PROJECT

STEPS

Scenarios for the Transport System and Energy Supply and their Potential Effects

Funding: European (6th RTD Framework Programme)
Duration: Jan 2004 - Jul 2006
Status: Complete with results
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CORDIS RCN : 73996

Background & policy context:

The future framework of the transport system is closely linked to the general energy supply of the future. The relatively cheap availability of petroleum oil has allowed great expansion of the transport system over the past hundred years. This relationship between energy supply and vehicle technology and the characteristics of the transport system is typified by the internal combustion engines that power much of the transport system.

However, circumstances are changing. There is an increasing concern about the environmental consequences of the fuel technology used. Just as important are the concerns over the future availability of the fuel required. The recurrent crises and even wars in some areas where oil and gas is produced and the instability of political systems in other fuel producing areas only add to this.

Driven by these issues, a wide range of new or improved fuel technologies were proposed and developed, each with its issues over the wider consequences of its adoption.

The implications of the various futures are best considered by investigating a series of scenarios reflecting a range of 'best' estimates of future conditions in the energy, transport, economic and social fields. This explains the background behind the STEPS project.

Objectives:

The overall aim of STEPS was to develop, compare and assess possible scenarios for the transport system and energy supply of the future and supports both the overall FP6 Programme objective and the specific future needs of the transport energy sector. In doing this it took into account effects such as:

- autonomy and security of energy supply;
- effects on the environment;
- economic, technical and industrial viability and
- interactions between transport & land use.

Methodology:

The project started with mapping the State of the Art, and describing relevant trends in transport and energy supply systems. With these outcomes, a basic set of scenarios was compiled. Two main variables marked the scenario framework. The first was fuel price increase, which is directly related to energy scarcity. The second variable is represented by the policies that various authorities deploy in response.

The scenarios were simulated with existing integrated land use - transport models, both on the
European scale and on the regional scale. The regional models covered five diverse regions in Europe: Edinburgh, Dortmund, Helsinki and Brussels with their respective surrounding regions, and the region of South Tyrol in Northern Italy. Partly, the scenarios worked together to produce the input needed to calculate all parameters needed. In some cases, results from the European models could be used as input in the calculations within the more detailed regional models. The prognosis year was typically 2030 (in some cases 2020). The outcomes were described in an extensive overview of their impacts. The modelling exercise provided indications about the development of several variables (transport demand, economy, energy consumption, emissions, etc.) over the period 2005 - 2020 / 2030 under the different scenarios.

To acquire a good picture of their comparability, the scenario modelling results were subjected to a meta analysis. This gave the possibility to cross-validate the model results.

With the meta analysis showing that the model results were in reasonable agreement about major environmental effects and societal behavioural responses, the assessment and comparison of scenarios was conducted using a multi-criteria analysis. All scenarios were firstly tested as to current policy objectives on the European scale. To establish a valid and credible evaluation framework, a questionnaire was sent to a group of politicians and experts in the transport and energy fields to enquire what aspects they thought were most important: energy (including e.g. reducing consumption and dependence upon import), environmental aspects (emission reduction, global warming), social aspects (e.g. safety) and economic aspects (like competitiveness, employment, GDP and the decoupling of transport growth and economic growth). The resulting weight set was used to calculate value functions to assess the scenarios as to the fuel price effect and the policy effect.

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**FP6-SUSTDEV-2 - Sustainable Surface Transport**

**Institute type:** Public institution  
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Key Results:

The results of STEPs constituted a valuable synthesis of the main findings on trends and policy scenarios and their predicted effects. STEPs results served as a basis for the development of a view on future policy and give insight into research requirements in the area of transport and energy scenarios.

Main findings on trends:

- The long-term future of energy supply for transport appears difficult, and the situation has become significantly more critical even during the short project period of STEPs.

- At the time of the project a growing majority of experts believed that because of a combination of scarcity in cheap oil, increased global energy demand and greater supply disruptions provoked by Geopolitical Dependence of Europe, fuel prices would continue to rise in the medium and long term. Indeed, mostly due to the emerging economies in Asia (in particular China and India), energy demand would rise significantly more than oil production and oil refining capacity, making disruptions in energy supply a major and increasing concern. The share of worldwide energy demand and energy market stress that these markets bring along with their expansion is overwhelming. The growth of mobility and transport systems in most Asian countries has progressed at a different speed – India and China had a slow start but have now surpassed Western regions in their economic growth rates, which is directly reflected in their transport...
demand, mobility growth, and increased energy demand.

- All trends in economic activity, goods transport and personal travel, point towards longer distances and, despite energy efficiency gains, to more energy consumption. This reflects a pattern shared by most industrialised countries which have developed their economy and lifestyles firmly rooted in the promise of cheap energy supply. A trend towards an ever-increasing intensity of freight transportation is observed. In the passenger transport sector a trend for increased mobility coupled with faster and more flexible realisation of mobility needs and an increase in the use of private automobiles continues. This is noticeable in the increasing traffic flows, the modal split, high car dependency, etc. These trends are unsustainable vis-à-vis the trends of declining energy supply, increased supply disruption risks, higher energy costs and the growing risks of climate change.

- All efforts to decouple economic growth and energy consumption and to reduce greenhouse gas emissions have, with

### Policy implications

The STEPS project has made the following policy recommendations:

- The widening gap between global energy demand and declining energy resources and the growing risks of climate change require immediate, strong and probably unpopular policy action, including transport, regional, agricultural and technology policy. The common transport policy of the European Union needs to be fundamentally reviewed in the light of the urgency of these risks.

- While it is irrelevant for the behaviour of users whether fuel price increases are caused by rising resource costs or fuel taxes, for decision-makers or governments it makes a difference. Fuel taxes contribute a lot to government revenues which may well be affected directly and indirectly through impacts on other taxes. A harmonised system of vehicle taxes, fuel taxes and road pricing for cars and lorries on all types of roads should be introduced in all EU member states to achieve the necessary energy savings and emission reduction targets, with special exemptions for disadvantaged and peripheral regions.

- Fuel taxes can be used to mitigate or reinforce the effects of increases in fuel resource costs. Consultation among governments could result in a unified fuel tax policy throughout Europe, aiming at increasing global competitiveness.

- Co-ordination between different government sectors and levels of government should be enhanced in order to design and implement integrated strategies combining policies from different policy fields, such as transport policy, regional policy, urban land use policy and environmental policy.

- The production and use of biofuels in Europe is seen as a promising short- to medium term option to decrease European energy dependency regarding transport related energy consumption. Yet, despite the positive indications contained in the EU policy supporting the production of biofuels as an alternative to fossil fuels, there are little evidences that biofuels can effectively be seen as a full alternative to conventional sources, but rather as an interesting complement to satisfy a parcel of the energy demand in transportation.

- National, regional and local governments should be encouraged to support domestic economic linkages, regional and local production circuits, less car-dependent, more compact forms of settlements and pedestrian-friendly neighbourhoods.

- The EC should vigorously adopt a long-term goal to drastically reduce CO2 emissions from transport by promoting, through