under the Kyoto Protocol.