

7. Internationale
Energiewirtschaftstagung
an der TU Wien

IEWT 2011

**Energieversorgung 2011:
Märkte um
des Marktes Willen?**

16. – 18. Februar 2011
Wien, Österreich

Tagungsort:
Technische Universität Wien
Karlsplatz 13
1040 Wien



Kurzfassungsband

Veranstalter:

Institut für Energiesysteme und
Elektrische Antriebe der TU Wien

AAEE (Austrian Association for Energy Economics)



Bundesministerium
für Verkehr,
Innovation und Technologie

ALTER-MOTIVE: An action plan for sustainable future European transport policies

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Abstract:

The core objective of the project ALTER-MOTIVE is to derive effective least-cost policy strategies to achieve a significant increase in innovative alternative fuels (AF) and corresponding alternative more efficient automotive technologies (AAMT) to head towards a sustainable transport system.

The last step towards the achievement of this target in this project is to derive an action plan consisting of a portfolio of effective least-cost policy strategies to achieve a significant increase in innovative alternative fuels and corresponding alternative more efficient automotive technologies to reduce CO₂ emissions significantly.

This paper presents the (preliminary) results and recommendations regarding the Action Plan.

Keywords: action plan, transport , alternative fuels, alternative technologies

1 Introduction

The objective of this paper is to show the some of the preliminary results of the project ALTER-MOTIVE funded within the Intelligent Energy Europe (IEE) programme and to give an outlook of expected results.

The core objective of the project ALTER-MOTIVE is to derive effective least-cost policy strategies to achieve a significant increase in innovative alternative fuels and corresponding alternative more efficient automotive technologies to head towards a sustainable transport system. The important outcome of the ALTER-MOTIVE project is an Action Plan for policy makers.

Due to the continuously increasing energy consumption in passenger car transport as well as increasing CO₂ emissions (see Figure 1), it is more and more important to implement effective and efficient policy measures in transport sector.

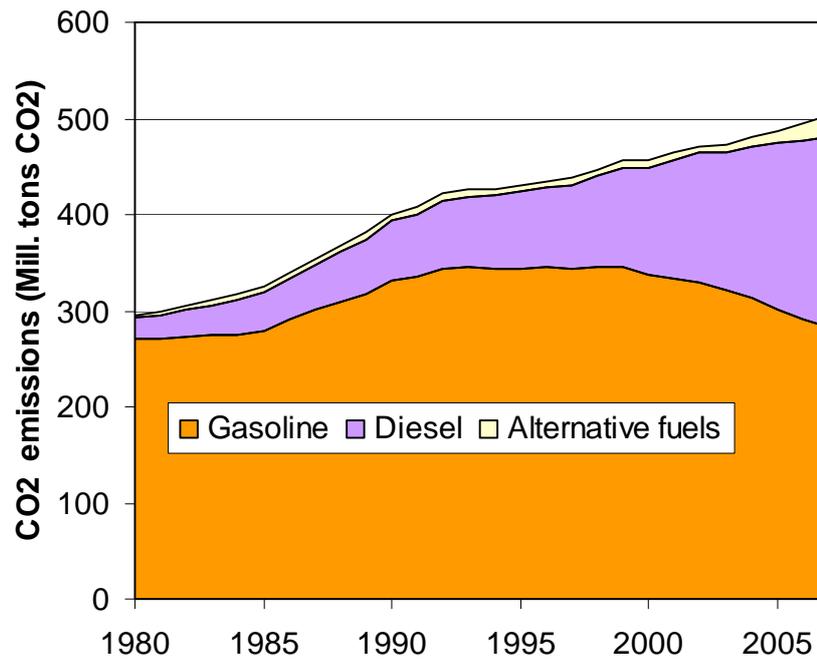


Figure 1. Development of CO2 emissions of car passenger transport in EU-15 by fuel, 1980-2007

The reduction of CO2 emissions is a very important goal of European policy. This target could be realised through the reduction of traffic in general. Traffic reduction can reduce also some additional problems such as noise, urban traffic density and congestions. CO2 emissions in transport sector could be also reduced with the significant increase in innovative alternative fuels and corresponding alternative more efficient automotive technologies. However, reduction of CO2 emissions could be achieved with the significant improvement of efficiency of conventional technologies (and of transport system in general).

In detail the following effects could contribute to reduction of CO2 emissions in car transport:

- reduce (individual motorized transport and transport needs) and articulate transport and urbanism policies (shortening of distances)
- improve (efficiency of all passenger cars and existing public busses)
- switch (to more efficient cars and develop public transports, bike or walk)
- increase public awareness (eco-driving, choice of vehicles, choice of type of transport)
- and at last substitute (gasoline or diesel by more environmentally benign fuels)

However, in order to realise these effects it is necessary to have appropriate and effective transport policy measures.

2 Action Plan: Method of Approach

A very important outcome of the ALTER-MOTIVE project is an Action Plan with the recommendations for policy makers.

The Action Plan is based on the work done in the scope of the ALTER-MOTIVE project, but also on the feedbacks from policy makers, experts and stakeholders from different European Member States.

The results documented and the recommendations derived in the Action Plan are based on the method of approach depicted in Figure 2:

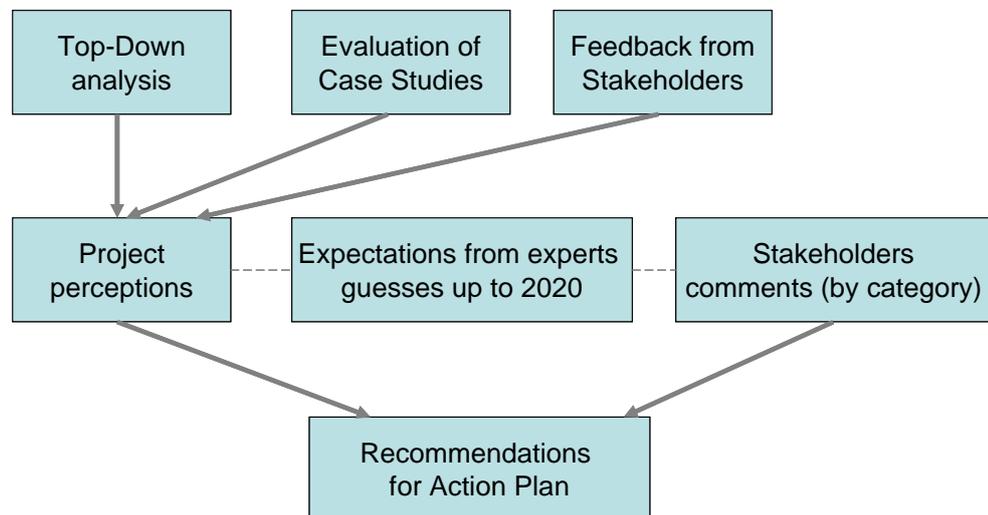


Figure 2. Action Plan: Method of approach

In the scope of the project ALTER-MOTIVE we have done a comprehensive Top-Down and Bottom-Up analysis. We have analysed historical developments in all EU-27 countries regarding energy consumption, alternative fuels and alternative automotive technologies as well as regarding implemented policy measures for car passenger transport.

For all relevant alternative fuels and alternative automotive technologies we have done in-depth analyses from an ecological, economical and technical point of view.

Very important part of this project was documentation of about 100 implemented case studies related to alternative fuels and alternative automotive technologies. This analysis has been done with an aim to identify successful case studies. The success of cases was assessed using the following criteria:

- high degree of transferability,
- low costs,
- high CO₂ reduction potential.

From the “top-down” analysis of policies on aggregated (country and EU level) level we derived the following major results:

- Fuel taxes as well as registration taxes had an impact on energy consumption respectively stock and quality (fuel intensity) of cars;
- Quotas for biofuels work and have a much higher impact than bottom-up initiatives.

To investigate the sensitivity of various policies based on the “top-down” analysis we have developed different scenarios. They take into account various price developments and various magnitudes of policies (e.g. taxes or quotas). It delivers answers to the following questions:

- What are the effects of various fiscal policies up to 2020?
- What are the results with respect to CO₂-reduction up to 2020 from alternative fuels?
- Which improvements of the economic and ecological performance of e.g. biofuels and hydrogen and electric vehicles are necessary and realisable (per year) to contribute significantly to CO₂ reductions up to 2020?

Moreover, we have developed a web-tool “Play policy maker”, which is available on our website (www.alter-motive.org).

However, the final conclusions and recommendation for the policy makers will be drawn based on analysis described above, critical reflection within the project team and the feedbacks and comments from national stakeholders, experts and policy makers.

A fundamental objective of the whole ALTER-MOTIVE project is to involve stakeholders continuously in the discussion process. This is done by using various ways of involvement and communication tools: workshops (we have organised nine national workshops in different European countries), an internet-based discussion platform, the midterm and final project conference and bilateral communication. For the action plan it is important to identify what are the country-specific perceptions and what can we learn from stakeholders experience.

The draft version of the Action Plan is available on the ALTER-MOTIVE homepage (www.alter-motive.org). The Action Plan presents the (preliminary) results and hypotheses. Its purpose is to serve as a “living document”. It will be continuously updated and completed until the end of the project taking into account comments and suggestions from interactions with stakeholders, policy makers and experts. The final version will be available in March 2011.

3 Ten major hypotheses of the Action Plan

The major result of our analyses is that the following measures have to be undertaken to reduce CO₂-emissions in an effective and least-cost way:

3.1 Revise registration tax system

The registration tax in EU-countries should be changed towards a progressive system taxing larger (and dirtier) cars remarkably higher. The magnitude should be similar to the current one in Denmark. Exemptions for registration tax – as e.g. exist in Germany for company cars – should be rigorously abolished. This measure should lead to a considerable change in car size and straightforward in fuel consumption and CO₂ emissions

3.2 Increase fuel taxes by 20% on top of the current maximum level and convert to CO2-based tax

Fuel taxes in Europe have been a major slower of fuel consumption as well as curbing CO₂-emissions. An increase of fuel taxes by 20% on the top of currently highest tax levels – as implemented e.g. in Germany and France would provide a significant contribution towards the 2020 targets.

Moreover, this tax should take into account the differences between the WTW- CO₂-emissions of all fuels!

3.3 Introduce and tighten standards for all types of cars

There is a huge gap between car fuel intensity achieved in the laboratories and on-road fuel efficiency performed. One major policy measure to reduce fuel consumed per km driven is the introduction of standards.

A strict check of cars on-road (surveillance like for speed) regarding CO₂-emissions could kick-out the worst vehicles.

3.4 Requirements to the car manufacturing industry

Car producers must be committed to market a certain share of smart cars with less kW and lower CO₂ emissions and must document this increase of resource effectiveness of the fuel use to European authorities.

One major policy measure to reduce fuel consumed per km driven is the enforcement of standards. We suggest an improvement of standards for the aggregate of all segments of sold vehicles in every country by 3% per year of CO₂ emissions up to 2020.

3.5 Promote alternative fuels and high efficiency for public vehicles in cities

The case studies analysed has proven that alternative fuels – regardless whether it is CNG, Biogas, plant oil or biodiesel in cities – have clearly indicated that this is a promising approach to be pursued further. It has a high acceptance, CO₂ emission savings of about 50% and reasonable economic performance.

3.6 Introduce and extend emission-free zones

Starting with small zones in cities where only emission-free vehicles are allowed is an approach that stimulates the demand for zero-emission vehicles without providing subsidies and without leading to the danger of additional transport caused by just adding electric vehicles to the existing car stock.

3.7 Provide infrastructure for electric vehicles

(Battery) Electric vehicles may to some extent contribute to a relief of over-all CO₂-emissions and may especially in cities contribute to improve air quality. Yet, the overall ecological performance of BEV strongly depends on how electricity is generated, how the battery performs ecologically and whether actually conventional passenger cars are substituted or

additional transport is triggered. Hence, it is recommended that the public supports the build-up of infrastructure but there is no reason for subsidizing the purchase of EV. Moreover, in lockstep with the market introduction of BEV the corresponding deployment of new RES-E capacities must be ensured and proven by certificates.

3.8 Teach eco-driving

The way of driving can save about 20% of fuel intensity. To harvest this potential we suggest to introduce a rigorous EU-wide (and beyond) mandatory learning programme for fuel-saving driving.

3.9 Promote biofuels 1st generation cautiously

Biofuels 1st gen. should be promoted further mainly by means of introducing and increasing quotas. Moreover, biofuels should be exempted from general excise taxes but a WTW-based CO₂-tax should be implemented. So it must also be ensured that the ecological performance of biofuels 1st improves and meets continuously tougher standards. These standards should be subject to rigorous monitoring and a pan-European certification scheme.

3.10 Efficient R&D for 2nd generation biofuels and hydrogen

The time horizon of this project is 2020. Within the remaining period it is very unlikely that either 2nd gen. biofuels or hydrogen enter the market in a significant quantity. Yet, it is very important that R&D is intensified focussing especially on more efficient conversion of feedstock and primary energy carriers into these alternative fuels. Further pilot projects needed to come down the learning curve! This should finally also lead to more cost-effective production paths and market competitiveness.

4 Conclusions

It is clear that there is no “one size fits all” measure. A quite broad portfolio of actions has to be implemented to finally meet environmental targets (and also to avoid to bet on the wrong horse!). A major recommendation will be to focus on fine-tuning, adaptation and exchange of lessons learned – between countries and regions. So, the major conclusions of this project are:

- With respect to alternative fuels biofuels have the potential to gain significant market shares of about 20% up to 2020. However, due to the moderate ecological performance CO₂-reduction will only be small;
- With respect to AAMT the potentials for market penetration and CO₂-reduction up to 2020 are very limited for all three major technologies (BEV, fuel cell cars and flex-fuel vehicles) are very limited. In an optimistic scenario the number of BEV will grow to a stock of 500.000 cars in 2020.

- Case studies for AF and AAMT are successful in the sense that they achieve local CO₂-reduction and get a high acceptance but from a global point of view they are of minor relevance;
- Fiscal policies and technical standards are rather promising and cheap policy tools for short-term CO₂-reduction;
- However, in the future a very broad portfolio of policy instruments (taxes, standards, quotas, emissions free-zones...) will be necessary to reduce energy consumption and straightforward CO₂ emissions significantly.

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