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**Fuel economy labelling of cars and its impacts on buying behaviour,
fuel efficiency and CO₂ reduction**

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"Things should be made as simple as possible, but not any simpler." Albert Einstein

1 SYNOPSIS

The paper describes the results of a study on fuel economy labels for passenger cars: Requirements, options, detailed analysis, findings, recommendations for and impacts of a fuel economy label. This project serves as an example to show how SAVE-projects can support EC-policies.

2 ABSTRACT

This paper deals with the introduction of a fuel economy labelling scheme for new passenger cars. Its main objectives are

- o to investigate energy savings which can be realised through behavioural changes in car buyers' choice as a result of the label,
- o to analyse the impact of the label on reductions in fuel consumption and CO₂ emissions of the car fleet and
- o to determine the labelling system best suited to influence consumers to purchase more efficient cars.

Moreover such a label is a tool to influence car manufacturers to put more emphasis on fuel efficiency. Different labels have been designed and tested among representative samples of consumers. A label showing a comparison of a specific car's fuel consumption to the average fuel consumption of cars of the same size was clearly preferred to a comparison among the whole fleet of new cars.

The recommendations on the basis of these findings, among others, include accompanying measures to ensure and enhance the effect of the label as well as a suitable framework to fit the labelling strategy into the overall strategy to reduce CO₂ emissions of passenger cars. The possible label impact on fuel consumption and CO₂ emissions of cars is calculated.

Chapter 5 takes the SAVE-project on Car Labelling as an example of how SAVE can support EC-policies as well as national implementation. SAVE projects serve as information source, as communicator and as dissemination tool for energy efficiency measures.

3 RESULTS OF THE PROJECT

3.1 Introduction

Why would we need a fuel economy label for passenger cars? A label won't cause less motorization or cars on our roads. But next to avoiding unnecessary traffic and next to shifting transport to sustainable modes, increasing energy efficiency of the remaining motorised vehicles is the third column of a strategy towards sustainable transport.

Why would we need a fuel economy label for passenger cars then? Cars have become 25% more efficient in the last twenty years. Despite of heavier and more powerful vehicles standardised fuel consumption, decreased by one quarter since 1975. The car industry was not only able to substantially cut down exhaust gases like CO or NO_x but also to reduce CO₂ emissions by 25%.

Theoretically. Because fuel consumption data under real life conditions shows the other side of the coin: Gains in motor efficiency are jeopardised by making cars more powerful, more comfortable, faster and heavier. Increasing energy efficiency is (over)compensated by equipping cars with more power. These features and a change in driving style give real life consumption data that are widely

differing from standardised consumption figures. E.g. in Germany - the biggest European car market - the average fuel consumption of the whole car fleet is about 9 l/100 km and thus not different from 1960 values (Petersen et al 1998)!

This paper presents results of the study which has been carried out within the framework of the SAVE programme of DGXVII - Energy and supported by the Austrian Ministry of Science and Transport.

This project has been designed

- o to develop labels which will meet the criteria for being successful
- o to evaluate the impact of the label on consumers and manufacturers
- o to work out recommendations for a labelling strategy.

3.2 Options and Requirements for Labels

3.2.1 Aims of car labelling

An energy label is the necessary precursor for most other policies and provides useful information for consumers, but its maximum effect depends upon informed and supportive retail staff. The range of models stocked by retailers can only come from the models manufactured, but is strongly influenced by perceived consumer demand. The manufacturers respond both to legislative requirements and customer preferences. This circle of influences has yet to become properly established and powerful (ECU 1997).

The main **objectives** to be achieved by car labelling are:

- o to make consumers aware of fuel efficiency, influence their purchasing decision leading to a market transformation and encourage private motorists and business drivers to purchase an energy efficient car. By using the information on the label, consumers are supposed to make more fuel efficient and environmental friendly purchase decisions. An efficient car produces less CO₂ saves money in use as life cycle costs for fuel and maintenance are lower.
- o to increase fuel efficiency and cut the average CO₂ emissions of new registered passenger cars
- o to get more efficient vehicles on the market through a combination of efficiency standards, labels, tax increases and development of new technologies
- o to influence car manufacturers to improve the energy efficiency of newly produced passenger cars
- o to increase awareness of fuel consumption and/or CO₂ emissions and influence buying and driving behaviour.

3.2.2 Requirements of car labels

A label for new passenger cars, aimed to inform consumers about the fuel economy of different passenger cars, should be:

- o **simple** and easily understood by purchasers
- o **insensitive** for manipulation: it should not be possible to change the classification of a model by simple manipulation by the manufacturer.
- o **durable** in order to make sure, that current as well as future cars are classified correctly
- o workable: standardised fuel consumption data have to be based on available vehicle characteristics such as mass, external dimensions, specific engine power or specific carrying capacity.
- o **conspicuous** and **well known** in order to achieve purchaser's attention
- o **adjustable** to technological developments in fuel economy.
- o **accepted** and **supported** by consumers, authorities, automobile and consumer associations and if feasible, by the car industry and car dealers,.
- o based on fuel consumption figures measured according to Directive 93/116/EC

3.2.3 Systems of car labelling

Among existing or planned car labels concerning fuel economy we found two main types:

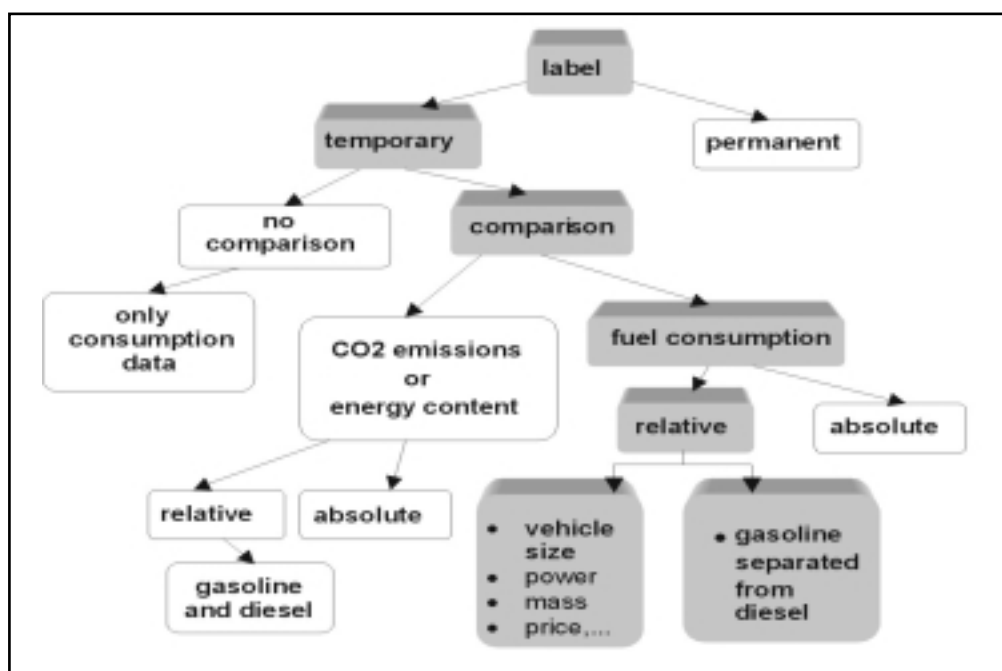
- o A "permanent" label for the most economic newly registered cars. This label is put on the car after purchase. Only a minor percentage of new cars are labelled.
- o A label for all new car models at the point of sale that is removed after the purchase. Regarding

this temporary fuel economy labelling, there are two principle possibilities:

- o Labels containing absolute consumption figures without comparison: Only labelling the bare fuel consumption figures without any comparison on the label is a simple solution, most likely to be accepted by car manufacturers but it hardly provides any additional information to potential car purchasers, because this information normally is already given in promotional brochures and manufacturer's booklets. Therefore it is not preferred by consumers.
- o Labels containing a comparison of the fuel consumption/CO₂ emission of a specific model type with other new passenger cars: This comparison on the label again gives two main possibilities: the comparison of a model to the average consumption of cars that are somehow equal (relative comparison) or to the average consumption of all new cars sold (absolute comparison, see Figure 1).

A combination of both would give the consumer the most precise information, but it would also be confusing to see the same model classified differently on one label. Therefore, there has to be a decision for one of the two possibilities.

Figure 1: Label types



3.2.4 Possibilities of comparison

Absolute versus relative comparison

Consumers mostly select a new car within a certain range, that is determined by size, price and needs. Thus, they are interested in the fuel economy of a certain car with respect to other cars, that are about equivalent in their eyes. This supports a relative comparison. From consumer tests and market research we know, that the method of relative comparison influences consumers buying behaviour most for most of the respondents switch to more efficient cars which are similar in size.

An absolute comparison would classify most of the large cars above average fuel consumption and most of the small cars under average, whereas a relative comparison does not have this effect. Small cars may be above average, large cars under average fuel consumption. However, consumer test and market research clearly show, that customers prefer a relative comparison. Also the impact on energy efficiency is higher than that of a label comparing a car to all other new cars.

Defining the standardisation parameter for relative comparison

To be able to compare fuel economy of different cars in the same 'market segment' one has to define a standardising criterion. This parameter has to serve the objectives of a labelling strategy (which

is increased fuel efficiency), but should also be linked to the consumer's value of a car. The following parameters have been considered as standardisation parameters for comparison:

- o purchase price
- o internal vehicle dimensions
- o vehicle mass
- o power (or other performance characteristics: capacity, speed, power to weight ratio)
- o vehicle size (external vehicle dimensions: size, length, width)

The **price** of a new passenger car gives the purchaser an idea of the class the model belongs to. Usually, cars in a certain price segment are comparable. But the price both can vary from country to country and during the year, altered by importers. Thus, it is not a fix characteristic and rather not suitable to refer as a parameter. Likewise, **interior space** or **number of seats** can not fulfil the requirements. There is no proper method to measure interior space and the number of seats can be altered in many cars.

In terms of comparing the specific fuel economy of a car to others **vehicle mass** or the weight of a car is to be doubted too. Firstly, consumers do not appreciate weight as such. Secondly, reducing the mass of new passenger cars is an important method to improve fuel economy. Even paradoxical effects may occur when taking mass as a parameter for fuel economy comparison. A new passenger car can be equipped with a lot of accessories, thus weight is a category to be changed more easily than e.g. external dimensions. A relative labelling system based on weight will not encourage manufacturers to build less heavy cars.

Alike reducing the vehicle mass, the external dimensions or the **power** of a model could be reduced. But unlike a lighter vehicle that is otherwise similar, a car with smaller dimensions or a lower power has a lower value for the consumer. However, defining this value on base of power or top speed leads to effects not suitable for a strategy to reduce CO₂ emissions. More power does not increase the carrying capacity, but increases fuel consumption substantially.

External length or **vehicle size** (length x width [m²]) of a car are two more possibilities to serve as a standardisation parameter. Although consumer's are not too familiar to this category they already buy cars in a certain class of size. Advantages of vehicle size:

- o indisputable and easily available for all car models,
- o easy to understand for consumers
- o different versions of one car model are grouped together and allow to figure out the most efficient version

Vehicle size gives fairly good results in terms of fuel economy labelling for all kinds of passenger cars. In comparison label systems based on price, weight or power classify costly, heavy or powerful cars, which are usually inefficient, as economical, whereas more economical and relatively inexpensive, light or not powerful cars are classified less economical. The study clearly recommends vehicle size as parameter for fuel economy comparison.

Table 1: Evaluation of parameters to standardise fuel economy

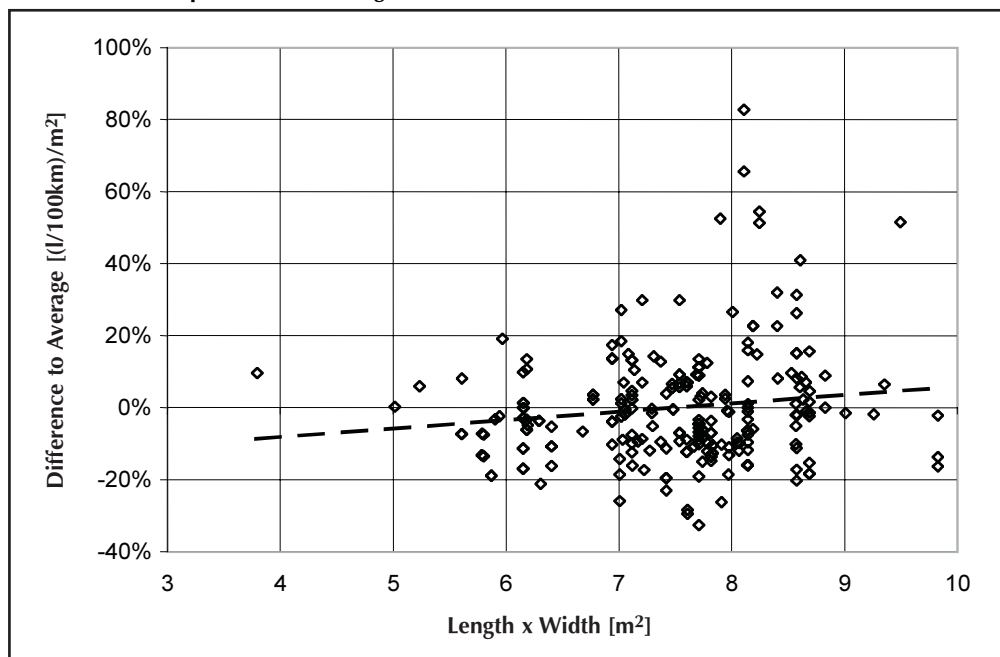
	simple easy to understand	available for all new passenger cars	suitable for CO ₂ /fuel consumption target of EC	insensitive for manipulation
price	+	+/-	-	-
weight	+	+	-	+/-
engine power	+	+	-	+/-
engine capacity	+	+	+/-	+/-
vehicle size	+	+	+	+
internal dimensions	-	-	-	-
number of seats	+	+	-	-

Methods of comparing cars referring to fuel economy

To avoid problems in defining 'classes' of passenger cars for relative comparison, which change and are different by the industry and the consumer, new methods were developed:

1. The fuel consumption reference standard of each car is equal to the average fuel consumption of all new passenger cars with the same vehicle size (length by width) as the considered vehicle. The relative fuel economy is calculated with **regression lines** reflecting the average fuel consumption as a function of vehicle size (in length by width). These regression lines could be determined for each member state or the EU, taking account of the number of sold vehicles per model. As fuel consumption changes over the years, the regression lines could be updated annually or kept stable for some years. If a car is 10% below the regression line, it has a relative fuel economy of plus 10% compared to the average of vehicles with the same size.
2. Instead of the regression line the **average relative fuel consumption value [(l/100km) per m² base]** can be used as parameter for the comparison. The relative fuel economy is calculated from the ratio of the fuel consumption value per m² base for an actual car and the average of this value for all cars. If a car is 10% below the average, it has a relative fuel consumption of minus 10%. Cars with the same size are compared in the same way as when using the regression line. Since the average value is fixed as when using the absolute fuel consumption value, large cars have a penalty compared to smaller cars too, but still could have a better ranking on the energy label if they use better technology (see Figure 2). This may find a common agreement from all parties involved in the discussions on the political decision.

Figure 2: Differences in the specific fuel consumption values per m² base of new gasoline car models 1998 compared to the average value.



Separation of diesel and petrol cars

The Dutch label as planned to be introduced (Zuidgeest 1997) and also the planned EU directive on consumer information regarding fuel economy (COM 98 489 final) give separate averages for petrol and diesel. This allows different strategies for the two fuels, but it does not give the consumer a possibility of comparison. The decision between petrol and diesel is an important one in the purchasing decision. From an energy efficiency point of view, it does not make sense to separate the fuels, but to make diesel and petrol cars comparable would mean to use CO₂ emissions or energy content instead of fuel consumption in litres as a measure of comparison. Consumers are not very much used to g CO₂/km or Joule, but they know fuel consumption in l/100 km or miles/km per gallon/litre very well. To ensure and maximise the label impact towards more efficiency these well known and familiar measures should be used and diesel and petrol cars should be treated separately. If diesel and petrol cars were to be given a common labelling system, the issue of the differing other environ-

mental impacts of the two fuels would have to be resolved also.

National versus EU-wide average

The specific car model can be compared to the cars sold in one member state or in the whole EU. The second solution has the advantage, that the same car model will not be classified differently in different member states and that the consumer can compare EU wide. On the other hand, consumers think in national horizons and sales figures are weighted when calculating the average, and these sales figures vary from country to country.

Following this arguments and the proposed EU directive (availability of consumer information on fuel economy), giving the member states the possibility to design their individual label, the national average would be preferable. This is not a strong recommendation and a EU-wide average would be preferable in the end. But the directive and feasibility aspects will lead to national averages in first place.

3.3 Detailed Analysis Of Labelling

3.3.1 Label development: Layout and contents

Already in the proposal of this study it was decided to develop labels following the EU energy labels for households appliances. Energy labels for household appliances and fuel economy labels for passenger cars will strengthen each other and increase the factor of being well known. A car label-design derived from energy labels will enable customers to experience a "recognition effect". If the consumer is aware of the appliances labels he probably will recognise the car label as energy or environmental information. The other way round, car label marketing will enhance the comprehension of the appliances labels (Kestner 1998).

Furthermore, all work done on communication, awareness, marketing and education of the public for the appliances labels can be used for car labels and secures a lead compared to newly designed labels.

The **layout** is both, simple and comprehensible, two of the most important factors due to the results of the market research done in our study. Consumers catch the core information, the fuel consumption of the car considered compared to others, at first glance. Due to the consumer test the use of colours is very important for the impact of the label.

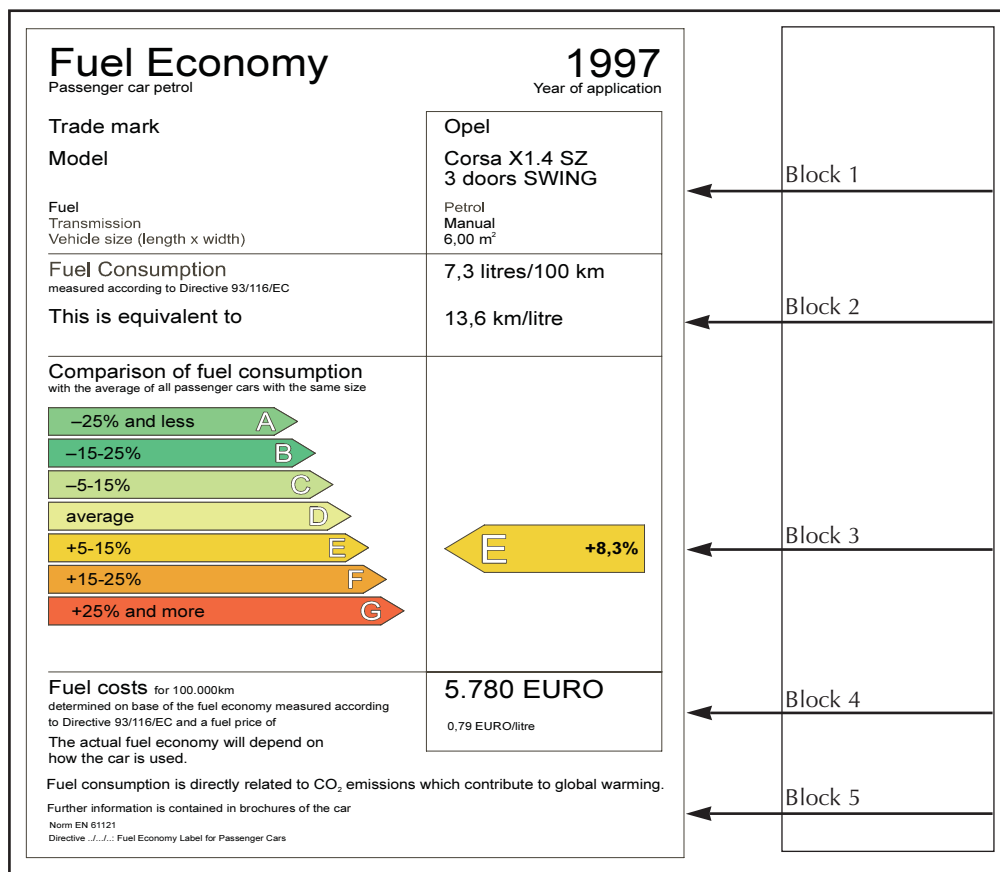
Consumer test and market research also show, that the label must not be too complex or complicated in contents and layout. The study recommends the same layout for all member states. Only an EU-wide standardised layout guarantees recognition and reinforces the effect of the label.

Regarding the **contents** of a fuel economy label, it is important not to "overload" the label with information. On the other hand some basic information has to be communicated to the consumer to guide him in the direction of buying a more efficient car. The label as proposed in the study tries to get out the best of this balancing act by offering a fuel economy comparison in form of coloured bars forming seven classes, well known from the appliances labels. From a wide variety of possible information on a car label only very little has been chosen to design different labels, especially to keep the label simple and understandable:

- o model characteristics (brand, type, fuel...)
- o fuel consumption: litres per 100 km, km per litre or miles per gallon
- o comparison of fuel consumption of the model to the average of sold cars in a certain year
- o fuel costs for 100.000 km
- o an advice that the actual fuel consumption will depend on how the car is used
- o a message on CO₂ and global warming

Fuel economy labelling of cars and its impacts on buying behaviour, fuel efficiency and CO₂ reduction

Figure 3: The proposed fuel economy label



Block 3 shows the comparison: Following the EU household appliances labels, it consists of seven coloured bars A to G representing efficiency classes, e.g. from 5-15% less fuel consumption (class C) as the average (class D). The limiting classes are A ('25% or more' less fuel consumption) and G ('25% or more' more fuel consumption as the average).

Block 1 deals with vehicle characteristics like make, model, version, types of fuel and transmission and vehicle size.

Block 2 gives the fuel consumption in absolute figures. The mixed cycle due to Directive 98/116/EC is given in l/100 km as well as in km/l. This could also be miles per gallon and depends on the usual way to state fuel consumption in the different member states.

Block 4 shows fuel costs for 100.000 km based on assumptions (average fuel price, fuel consumption referring to mixed cycle from directive 96/116/EC). 100.000 km were chosen because it is easy to calculate with this amount and differences between models are more striking.

Block 5 contains a message on the direct relation between fuel consumption, CO₂ emissions and global warming and a note, that actual fuel economy will depend on how the car is used. This is mentioned in order to make clear, that the values given on the label can not be exactly "copied" by consumers, neither absolute consumption figures nor fuel costs for 100.000 km and to raise awareness concerning the greenhouse effect.

3.3.2 Consumer Test

Four different labels have been developed and evaluated in a consumer test:

- o **CO₂/Environmental label:** CO₂ emission of specific car compared to average of all new cars
- o **Absolute fuel consumption comparison label:** fuel consumption of specific car compared to the average of all new cars
- o **Relative fuel consumption comparison label :** fuel economy of each passenger car expressed in relation to other cars with the same vehicle size, measured in m². This label was clearly preferred by consumers.
- o **Fuel economy costs label:** fuel consumption values without comparison. Consumers rejected this label.

The four labels have been tested with two car models in a consumer test. In-depth interviews were carried out with car buyers. The aim was to evaluate the communicative effect of the different labels and to draw conclusions on label design and content. Due to the method of the consumer test, the four labels were different to each other only on one main characteristic. This gave better indication on how the consumer responds on the specific characteristic. The results of the consumer test show that:

- o the subject fuel economy is very well communicated by the label
- o comparing a specific model to other cars is essential
- o a comparison of the model to cars of the same size is preferred to a comparison of all cars
- o the use of colour is important: a model in an "orange" or "red" class such as F or G is likely to be ruled out

3.3.3 Market research

Results from the market research on the impacts of a car label

From February to August 1998 a representative market research on the acceptance of a fuel economy label for new passenger cars was done in Austria and France, consisting of the following parts:

- o Focus group **discussions**
- o Car drivers **questionnaire**
- o Face-to face omnibus **survey**
- o **Interviews** with French car manufacturers (by French partner)

Fuel economy as a criterion when buying a new passenger car is quite important. Among seven criteria it is ranked third. (But also "cost", ranked second behind safety, included fuel economy in the questionnaire). People see fuel economy as important but only in connection with financial savings. The seven criteria given were (ranked from most to least important): safety, cost, reliability, fuel consumption, size, image, ecology. Safety is ranked first, not least because of intensive promotional activities by the car industry. The least important is ecology/environmental friendliness.

Car labelling influences the buying decision differently: About 65% **of all respondents** tend to buy a car with less fuel consumption, if their first choice model is classified inefficient (i.e. "E" to "G"). At least 10% want to shift to a smaller market class. About 25% want to switch to a more economic version within the same model family whereas about 30% would make a change to a more economic car within the same market category/class.

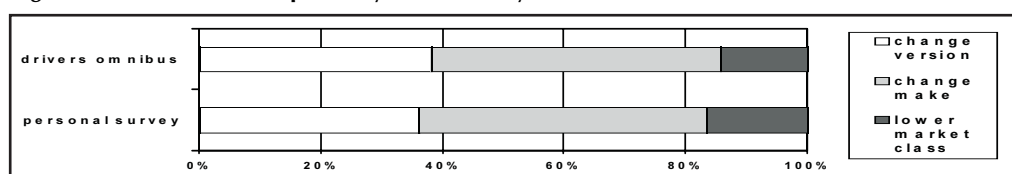
Table 2: Label influence on buying decision*

%	personal attitude	"What would an average buyer do?"
sticks to his decision anyway	24	17
more efficient version within model range	24	23
more efficient car within market category	30	27
more efficient car in lower market category	9	13
switches to diesel engine	2	6
don't know / no answer	11	14

*if car of first choice is classified very inefficient

Figure 4 shows which options those respondents, who react positively on the label, would chose. The first group, those who want to switch to a more economic version within the same model family lies slightly below 40%, whereas the second group, changing make within the same market category counts about 45%. Those who want to shift to a lower market class represent the smallest group with a share of less than 20%.

Figure 4: Reaction of those positively influenced by the label



Comparing cars of the same size (m²) is not as accepted as a comparison of cars with the same, because consumers are more accustomed to power and price. But from chapter 4.4.2 we know, that the latter are not quite suited as parameters for a relative comparison. Only 19% would prefer the total market comparison (a certain model among all new cars).

82% of the respondents find independent information in form of a label useful for their buying decision. Most of them want to find this information in car club magazines, followed by dealers (label behind the windscreen).

Interviews with French car manufacturers

Manufacturers tend to oppose against the idea of a comparative label. But it is seen as certain that labelling new passenger cars will have a consequence on the choice of the consumer. As a manufacturer noticed, the consumer uses all the information available. During the interviews manufacturers did not quantitatively evaluate the impact of labelling but indicated what they think a label would bring:

- o The repositioning of manufacturers of less fuel consuming vehicles is uncertain. Several arguments are defined: The first is that the conception of a new model takes several years and costs about 1 billion Euro. Preoccupations of manufacturers in the development of vehicles are multiple (comfort of driving, security, design, motorization) and the consumption criteria is secondary: all the manufacturers are at the same level.

Still there are substantial differences in fuel consumption, even within different versions of one model.

- o Manufacturers will commercialise very energy efficient models but completely unmarketable. All interlocutors mentioned the example of the Volkswagen Lupo: the consumption is 3 litres/100 km but its price reaches 100.000 French francs. VW counts on thousands of sales only to have an environmental image. The other versions of the Lupo consume the same quantities of fuel than vehicles of the category.

This points in the right direction but draws the wrong conclusions: Currently the industry creates some very expensive "eco-cars" that will be niche products. But if all have to compete due to a fuel economy label imbedded in a overall strategy to reduce CO₂ emissions and energy consumption of cars, they will have to find cheaper ways, like simply reducing power or cylinder capacity to cut down fuel consumption substantially.

- o Avoiding the labelling: manufacturers will put the most effective models forward, especially because all the models are not exposed in the showrooms.

Manufacturers and dealers will not be able to "avoid" the label: One of the accompanying measures will be a poster in all showrooms, were all the models available at a dealer will have to be listed.

3.3.4 The dimensions of social change

The reduction of power or capacity is not only to be achieved by car producers. Here it comes to change lifestyles, here it comes to the dimensions of social change: Political will, fiscal incentives, propaganda work and awareness campaigns have to change consumer's behaviour and social attitude. This has to lead to a "pull" from the demand side -the consumers- so that manufacturers will have to produce more efficient cars. Cars with less acceleration and power or top-speed have to become "socially acceptable" again. Developments like the SmILE concept (Small Intelligent Light Efficient car) point into the right direction.

3.3.5 Impact analysis on fuel consumption of the car fleet

The total possible effect of the proposed fuel economy label on the specific fuel consumption of new registered cars is obtained by weighting the single effects with the share of consumers, willing to act in the way as stated in the market research (change to more efficient model or make or to a smaller car). On average 4-5 % lower specific fuel consumption could be obtained together moderate reductions of purchase costs and weight. The reaction of the car manufacturers to a fuel economy label could increase these benefits for the medium and long-term future. These figures show the upper level of possible impacts, reflecting the attitudes of the people. Taking into account, that people do not act really as the intend to do when asked, the realistic impact will come down to about 1 %.

3.4 Recommendations for a labelling strategy

Furthermore to the recommendations on label type, contents and layout described above, the study recommends items that have to be considered in a 'communication strategy' for the label, as well as accompanying measures and an overall strategy as a framework for the label to reduce CO₂ from passenger cars and raise energy efficiency.

3.4.1 Communication and Implementation strategy

To substantially reduce fuel consumption and CO₂ emissions of the whole car fleet the fuel consumption of "the average car" has to be reduced. A "few eco-minis" alone or an information strategy targeting a minority of environmentally sound car purchasers do not have this effect.

The importance of fuel economy for consumers

Both, our study and the planned EU directive propose four information carriers to communicate fuel economy to the consumer:

- o labels fixed to the windscreen of every new passenger car at dealer's showrooms
- o posters in showrooms, listing the fuel economy of all car models available at a dealer
- o folders (fuel economy guides), listing the fuel economy and CO₂ emissions of all new car models available on the market. They will be distributed by dealers, car clubs, official bodies etc.
- o fuel consumption data must be given in all kind of promotional literature for new car models.

Of all these information carriers labels have the largest impact on behavioural changes of consumers. The fuel economy information attracts much more attention than information about environmental classification.

A Swedish ranking (Konsument verket 1997) of fuel economy and environmental friendliness among factors influencing car buyers' behaviour very closely corresponds with the results from both the consumer test and market research from this study. Information on fuel economy is ranked third and information on environmental classification tenth among twelve factors. This results in the recommendation to base the marketing of consumer information regarding fuel economy on economical aspects including the argument that car drivers save money by purchasing fuel efficient cars, because they consume less fuel.

Target groups

The group of buyers susceptible for environmental information such as CO₂ emission values is much smaller than the group of "fuel savers". If the "environmental argumentation" should go first, much more of propaganda work and awareness raising will have to be done. Another main target group for fuel economy information are new-car buyers changing brand (approximately 1/3) and especially persons who have recently been exposed to altered life conditions. Altered conditions (children, change in job, new home, ...) cause them to buy a different type of car. That's when they are receptive for information on fuel consumption, such as a fuel economy label.

Training of sales staff

From market research, label evaluations and research done on household appliances labels (ECU 1997) we know that information on fuel consumption is greatly facilitated if (car) salesmen refer to and use it in the sale situation. Therefore training in the use of the label (respectively fuel economy guide and poster) for showroom or sales staff should be provided. Information on fuel economy can only fit into a salesman's strategy when he knows about the advantages of fuel efficient cars for the dealers, such as a new clientele attracted by efficient cars and innovative measures like a label.

Dialog with car manufacturers

This has to be communicated to the producers, too. Car labelling offers the opportunity to address a wide range of new purchasers and is an incentive to produce more efficient cars, to be ahead of the competitors by introducing new technologies cutting down fuel consumption of the whole brand fleet. Especially for companies already operating with the argument of energy efficiency, respectively fuel economy, the label and accompanying measures like fuel economy guide and posters, even the

obligation to give fuel consumption figures in promotional literature, offer a chance to be present on the market and to raise competitiveness. A dialogue is also necessary to convince the car industry of an information strategy on fuel consumption and to clear up genuine misunderstandings, as they occurred in the study when interviewing French producers. Labelling will support the car manufacturers to reach the goals of the voluntary agreement signed with the Commission to reduce the consumption of their fleets.

Car club magazines and car journals

In addition to the directive as proposed this study recommends to also use car club magazines and car journals in the information strategy, because more than 50% of consumers intending to buy a new passenger car consult these media to get information on fuel consumption.

Consumer organisations, environmental institutions and tourist clubs

The car industry tends to refuse a comparative label as described and has a strong lobby. Still a label comparing cars that are similar is preferred to a label comparing one car to all cars. 'Umbrella' organisations, such as consumer-, environmental institutions, tourist clubs and road safety boards have to be informed and included in an implementation strategy as supporters of the idea of a comparative car label as proposed.

National ministries and official bodies

The EU directive on fuel economy information gives a framework with some determined criteria on format, contents and design of fuel economy labels. Details, especially in design and further measures, are up to the member states. Therefore, official bodies have to be convinced on the advantages of a comparative label.

3.4.2 Accompanying measures

In the coming two years all member states will have to introduce a label: Our study aims to provide arguments to standardise label layout and contents. This standardisation does not have to take place in the very beginning of labelling cars in the EU, but could be useful after the member states have made experiences with their differing labels and evaluations of label impact.

Accompanying measures ensure and enhance the effect of the label and form a suitable framework to fit labelling into an overall strategy to reduce energy consumption and CO₂ emissions of passenger cars. Label, fuel economy guide, poster and fuel consumption figures in promotional literature together are one module in an information strategy to change purchase decision and driving behaviour. To improve the impact of these measures they should be accompanied by others such as:

- o Brochure on purchasing efficient cars and on how to drive energy efficient in an economic driving style, on factors increasing fuel consumption (low tyre pressure, air condition, etc.) and about operating costs for average use over a certain period of time. This is already planned in the directive proposal.
- o Use of the label as the basis for economic instruments (enhancement of fiscal incentives)
- o Promotion campaigns for fuel efficiency and monitoring of implementation and effectiveness by national authorities and the car industry

4 CONCLUSION OF THE STUDY

A fuel economy label is a relatively cheap measure to influence consumer behaviour on the one hand and to induce a market transformation by encouraging car manufacturers to produce vehicles that are more efficient on the other. And although a label alone will not be able to reduce CO₂ emissions from the whole fleet of cars to the target of 120 g/km, it is a very effective instrument when accompanied by other instruments and strategies as described in chapter 6. It is the ideal precursor for all these measures.

Only a package of measures can help to substantially reduce CO₂ emissions from passenger cars. While some of these actions are better implemented by the member states, actions to improve the fuel efficiency of motor vehicles should be decided at Community level to provide a large market

and strong incentives for the auto industry to introduce more fuel efficient and thus less CO₂ emitting vehicles.

At the same time, targeting ambitious fuel economy objectives should not counteract the reduction of noxious emissions or the increase in safety and reliability of passenger cars. The achievement of air quality targets in the short to medium term furthermore requires the rapid penetration of the vehicle stock with new and more efficient vehicles.

As today growing sales of passenger cars jeopardise the decreases in specific CO₂ emissions, reducing this specific emissions by all the above mentioned measures has to be accompanied by incentives to avoid or decrease traffic needs and to shift the modal split towards other modes than private motorised vehicles, such as park and ride, public transport, bike and ride and the use of the bicycle.

5 HOW DOES THE CAR LABEL PROJECT FIT TO SAVE

5.1 SAVE projects as supporter of EU strategy

The European Union has committed to reduce greenhouse gas emissions by 8% by the year 2008/2012 at 1990 level. Improving energy efficiency is one major way of achieving these targets, an approach requiring detailed programmes in all sectors, including industry, commerce, domestic energy consumption and transport. In 1995, transport had a share of about 33% of final energy consumption in the European Union. Between 1974 and 1995 transport energy demand grew steadily and faster than the overall economic activity.

This trend is also reflected in the increase of CO₂ emissions. Transport represents about 1/4 of total CO₂ emissions in the European Union. About 50% of the emissions of the transport sector - respectively 13% of total CO₂ emissions - are produced by passenger cars (COM 95 689). Transport related CO₂ emissions are forecasted to increase significantly under a "business-as-usual" scenario as transport demand is likely to continue its upward trend. Current growth trends of CO₂ emissions in the transport sector threaten to jeopardise the Community's CO₂ objectives.

Therefore the strategy of the European Commission to reduce CO₂ emissions and fuel consumption of passenger cars sets the target to decrease the CO₂ emission of a newly registered passenger cars to an average of 120 g per km by 2005/2010. This means an average fuel consumption of approximately 4,5 l diesel or 5 l petrol per 100 km and a 25% reduction compared to the actual state of CO₂ emissions of cars (1995 data). A consistent strategy is necessary to fulfil the aim. Parts of this strategy are measures to influence consumer behaviour, agreements with the car industry and higher taxes on fuels.

One of the measures to influence consumer behaviour is to supply new passenger cars with a fuel economy label indicating fuel consumption and energy efficiency, comparable to the EU energy label for household appliances. In autumn 1999, the European parliament is

This strategy has been mainly supported by the SAVE project and can be further supported by SAVE actions.

5.2 SAVE projects as provider of information based on analysis

The SAVE project on Car Labelling has filled the gap of lacking information on the design of a Car Label, the advantages and disadvantages of different possibilities of Car Labelling, the possible impact on consumers decisions as well as label initiatives in different countries. Thus, the project has been valuable for the formulation of the directive as well as for the coming national implementation. It also gives basic information for the revision process that is planned for 2003.

5.3 SAVE projects as communicator and dissemination tool

In line with the project, input of the project team has been given to label expert meetings and the results have been presented to stakeholders in the process of label implementation. Thus, the process has been supported by bringing analysis-based and well structured information to the discussion.

Secondly, the dissemination to the national level turns out to be very important for the process of national implementation. The results of the study have been disseminated through national experts and media. There is still a lot to be done. This would give room to a new SAVE project which provides networks to exchange information on the implementation process as well as on studies done in this field in the different countries.

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All information on the project on <http://www.eva.wsr.ac.at/projekte/carlab.htm>